MOTT MACDONALD

Electric Vehicle Strategy and Expansion Plan

Orkney, Shetland and Western Isles Councils

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Orkney, Shetland and Western Isles Councils

September 2023

Issue and Revision Record

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Executive summary

Summary

This Strategy and Expansion Plan sets out how the local authorities of the Northern and Western Isles (Orkney Island Council, Shetland Islands Council and Comhairle nan Eilean Siar (Western Isles Council) can invest in electric vehicle charging infrastructure (EVCI) to meet projected demand over the next three-to-four years.

The proposed EVCI programme will increase publicly available council provided chargers from 87 devices to 166 devices. It has been forecasted that 197 publicly available chargers will be required by 2025/26, with independent asset owners providing the remaining devices without public sector aid. This programme will allow the three island authorities to meet strategic objectives, provide a substantial network that is fit for purpose, and collaborate with other parties to support EV growth in the Northern and Western isles.

The term council provision is used to identify EVCI estimated to be required on top of independently provided chargers, to meet the strategic aims of this business case. The application for funding covered by this business case therefore includes funding to support the council provision outlined in Table 0.1 below.

Table 0.1: Summary of existing and planned EVCI to be provided through the EVIF

	AC (7kW)	AC (22kW)	DC (50kW)	Subtotal council provision	Total council provision (Existing & Planned)
Orkney Existing	8	11	11	30	65
Orkney Planned	15	11	9	35	
Shetland Existing	6	14	6	26	50
Shetland Planned	12	0	12	24	
Western isles Existing	4	14	13	31	51
Western isles Planned	6	0	14	20	

Source: Urban Foresight Evaluation Framework

The estimated capital investment required to achieve the above EVCI network is summarised in Table 0.2.

Table 0.2: Capital Cost Breakdown

Cost Item	Value £, 2023 prices
Existing Asset replace and update	£2,400,000
Capital Enabling Costs	£400,000
Capital EVI + Installation Costs	£2,700,000
Standard DNO Costs	£400,000
Total Capital Cost requirement	**£5,900,000**

Strategic Case

The Strategic case for investment is outlined in Section 6 of this report. The EVCI programme aligns with and helps to deliver the wider Draft Vision for Scotland's Public Electric Vehicle

Charging Network 'A Network fit for the Future' (Transport Scotland, 2022), and its four key principles underpinned by the need for a 'just transition':

- a people-focused network
- accelerating commercial investment
- coordinating with the electricity network; and
- integration with Scotland's sustainable transport system

The Scottish Government has mandated Scottish Futures Trust (SFT) to undertake programme management of the Electric Vehicle Infrastructure Fund (EVIF), including providing the framework for local authorities to bid to the fund, and making recommendations to the Scottish Government on funding awards. SFT has developed the business case template that this document follows and stipulated key metrics to be provided in the rest of this Executive Summary.

The proposed programme of EVCI in this business case meets SFT's strategic aims as outlined in Table 0.3.

Table 0.3: Alignment with SFT's Strategic Aims

SFT's Strategic Aims	How the Approach of the EVCI Programme in this Business Case Meets Those Aims
A comprehensive network of public charge points	From 2025, the successful delivery of EVCI programmed in this business case will result in there being a comprehensive charging network across the three island authorities. The preferred approach to types of planned charging infrastructure varies by council area. Due to the sparse population and large distances involved, a charging hub approach has been adopted in main settlements in Shetland and the Western Isles. In Orkney additional EVCI is focussed on every day destinations to enable charging as part of every day trips. The Rural Proofing analysis indicates that the majority of the islands will be within a 30-minute drive of a charger.
Access, fairness and need	The vision of this programme is to provide a usable network, accessible for all and through the 'Place Principle' and 'Community Wealth Building' approach should ensure that island communities are not left behind. The SIMD analysis indicates that the proposed charger network is evenly spread across areas of varying social demographics.
Leveraging private investment and approach to enabling this investment	It is acknowledged that initial findings indicate that this investment will not be as attractive to the private sector as more urban locations in Scotland. The proposed approach includes further consideration of commercial delivery options to maximise input from the private sector, including alternative delivery partners.
Enabling wider sustainable transport outcomes	This EVCI programme aims to reduce private car use and integrate with the sustainable and active travel offering. The Scottish Government has published a target to reduce vehicle km by 20% by 2030. The analysis illustrates that the proposed EVCI is integrated with the public transport network.

Economic Case

The forecast charging infrastructure requirement for each of the three island authorities for 2025/26 and 2030/31 is outlined below. This forecast includes EVCI anticipated to be provided by both independent providers and the island authorities through EVIF.

Table 0.4: Forecast EV Charging Infrastructure Requirement for the Orkney Islands

Orkney Islands	2025/26	2030/31
Total Fast (7 to 22kW) Chargers	55	123
Total Rapid (50kW+) Chargers	20	35

Orkney Islands	2025/26	2030/31
Total Charging Devices	**75**	**158**

Source: Urban Foresight Evaluation Framework

Table 0.5: Forecast EV Charging Infrastructure Requirement for the Shetland Islands

Shetland Islands	2025/26	2030/31
Total Fast (7 to 22kW) Chargers	39	87
Total Rapid (50kW+) Chargers	13	23
Total Charging Devices	**51**	**110**

Source: Urban Foresight Evaluation Framework

Table 0.6: Forecast EV Charging Infrastructure Requirement for the Western Isles

Western Isles	2025/26	2030/31
Total Fast (7 to 22kW) Chargers	45	82
Total Rapid (50kW+) Chargers	26	39
Total Charging Devices	**71**	**121**

Source: Urban Foresight Evaluation Framework

It is anticipated that a proportion of the forecast identified above will be met by independent providers, without any intervention from the public sector. Taking this into account, the EVCI proposed to be delivered through EVIF is outlined in Table 0.7.

Table 0.7: Summary of existing and planned EVCI to be delivered through EVIF

	AC (7kW)	AC (22kW)	DC (50kW)	Subtotal council provision	Total council provision (Existing & Planned)
Orkney Existing	8	11	11	30	65
Orkney Planned	15	11	9	35	
Shetland Existing	6	14	6	26	50
Shetland Planned	12	0	12	24	
Western isles Existing	4	14	13	31	51
Western isles Planned	6	0	14	20	

Source: Urban Foresight Evaluation Framework

Table 0.8 shows the number of chargers provided per 100,000 capita. In the specific case of the Northern and Western Isles where the population is less than 100,000 people, this metric has less meaning but has been provide to enable comparison with other authorities in Scotland.

Table 0.8: Council provided chargers per 100,000 capita

2025/26	2022/23	2025/26
Orkney	**133**	**288**
Shetland	**113**	**218**

2025/26	2022/23	2025/26
Western Isles	**73**	**119**
Combined	**99**	**188**

Source: Urban Foresight and HITRANS

Table 0.9 shows the resulting ratio of EVs per charger for 2022/23 and the forecast in 2025/26.

Table 0.9: Ratio of EVs to Charger

2025/26	2022/23	2025/26
Orkney	**35**	**59**
Shetland	**26**	**49**
Western Isles	**39**	**73**
Combined	**34**	**60**

Source: Urban Foresight and HITRANS

In the table above, the number of PiVs per council charger increases in 2025/26 from the baseline despite the introduction of additional council chargers. However, we note that the proportion of rapid chargers is high and additional chargers are also anticipated to be installed by independent providers.

Commercial Case

The commercial case provides an assessment of potential commercial models the three island authorities could pursue for the existing assets and expansion of EVCI network. The analysis involved stakeholder engagement and a literature review of best practices of EVCI rollout in island settings.

The commercial options identified for assessment are:

- Own and operate model
- Concession model (potential across multiple authorities to generate scale in procurement) and
- Alternate investment partner model.

All models are assessed in terms of affordability, resourcing, contestability, value for money, transition and social outcomes.

At this Strategy and Expansion Plan stage, it is not possible to draw conclusions on a preferred model. An informed decision on the preferred commercial model will be based on further market engagement with CPOs and island fleet operators (e.g. NHS, fire and police service), further assessment of non-conventional models as alternate investment partner model, and internal council discussions and assessment. These discussions and assessments will take time, and given the outcome of financial assessments in Section 8, it may be identified that the best scenario for the islands would be to pursue an investor and alternate commercial model in the future, when the commercial viability of investment increases.

Financial Case

The SFT Feasibility model appraises a concession delivery model. The results are illustrated below.

Table 0.10: SFT Feasibility Model Results

Funding Source	Value £, 2023 prices
Indicative Private investment	£100,000
'Minimum' Transport Scotland Grant	£900,000
Remaining capital amount	£4,900,000
Total Funding/Capital Cost requirement	**£5,900,000**

Source: Mott MacDonald

The results indicate that there is almost no contribution from an investing CPO, as the margins are too small for them to make any significant return on their investment. It is therefore likely that for this commercial model to progress, significant subsidy including operational subsidy may be required.

Management Case and next steps

The next steps for the EVCI programme are identified as follows:

Table 0.11: Next Steps for EVCI Programme

Month/Year	Key tasks
September 2023	Submission of draft Strategy and Expansion Plan document to SFT for comment
Q4 2023	Further discussions and engagement on commercial delivery model Further engagement with SSEN to confirm any grid capacity constraints
Q4 2023	Incorporate comments from SFT on Strategy and Expansion Plan
Q1 2024	Confirm preferred commercial delivery model and procurement approach
Q1 2024	Re-confirm collaborative working arrangements based on the preferred model and agree and establish Inter-Entity Agreement IEA(s) as required Finalisation of Strategy and Expansion Plan and internal approval process Submission of finalised Strategy and Expansion Plan to SFT Soft market testing
Q2 2024	Development of procurement/tender documentation Commencement of procurement process
Q3 2024	Partner in place Commencement of capital works for new EVCI
Q4 2024	Commencement of service delivery
2025	EVCI programme in place, with installation and service delivery of new EVCI ongoing

1 Introduction

1.1 Purpose of this Report

The Scottish Government has mandated the Scottish Futures Trust (SFT) to undertake programme management of the Electric Vehicle Infrastructure Fund (EVIF); supporting Councils across Scotland to draw in private investment and enable the rollout and expansion of Electric Vehicle Charging Infrastructure (EVCI) across their respective local authorities. SFT have provided the framework for local authorities to bid to the fund and are responsible for making recommendations to the Scottish Government.

The purpose of this report is to enable the Northern and Western Isles (Orkney Island Council, Shetland Islands Council and Comhairle nan Eilean Siar (Western Isles Council) to access the EVIF.

Separate applications were previously prepared on behalf of each island authority by Urban Foresight. However, the three island authorities have now collectively taken the decision to submit a joint application to access the EVIF. This report therefore combines the work previously undertaken and provides additional analysis to form a completed joint application which considers both the local context of each local authority and additionally provides a combined Electric Vehicle (EV) Strategy and Expansion Plan for the three island authorities.

1.2 Vehicle Types

The scope of this EVCI business case includes EVCI requirements for the following vehicle types:

- Cars
- Light Goods Vehicles (LGVs)
- Taxis
- Private Hire Vehicles (PHVs)

Charging facilities for other vehicles, for example, motorcycles, Heavy Goods Vehicles (HGVs), buses/coaches and Recycling Collection Vehicles (RCVs) are out of scope of the EVIF.

For the purposes of this report, the following definitions are used:

- **Battery Electric Vehicle (BEV)**: A vehicle powered by electricity, which is stored in a battery, and recharged by plugging into a source of electricity or supplemented by regenerative braking. The range depends on the size of the battery, which is measured in kWh, but most new BEVs have a range of at least 200 miles based on a 50kWh battery.
- **Plug-in Hybrid Electric Vehicle (PHEV)**: A vehicle that has both a ‘traditional’ Internal Combustion Engine (ICE) fuelled by petrol or diesel, which is supplemented with a battery-powered electric motor. These can travel on electric-only power for up to 40 miles, depending on the size of the battery. The battery is recharged by plugging into a source of electricity or by regenerative braking.

Other types of low emission vehicles such as hybrid Internal Combustion Engines (ICE) and Hydrogen Fuel Cell EV (FCEV) have been excluded from the analysis as they do not require charging infrastructure. The term plug in vehicle (PiV) is used throughout the report to refer to BEV and PHEV combined.

1.3 Charger Types

There are several charger types that provide power to PiVs, which are categorised based on the power output of the charger. These are summarised in Table 1.1.

Table 1.1: EV Charger Types

Charger Type	Output (kW)	Typical Time to Fully Recharge BEV	Examples of Location Suitability
Slow (AC)	Up to 7kW	6 to 12 hours	Residential on-street, workplace, private driveway, car parks, transport hubs.
Fast (AC)	7kW to 22kW	2 to 5 hours	Destinations including car parks, supermarkets, leisure centres, retail parks, transport hubs and workplaces.
Rapid (DC)	43kW to 100kW	20 to 60 minutes	Destinations such as supermarkets, retail parks and transport hubs, or en-route journey charging like motorway services and service stations
Ultra-rapid (DC)	100kW to 350kW	15 to 30 minutes	En-route journey charging such as motorway services and service stations.

Source: Mott MacDonald

The range of power outputs are dependent on the method of charging an EV. Alternating Current (AC) chargers use power supplied directly from the grid and typically output under 22kW. The amount of AC that an EV can accept is limited by the vehicle's onboard charger, which converts AC to Direct Current (DC) to store in the battery. Rapid chargers use DC to directly recharge the battery and so are quicker to charge the vehicle.

The higher the charger output, the greater capacity required in the local electricity grid. AC slow and fast chargers are typically the lowest installation cost by utilising existing power supplies, while DC rapid and ultra-rapid chargers typically cost more due to the electricity grid upgrades required.

AC chargers typically have a Type 2 socket. This type of charging typically requires the driver to use their own cable included with the car, and so the charger is 'untethered'. Tethered chargers are usually rapid or ultra-rapid, meaning the charger has cables built in. Power is delivered via CHAdeMO or Combined Charging Standard (CCS), depending on the vehicle type. In Europe, CCS is the preferred charging standard and CHAdeMO is gradually being phased out. Most EVCI offers a range of connector types and are interoperable with most EV models.

1.4 Report Structure

Following this introduction, the structure of the report is as follows:

- **Section 2 – Background:** provides an overview of the relevant socioeconomic data to determine the socioeconomic context for the three Island Authorities
- **Section 3 – Baseline Position:** outlines the existing number of EVs registered in the three Island Authorities, existing EVCI, and the current approach to delivery service
- **Section 4 – Stakeholder Engagement:** summarises the stakeholder engagement conducted and the subsequent findings and impact on the study
- **Section 5 – Strategic Case:** presents a vision for the development of EVCI within the context of local, regional and national policy
- **Section 6 – Economic Case:** describes the demand forecasting for EVs and EVCI, charge point mix and locations for each Council, an overview of the engagement with DNOs, cost estimates and identifies cost reduction options

- **Section 7 – Commercial Case:** provides an overview of the identification and assessment of commercial delivery models, engagement with charge point operators and opportunities to incorporate renewables
- **Section 8 – Financial Case:** summarises the potential funding streams to achieve the proposed EVCI network and sets out associated analysis of potential delivery options
- **Section 9 – Management Case:** explores options and provides recommendations for how the delivery of EVCI will be managed between HITRANS and the three island authorities.

1.5 Limitations

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2 Background

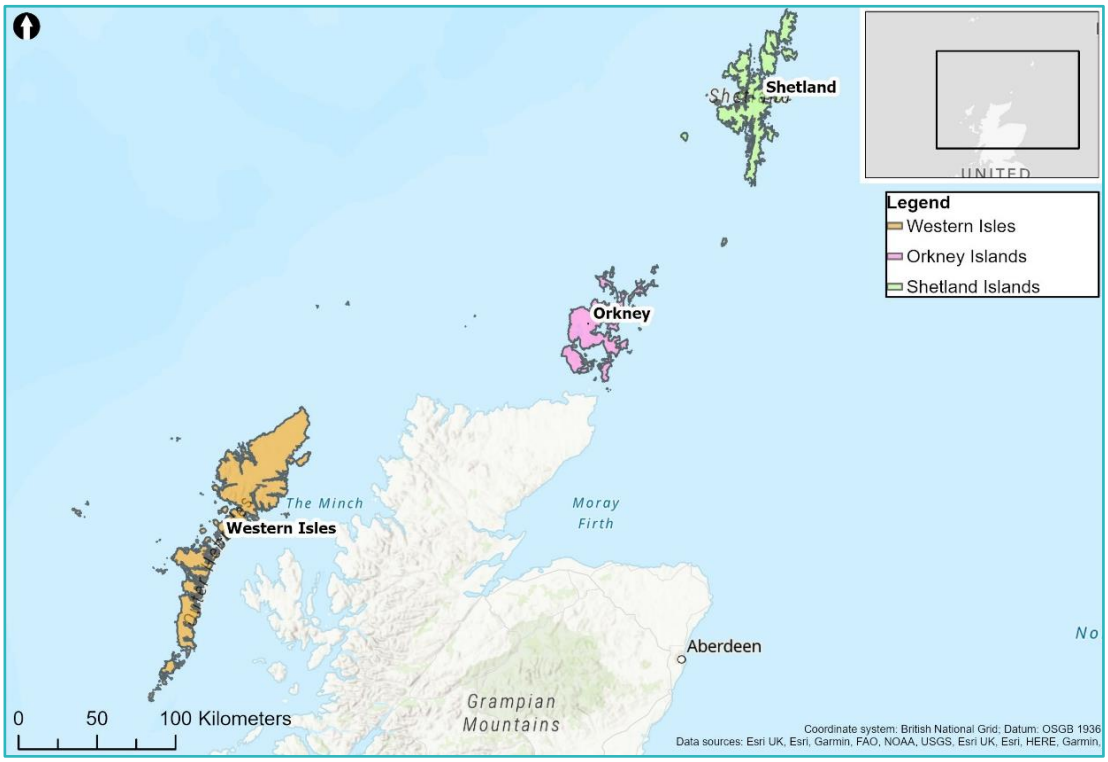
The Scottish and UK Governements' policy is that no new petrol and diesel cars and vans will be sold from 2030, with all new cars and vans required to be fully zero emission by 2035. The number of plug-in cars and LGVs licenced in Scotland increased from 500 in 2012 to almost 50,000 in 2022. It is therefore vital that Scotland expands its EVCI network to meet the growing demand for EVs.

This section outlines the relevant demographic data for the three island authorities. The data used in this section comprises population estimate, Scottish Indices of Multiple Deprivation (SIMD), dwelling statistics from National Record of Scotland (NRS), and employment charateristics. Undertanding socioeconomic context is a critical element of an EVCI strategy as population density, deprivation levels and employment all significantly influence EV ownership levels and, therefore, the demand for charging facilities across the region. In particular, this data will help identify areas of opportunity – as well as potential challenges – with respect to providing an equitable network.

2.1 Study Area

Figure 2.1 illustrates the study area; comprising each of the three island authorities. All maps are provided in A4 size in Appendix A.

Figure 2.1: Study Area



Source: Mott MacDonald

2.1.1 Population

Population characteristics can influence the uptake of EVs and therefore, the need for EVCI. The study area has a total population of 72,120[1], Table 2.1 provides an overview and breakdown by age for each of the three island authorities in comparison to Scotland as a whole.

Table 2.1: Population Estimate by Age, 2021

Age	Orkney	Shetland	Western Isles	Scotland
0-14	15%	17%	14%	16%
15-24	9%	10%	9%	11%
25-44	22%	23%	20%	26%
45-64	30%	28%	30%	27%
65+	25%	21%	27%	20%
16-64 (working age)	60%	61%	58%	64%
Total Population	**22,540**	**22,940**	**26,640**	**5,479,900**

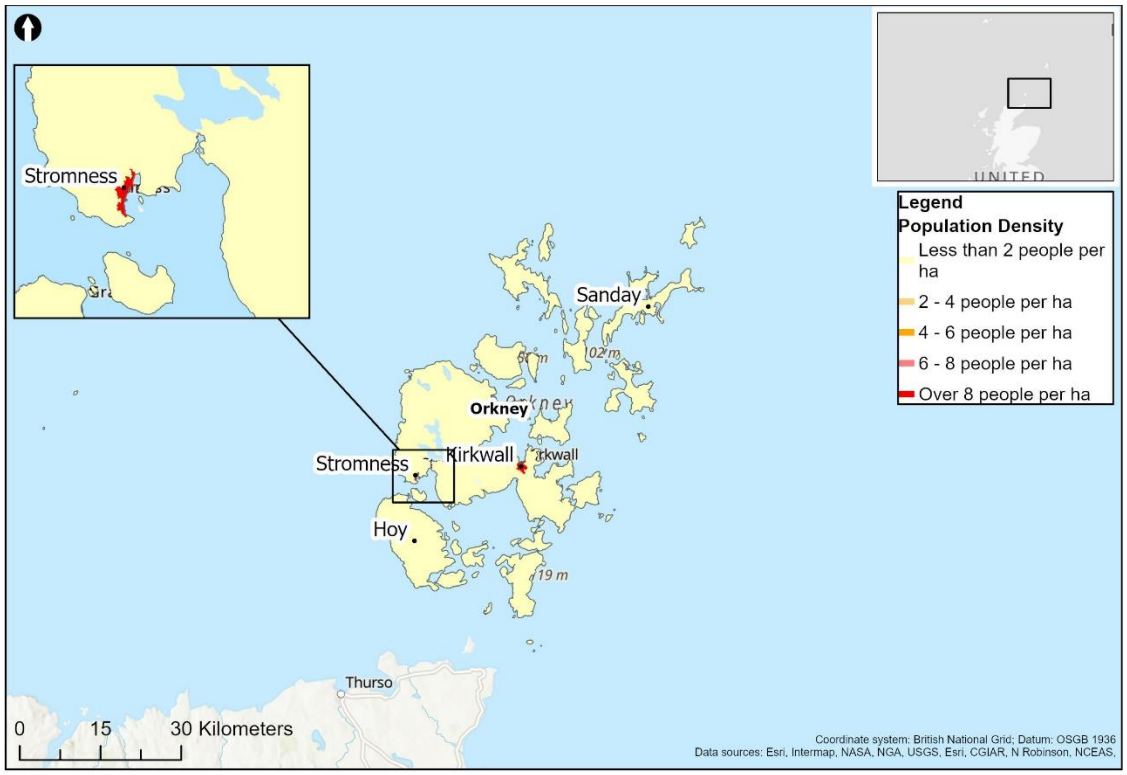
Source: Population Estimates 2021, ONS.

On average, Orkney, Shetland and the Western Isles have a slightly lower younger population (15-24-year-olds) and working population than the Scottish average. All three island authorities have a higher older aged population (65 +) than the Scottish average, although this is more pronounced in Orkeny and the Western Isles.

Figure 2.2, Figure 2.3, and Figure 2.4 illustrate the population density across each of the three island authorities in density per hectare (ha).

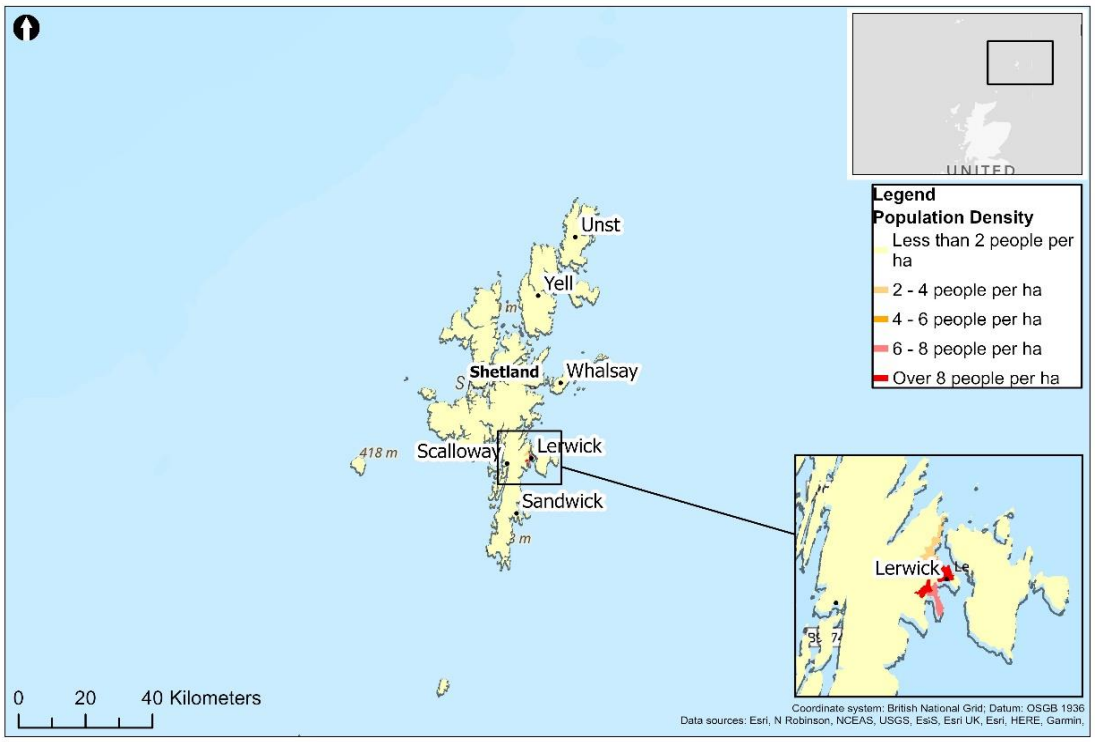
[1] Population Estimates 2021, NRS – Time Series Data | National Records of Scotland (nrscotland.gov.uk)

Figure 2.2: Population Density Orkney



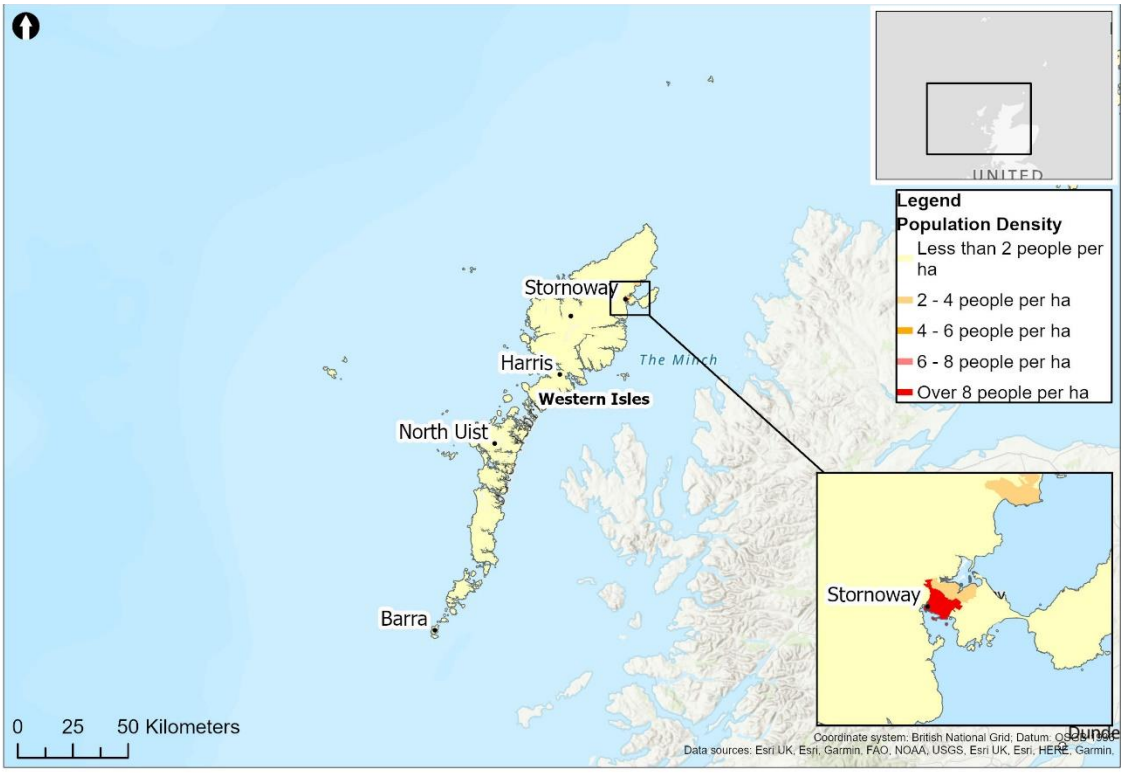
Source: Population Estimates 2021, ONS

Figure 2.3: Population Density Shetland



Source: Population Estimates 2021, ONS

Figure 2.4: Population Density Western Isles



Source: Population Estimates 2021, ONS

Much of the study area is sparsely populated and is predominantly rural. Outside of the major towns and settlements, the average population density for all three island authorities is less than two people per hectare.

Areas with low population densities mean that EV charging sites are likely to be less commercially viable due to fewer people requiring the use of them. However, the area will still require charging facilities for those with EVs and to encourage and facilitate the wider shift to EVs.

2.1.2 Scottish Indices of Multiple Deprivation (SIMD)

Equitable distribution is an important aspect of the Draft Transport Scotland vision for EVCI. This section provides an overview of the levels of deprivation and socioeconomic disadvantage across each of the three island authorities.

To aid understanding of deprivation and economic disadvantage, SIMD data has been mapped to provide a spatial understanding of the socioeconomic distribution in the study area.

Deciles are calculated by ranking the data zones from the most deprived to least deprived and dividing them into 10 equal groups. Zones in decile one fall within the 10% most deprived zones nationally, whilst zones in decile 10 fall within the 10% least deprived of data zones nationally.

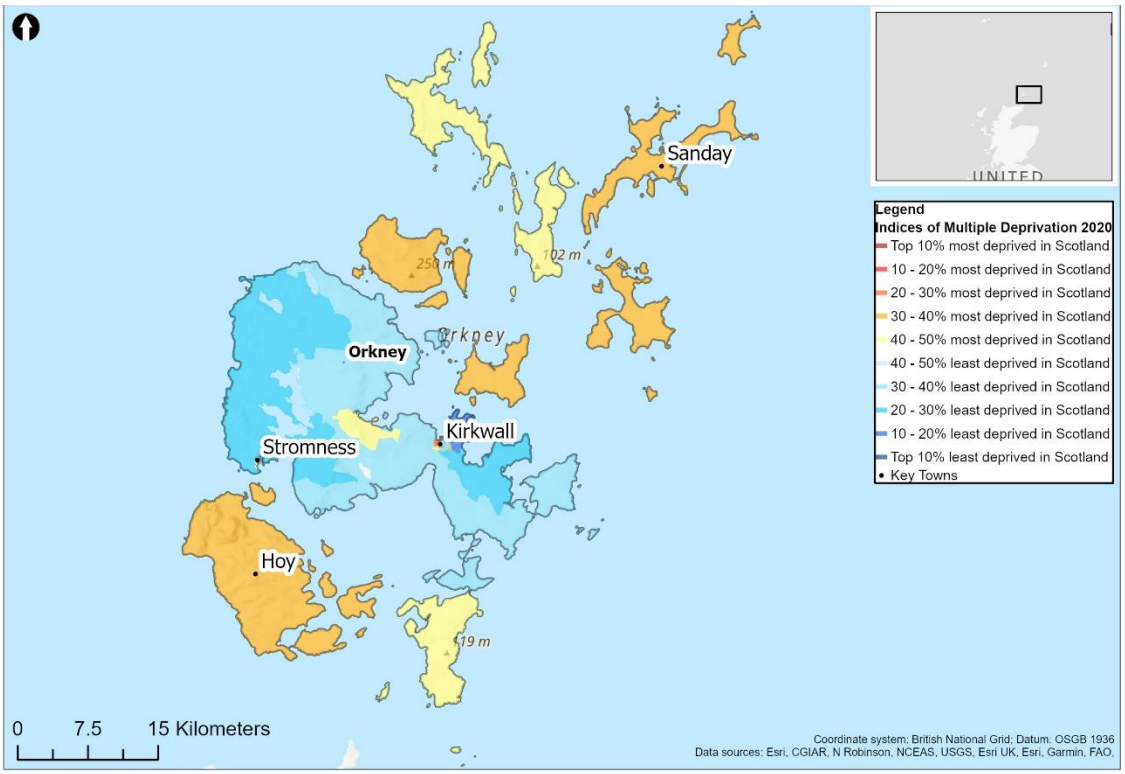
The SIMD is the official measure of deprivation and combines information from the following:

- Employment Deprivation
- Education, Skills and Training Deprivation
- Health Deprivation and Disability
- Crime
- Barrier to Housing and Services
- Living Environment Deprivation

Figure 2.5, Figure 2.6, and Figure 2.7 illustrate the SIMD deciles for the three island authorities in the form of a heatmap, whereby the red and orange hues signify areas that suffer from higher percentages of deprivation and blue hues signify areas with lower percentages.

Figure 2.5 shows that deprivation levels are relatively low across much of Orkney, with slightly higher levels in the rural parts of the northern and southern isles.

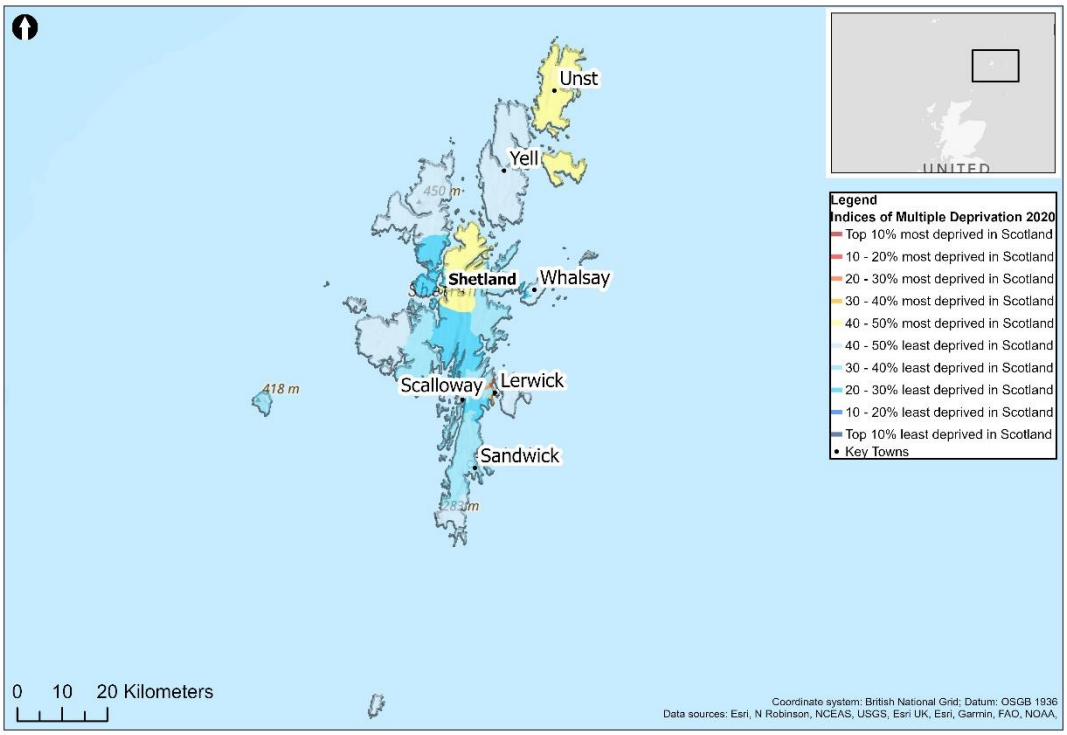
Figure 2.5: Scottish Indices of Multiple Deprivation (Orkney)



Source: SIMD

Figure 2.6, shows that deprivation levels are similarly low across Shetland with the majority of Shetland Islands registering within the 10-30% least deprived in Scotland.

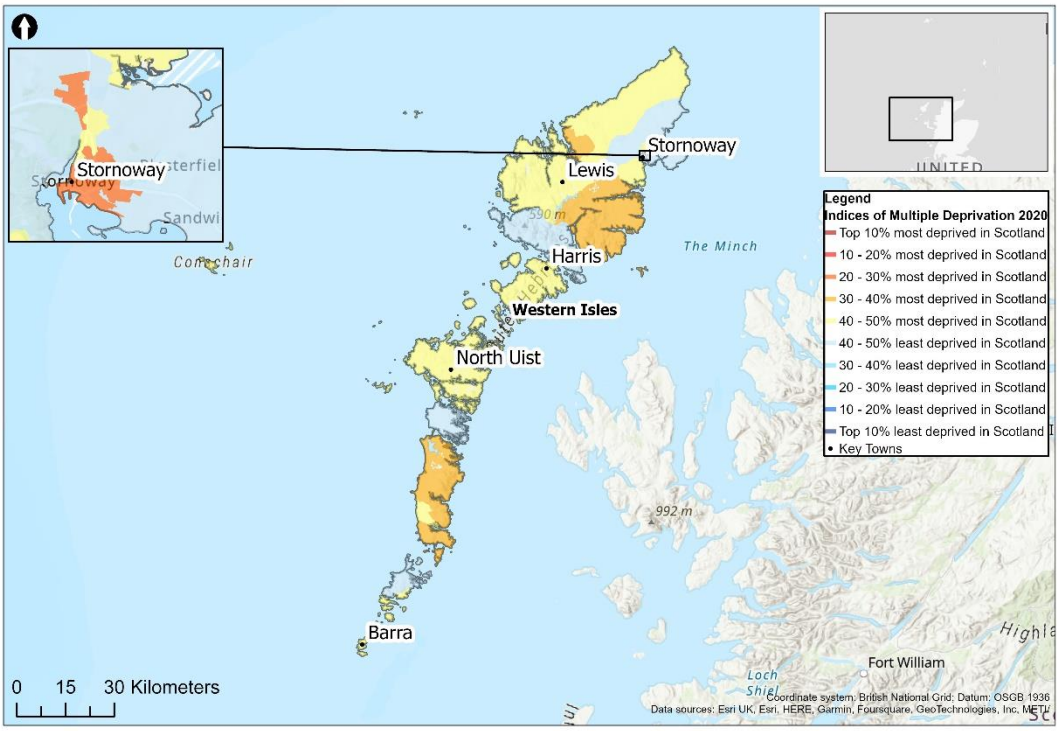
Figure 2.6: Scottish Indices of Multiple Deprivation (Shetland)



Source: SIMD

Figure 2.7, shows the deprivation levels across the Western Isles; relative to the other island chains (Orkney and Shetland), the data indicates that the Western Isles indicates slightly higher levels of deprivation. Stornoway, the capital town among the island chain, sits within the 30-40% most deprived in Scotland.

Figure 2.7: Scottish Indices of Multiple Deprivation (Western Isles)



Source: SIMD

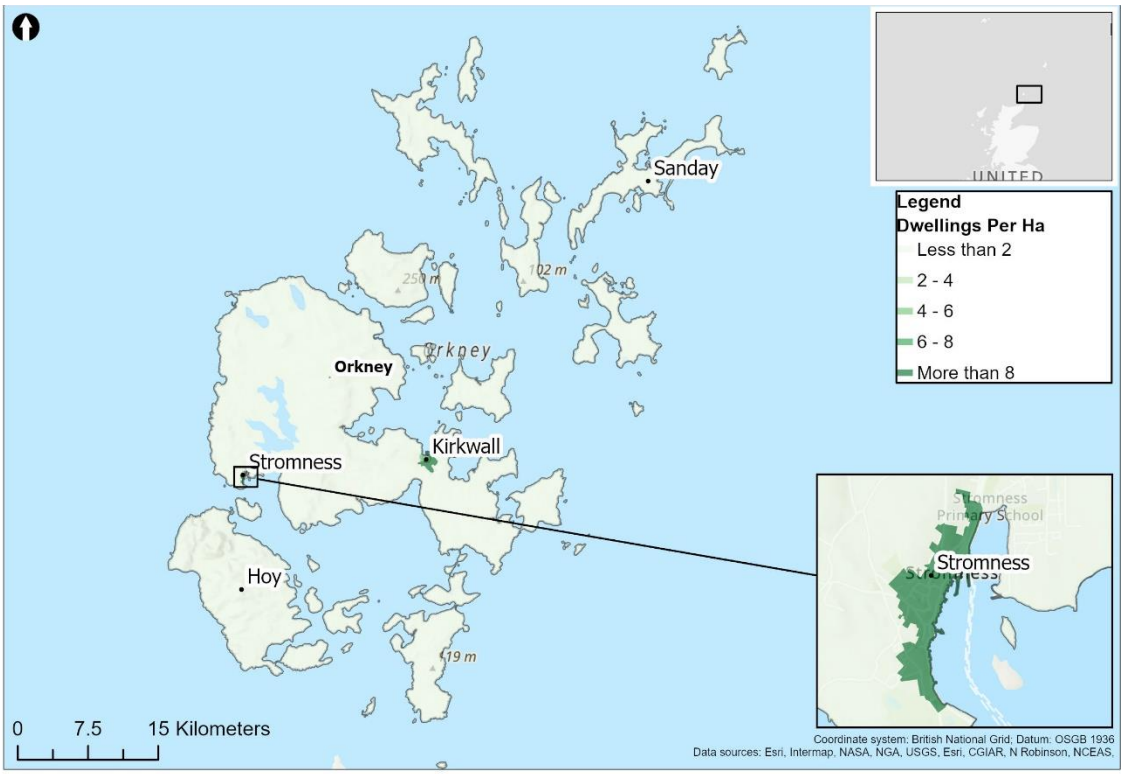
The purchase price of EVs is currently a significant barrier to uptake, meaning the socioeconomic context represents an important consideration for charging infrastructure. Demand for EVCI may therefore increase sooner in higher decile zones, and so be more attractive to private sector investment. In turn, this may mean that the lower decile areas may be less attractive to the private market. These are important considerations to ensure that the decarbonisation of transport is fair and just.

2.1.3 Dwellings

Figure 2.8, Figure 2.9, **and** Figure 2.10 show the number of dwellings per hectare across the Island authorities, with darker greens indicating a higher dwelling density. The areas with higher density are within each islands main towns including, Kirkwall, Lerwick and Stornoway. Outside of these areas the islands are rural and sparsely populated and therefore have low dwelling density.

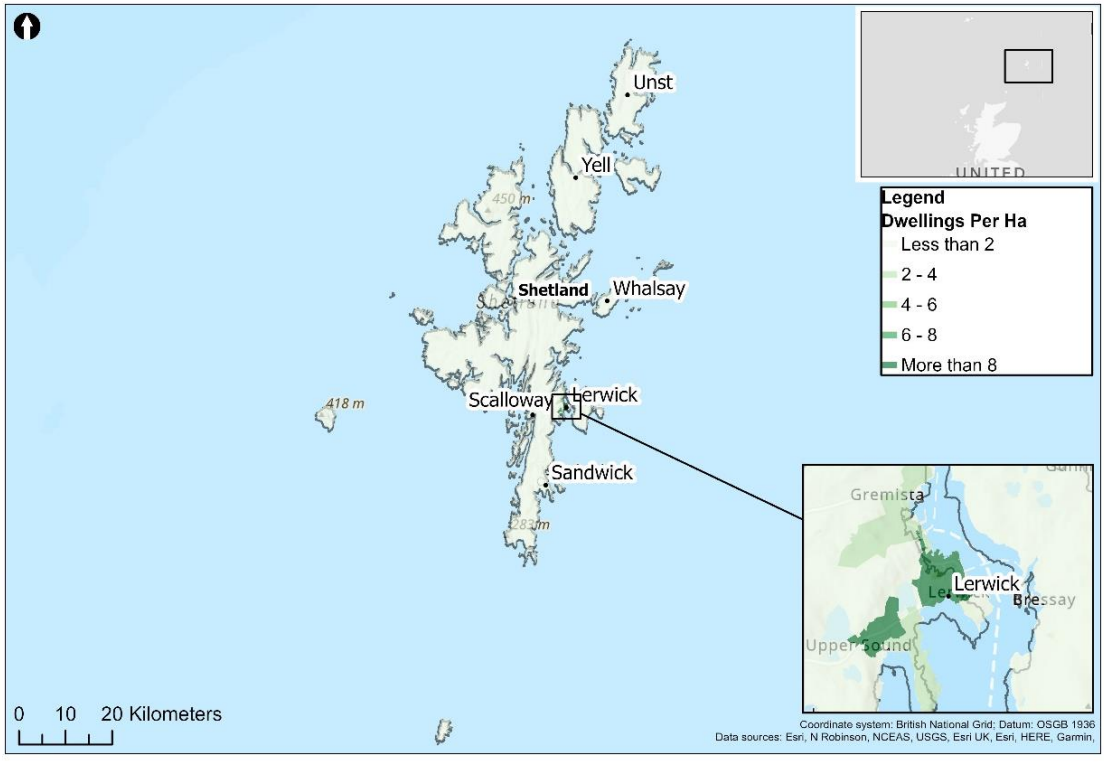
Commercial viability may be more challenging for publicly available EVCI where there is a lower density of dwellings. For those without access to home charging facilities, the availability of publicly accessibly EVCI is essential to avoid creating additional journeys for the purpose of charging an EV which are located a distance away; something which could be an issue across the three island authorities due to the geographical nature of the island chains meaning communities are dispersed.

Figure 2.8: Dwellings per hectare Orkney



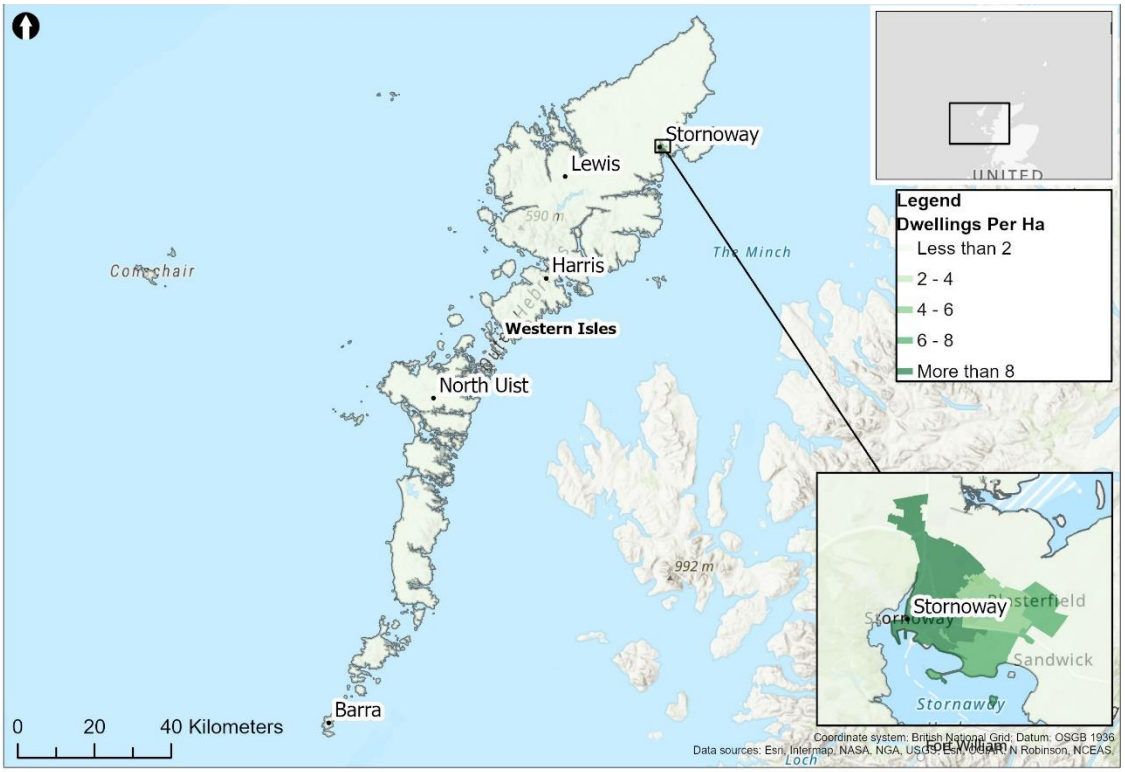
Source: National Records of Scotland (NRS), 2022

Figure 2.9: Dwellings per hectare Shetland



Source: National Records of Scotland (NRS), 2022

Figure 2.10: Dwellings per hectare Western Isles



Source: National Records of Scotland (NRS), 2022

Table 2.2 shows the number of dwellings in each of the islands.

Table 2.2: Number of Dwellings (2022)

	Number of dwellings
Western Isles	14,980
Orkney Islands	11,613
Shetland Islands	11,544

Source: National Records of Scotland (NRS), 2022

The Northern and Western Isles have a relatively high proportion of households with access to off-street parking[2] 66% (Shetland), 77% (Western Isles) and 81% (Orkney). This means there are more opportunities for residents to install home chargers.

2.1.4 Road Lengths

The EVCI requirement is based on travel patterns and vehicle km travelled across the Northern and Western Isles. The data illustrated in Table 2.3 shows the proportion of road types, with local roads being dominant; none of the islands have motorways or A Roads.

[2] Defined as having access to a garage or parking space on site from Scottish House Condition survey, 2019

Table 2.3: Road Lengths by Local Authority

Council	Local Authority A Roads	Local Authority B Roads	Local Authority C Roads	Local Authority Unclassified	Local Authority Total	Total all roads
Orkney	**161**	**205**	**160**	**459**	**985**	**985**
Shetland	**225**	**162**	**198**	**466**	**1,051**	**1,051**
Western Isles	**340**	**177**	**189**	**487**	**1,192**	**1,192**

Source: Transport Scotland, Scottish Transport Statistics, Chapter 4 Road Lengths, 2021[3]

Journeys across and within the Western Isles tend to be longer than those undertaken in Orkney and Shetland as they can cover the length of the island chain. This forms part of the justification for requiring rapid chargers for onward journeys.

2.1.5 Employment Characteristics and Centres

Table 2.4 shows the proportion of employees by industry (%) across the three island councils.

This analysis aids the understanding of employment trends and the industry types which underpin economic activity in the Northern and Western Isles region, including the likely vehicle types used or required for different industries (delivery vans, fleet vehicles), commuting patterns and types of employment land which can be used to identify locations for EVCI, as well as the need and potential for encouraging EV uptake, and reliable EVCI. The majority of people in the Northern and Western Isles work in the health; retail; agriculture, forestry, and fishing.

Table 2.4: Proportion of Employees by Industry (%)

Industry	Orkney	Shetland	Western Isles
Agriculture, forestry & fishing (A)	10.4	10	8.3
Mining, quarrying & utilities (B,D and E)	1.9	2	1
Manufacturing (C)	3.8	8.3	6.7
Construction (F)	6.7	8.3	7.5
Motor trades (Part G)	1	0.8	0.8
Wholesale (Part G)	2.5	2	1.5
Retail (Part G)	10.4	8.3	10.4
Transport & storage (inc postal) (H)	7.5	6	5
Accommodation & food services (I)	5.8	5.3	6.7
Information & communication (J)	1.7	1.2	1.2
Financial & insurance (K)	0.4	0.2	0.4
Property (L)	0.8	0.5	1.7
Professional, scientific & technical (M)	4.2	3	3.3
Business administration & support services (N)	2.5	4.7	2.9
Public administration & defence (O)	8.3	6.7	14.6

[3] Transport Scotland, Scottish Transport Statistics, Chapter 4 Road Lengths, 2021. Accessed here: Chapter 04 - Road Lengths | Transport Scotland

Industry	Orkney	Shetland	Western Isles
Education (P)	7.5	8.3	8.3
Health (Q)	16.7	16.7	18.8
Arts, entertainment, recreation & other services (R,S,T and U)	5	5.3	2.9

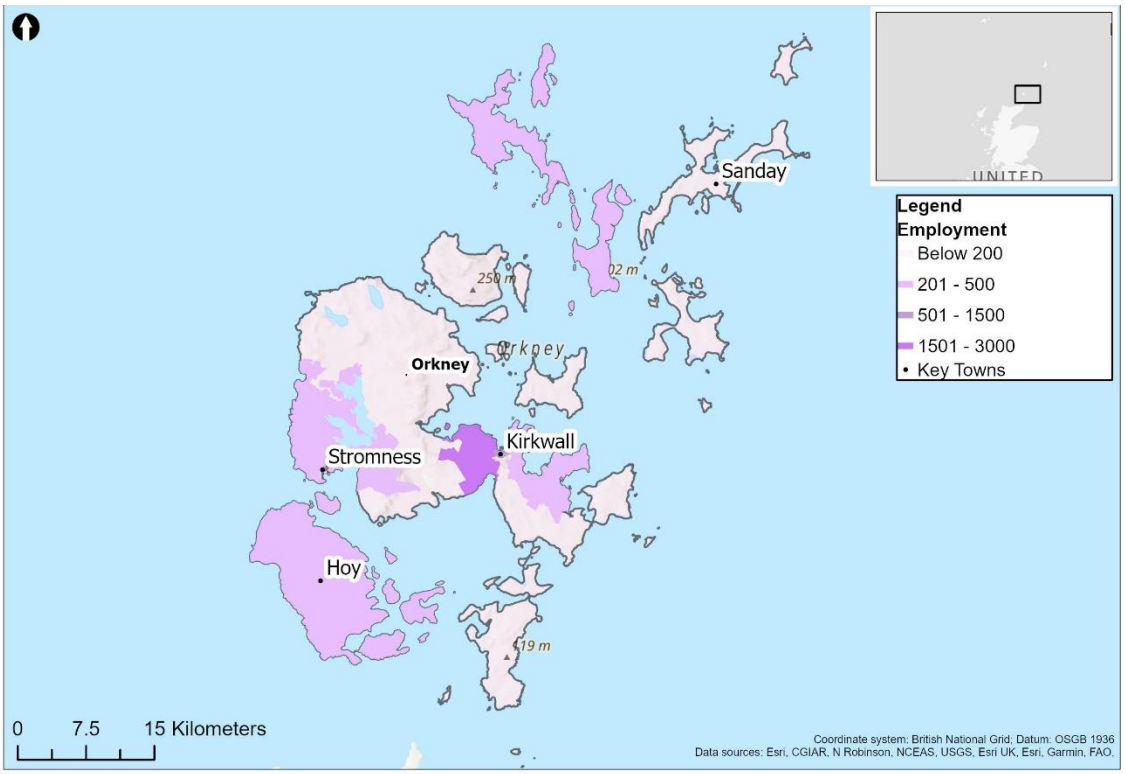
Source: Business Register and Employment Survey (BRES), 2021

Figure 2.11, Figure 2.12, and Figure 2.13 show the number of people employed across the Northern and Western Isles; the darker hues represent areas with a higher number of people in employment and therefore, key employment areas, and the lighter hues indicate lower numbers of people employed.

The key employment areas in Orkney include Kirkwall, Stromness and Hoy, as well as some of the northern regions (Figure 2.11). Figure 2.12 shows the key employment sites in Shetland which are comprised of predominately the Shetland mainland, as well as west of the mainland, Lerwick, Unst, Yell, and Sandwick. Figure 2.13 shows the key employment sites in the Western Isles, these include Stornoway, and the isles of Harris, North Uist and Barra.

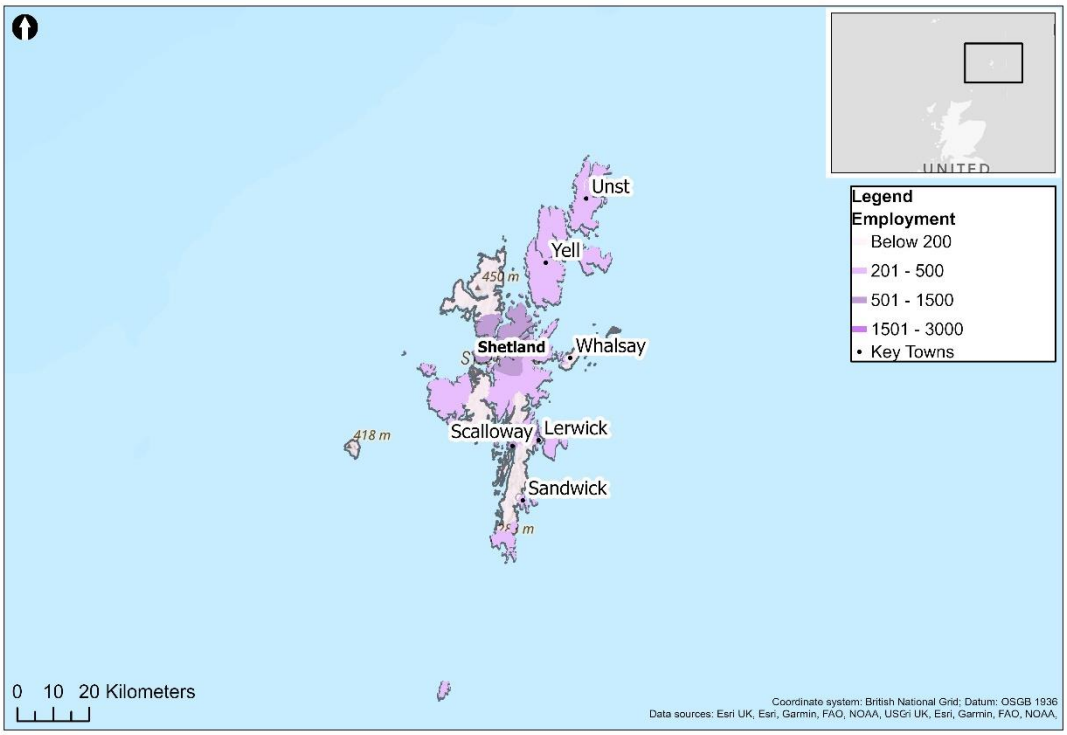
Employment centres can indicate commuting behaviours to key destinations where utilisation may be higher at workplaces and could be potential sites for a strategic charging hub.

Figure 2.11: Key Employment Centres Orkney



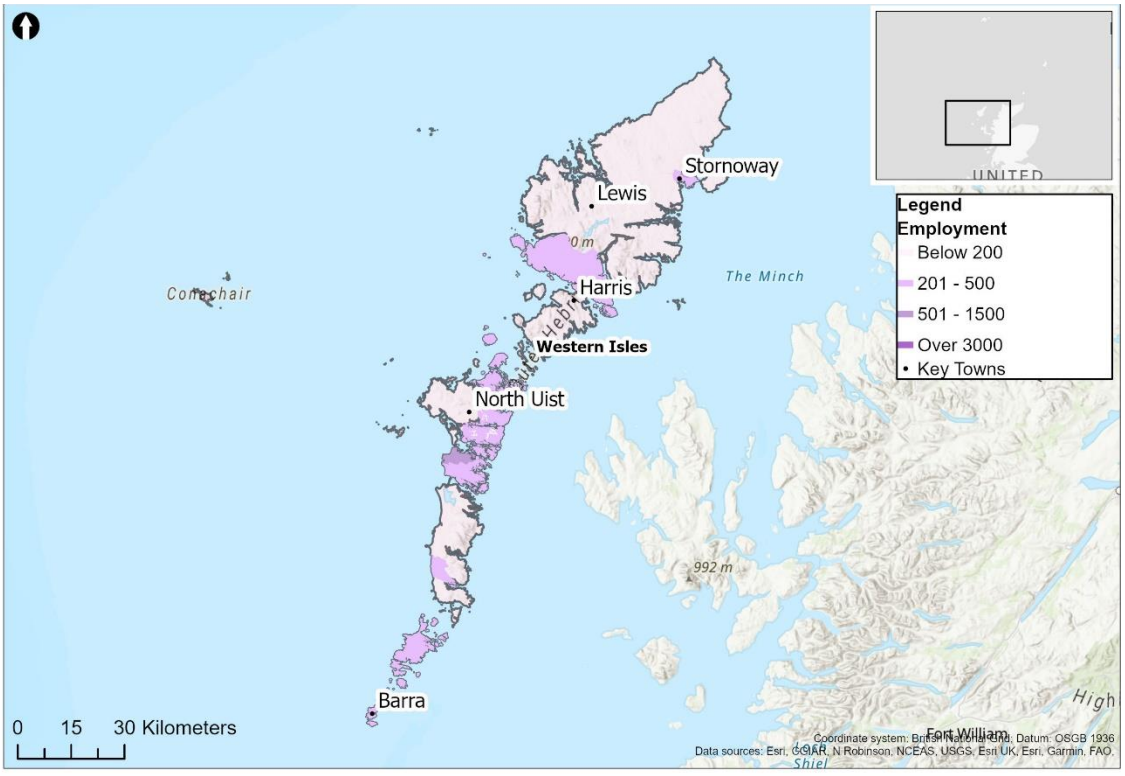
Source: Business Register and Employment Survey (BRES), 2021

Figure 2.12: Key Employment Centres Shetland



Source: Business Register and Employment Survey (BRES), 2021

Figure 2.13: Key Employment Centres Western Isles



Source: Business Register and Employment Survey (BRES), 2021

2.1.6 Visitor Attractions

As a region, the Northern and Western Isles are key tourist destinations and the need to accommodate visitor charging is therefore of high importance, particularly coupled with local demand and at peak times of year.

2.1.6.1 Orkney

The Orkney island chain is comprised of 70 islands and attracts on average, 192 thousand visits a year, 66% of which were visiting for a leisure of holiday trip and generating around £67m in spend[4]. The main tourist motivations in Orkney are the scenery, history and culture, the top 10 attractions (in order of most visited, as of 2019) include:

- Ring of Brodgar
- Skaill House/ Skara Brae
- St Magnus Cathedral
- Italian Chapel
- Public Museums, Heritage Centres
- Bishop's Palace and/or Earls Palace
- Maeshowe Chambered Cairn
- Distilleries' visitor centres
- Scapa Flow Visitor Centre
- Orkney Arts and Crafts Trail

2.1.6.2 Shetland

Between 2017-2019 Shetlands tourism economy grew by £12.6 million[5]. Shetland is a UNESCO Global Geopark and is a key tourist location for wilderness, outdoor activities and cultural events, attracting roughly 80 thousand visits a year with an annual spend of £35.8 million[6]. The top 10 attractions (in order of most visited, as of 2019) include:

- Shetland Museum and Archives
- Sumburgh Head
- Jarlshof
- St Ninian's Isle
- Scalloway Castle
- Fort Charlotte
- Scalloway Museum
- Clickmin Broch
- Eshaness
- Unst Heritage Centre and Unst Boat Haven

The tourist attractions in Shetland are island-wide, including the Hermaness Nature Reserve at the North of Unst which is also considered a major attraction.

[4] Orkney Islands Visitor Survey, 2019. Visit Scotland, Orkney. Accessed here: Orkney - Tourism Research & Statistics | VisitScotland.org

[5] Visit Shetland About | Shetland.org

[6] Shetland Islands Visitor Survey, 2019. Visit Scotland, Shetland. Accessed here: Shetland - Tourism Research & Insights | VisitScotland.org

2.1.6.3 Western Isles

The visitor statistics for the Western Isles are derived from the Visitor Survey 2017. On average there are 219,000 visits to the Western Isles a year (compared to 3.2 million visits nationally in Scotland[7]), 68% of which were visiting for a leisure of holiday trip and generating around £65m in spend[8]. The main tourist motivations in the Western Isles are the scenery, history, and culture, the top attractions (per island, 2017) include:

Lewis

- Callanish Stones
- Butt of Lewis
- Gearrannan Blackhouse Village
- Carloway Broch

Harris

- Harris Distillery
- Visited Harris Tweed Weaver
- St Clements Church
- North Harris Eagle Observatory

South Uist

- Prince Charlie Beach
- Kildonan Museum
- Am Politician
- Our Lady of the Isles
- Benbecula
- Borve Castle
- Eaval Walk
- Baille nan Cailleach

North Uist/ Berneray

- Bairanald Nature Reserve
- Hebridean Smokehouse
- St Kilda Viewpoint

Barra

- Airport Beach
- Catalina Plane Site
- Kisimul Castle

2.1.7 Background Summary

This section has provided an overview of the socioeconomic demographics and context for the three island authorities that comprise the study area. This includes population estimates, noting that generally, the three islands have a higher younger population and a lower working age population than the Scottish average; an analysis of SIMD which suggested that levels of

[7] International Tourism Statistics – Annual Report (2022) Visit Scotland, International Tourism Performance. Accessed here: International Tourism Statistics - Annual Report | VisitScotland.org

[8] Western Isles Visitor Survey, 2017. Visit Scotland, Orkney. Accessed here: Outer Hebrides - Tourism Research & Insights | VisitScotland.org

deprivation are relatively low across the three island authorities, although the Western Isles indicated slightly higher levels than Orkney and Shetland. The number of dwellings per hectare which suggests that commercial viability may be challenging as the three island authorities are predominately rural, particularly outside of key towns. An overview of the road lengths, key employment centres, visitor numbers and key tourist attractions was also provided, to demonstrate the key trip generators and show the significance of tourism across the Northern and Western Isles region and the contribution this brings to the economy on a local, regional, and national level.

3 Baseline Position

This section summarises the baseline position of the EV market and associated charging infrastructure across the Northern and Western Isles as of July 2023. The section outlines the number of PiVs registered and the current charging infrastructure provision including, the existing council-owned chargers, where these chargers are located, tariff pricing and utilisation.

A desktop review was undertaken to determine a baseline of existing PiVs and publicly accessible Electric Vehicle Charging Infrastructure (EVCI) in the Northern and Western Isles. Table 3.1 provides an overview of the population totals, number of EVs registered, and the existing, council owned EVCI baseline across the Northern and Western Isles, split by the three island authorities. The table also shows the number of EVs and EVCI per 100,000 capita and the number of EVs to EVCI. The following sections explore the baseline for each of the three island authorities, providing further detail.

Table 3.1: Baseline summary

	Population	EVs	Council EVCI	EVs per 100,000 capita	Councils EVCI per 100,000 capita	EVs per EVCI
Orkney	22,540	1,039	30	4,610	133	35
Shetland	22,940	667	26	2,908	113	26
Western Isles	42,640	1,215	31	2,849	73	39

3.1 Orkney Council

3.1.1 Existing EV ownership

The Department for Transport (DfT) VEH0142 statistical dataset was utilised to analyse the existing number of registered PiVs within the Orkney council area which can be found in Table 3.2.

Table 3.2: Cumulative Registered PiVs Each Year in Orkney between 2016 and 2022

Year	Battery Electric		Plug-in Hybrid / Range Extender		Total Licenced PiV at the end of the year
	Cars	LGV	Cars	LGV	
2016	83	12	13	0	108
2017	124	28	16	3	171
2018	155	35	28	3	221
2019	169	43	38	3	253
2020	200	50	49	3	302
2021	232	63	70	3	368
2022	281	72	96	5	454

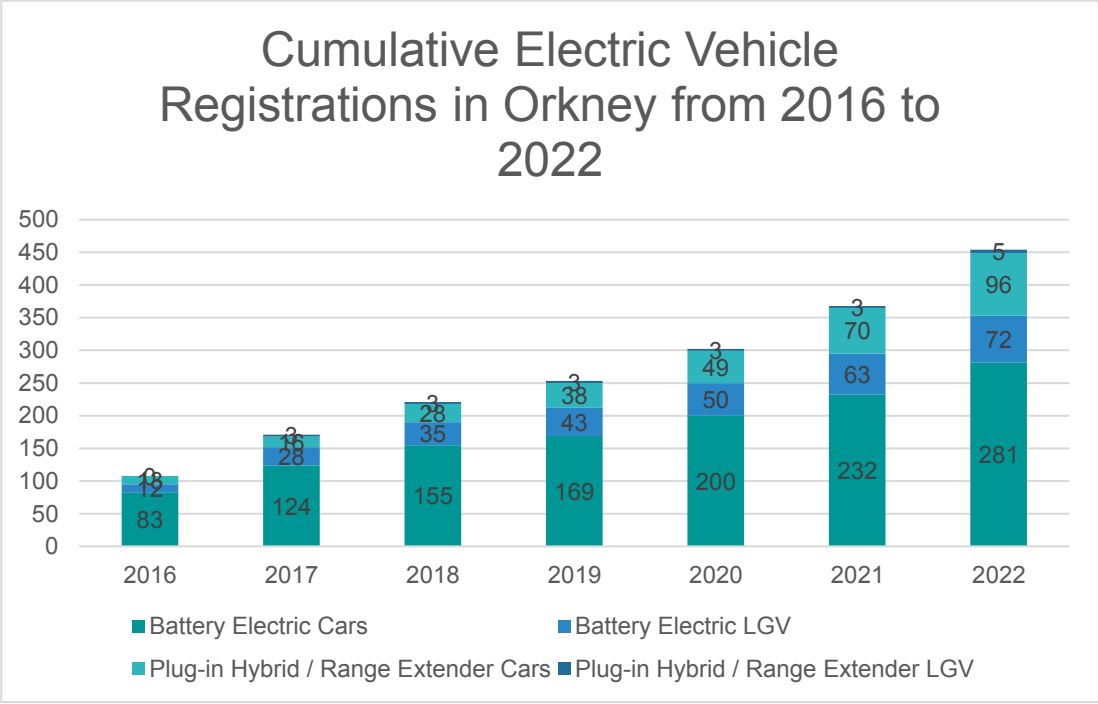
Source: DfT Vehicle Statistics, Vehicle Licensing Statistics Data Tables, VEH01421[9]

[9] Vehicle licensing statistics data tables - GOV.UK (www.gov.uk)

Most registered vehicles are battery electric vehicles, with a total of 353 across the 7 years. Across the 7 years of assessment, 77 electric LGVs were registered within the Orkney council area.

Chart 3.1 provides a visual indication of the cumulative increase in registered EVs from 2016 to 2022.

Chart 3.1 Cumulative Electric Vehicle Registrations in Orkney by Type from 2016 to 2022



Source: DfT Vehicle Statistics, Vehicle Licensing Statistics Data Tables, VEH0142[10]

In 2016, the total number of electric vehicle registrations in Orkney was around 108 and by 2022 this had risen to around 454. This is a percentage increase of 320%.

3.1.2 Existing council owned EVCI

The majority of the existing EVCI network (approximately 75%) across Orkney is council owned and operated through the Charge Place Scotland (CPS) network. The existing, council owned EVCI have been mapped (see Figure 3.1). Table 3.3 summarises the total number of existing council owned EVCI, of which there 30, with the majority being AC 22kW and DC 50kW chargers.

Table 3.3: Orkney Existing Council Owned EVCI

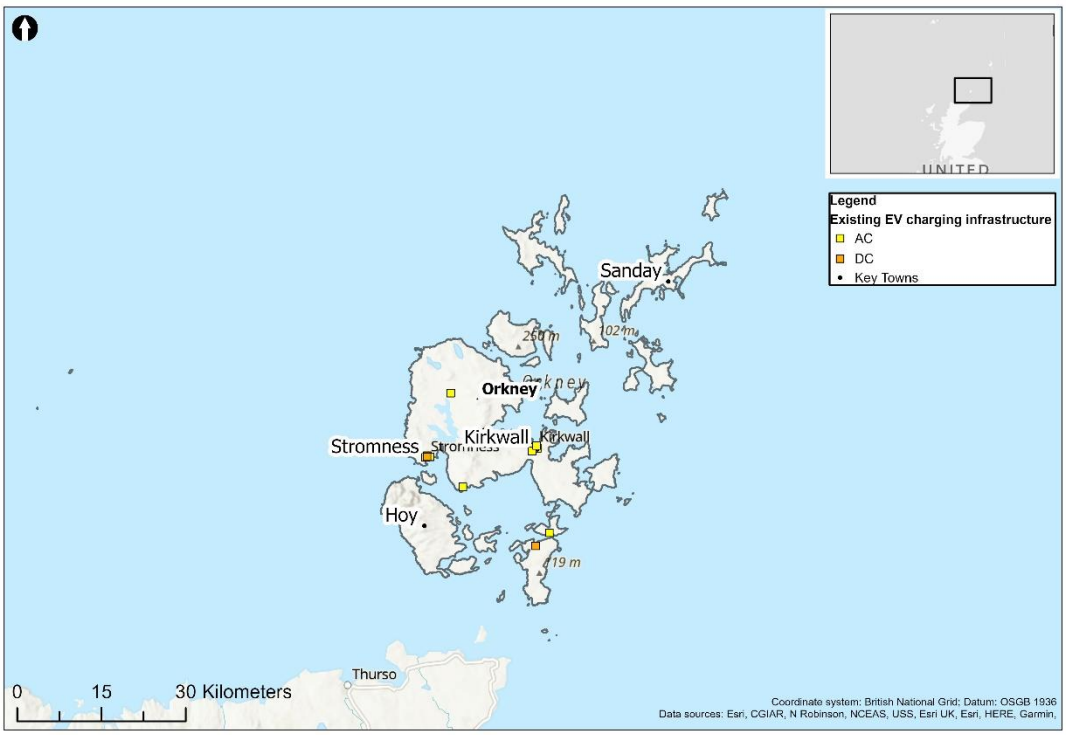
AC (7kW)	AC (22kW)	DC (50kW)	Total
8	11	11	30

Source: Urban Foresight Evaluation Framework

Figure 3.1 below illustrates the current locations of the council owned EVCI across Orkney and additionally breaks down the charger type by AC/DC.

[10] Vehicle licensing statistics data tables - GOV.UK (www.gov.uk)

Figure 3.1: Existing Council-Owned EVCI Locations - Orkney



Source: Urban Foresight Evaluation Framework

3.1.3 Utilisation

Orkney Islands Council provided usage data for existing council owned EVCI (operated by ChargePlace Scotland) for the period including 31st October 2021 to 1st November 2022. Utilisation varies across the charging network with averages provided in Table 3.4. The minimum outputs are relatively low and are evident outliers, whereas the maximum represents the most used/in demand locations. Utilisation is subject to the conditions in 2022, such as EV forecast, availability of chargers, cost and location of EVCI.

Table 3.4: Minimum, Average and Maximum Charger Outputs by Type - Orkney

Charger Type	Charger Output (kW)	Minimum (kWh)	Average (kWh)	Maximum (kWh)
AC	7-22	10	4,025	11,862
DC	43+	59	12,045	31,295

Source: Charge Place Scotland

3.1.4 Tariff

Orkney Islands Council has revised EVCI tariffs in consultation with Orkney Renewable Energy Forum (OREF). A tariff rate was determined that ensures the network remains attractive to users, whilst ensuring the council does not operate a commercial loss.

The Council will seek to refresh tariffs periodically to ensure all costs of operating a network are met. The new tariffs, introduced in November 2022, are shown in Table 3.5.

Table 3.5: Tariff Information – Orkney

	Rapid (50kW) Chargers	Fast (7/22kW) Chargers
Price	38p	30p
Minimum Charge	£3	£1.50
Maximum Stay	1hr	4hrs
Penalty for Overstay	£1 per minute	Between 08:00 and 18:00 - £5 Between 18:00 and 08:00 - £nil.

Source: Urban Foresight Evaluation Framework

Source: Urban Foresight

3.2 Shetland Council

3.2.1 Existing EV ownership

The Department for Transport (DfT) VEH0142 statistical dataset was utilised to analyse the existing number of registered EVs within the Shetland council area which can be found in Table 3.6.

Table 3.6: Newly Registered EVs Each Year in Shetland Between 2016 and 2022

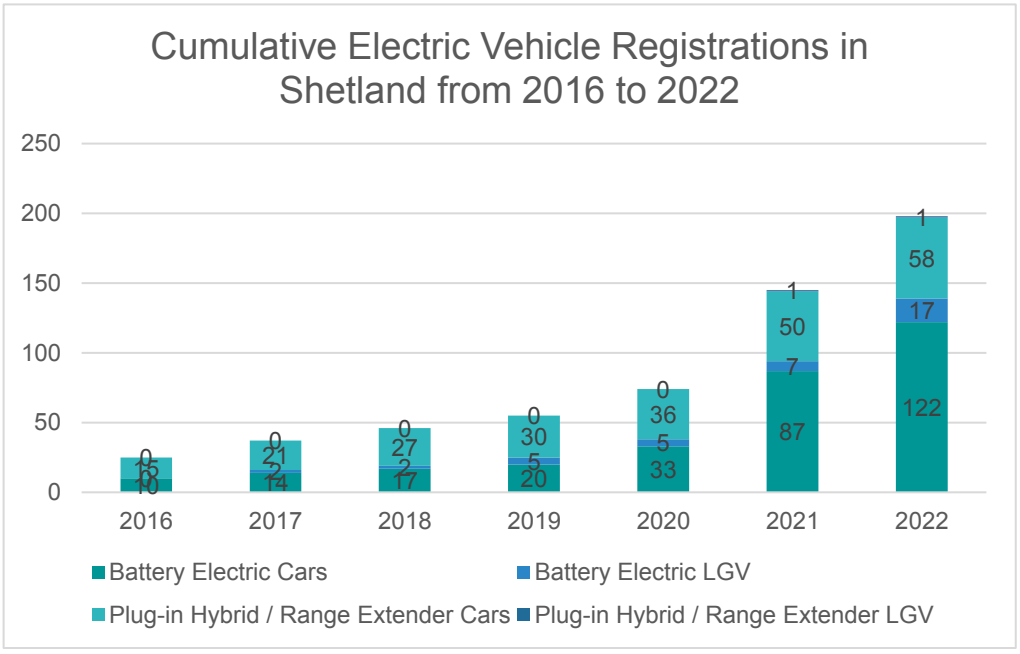
Year	Battery Electric		Plug-in Hybrid / Range Extender		Total Registered EVs
	Cars	LGV	Cars	LGV	
2016	10	0	15	0	25
2017	14	2	21	0	37
2018	17	2	27	0	46
2019	20	5	30	0	55
2020	33	5	36	0	74
2021	87	7	50	1	145
2022	122	17	58	1	198

Source: DfT Vehicle Statistics, Vehicle Licensing Statistics Data Tables, VEH0142[11]

The total number of EVs being registered annually in Shetland has increased year on year; between 2016 and 2022 the number of EVs registered increased by 692%. Battery electric vehicles have been the most popular, with a total of 139 over the 7 years, compared to 59 plug-in vehicles.

[11] Vehicle licensing statistics data tables - GOV.UK (www.gov.uk)

Chart 3.2 Cumulative Electric Vehicle Registrations in Shetland by Type from 2016 to 2022



Source: DfT Vehicle Statistics, Vehicle Licensing Statistics Data Tables, VEH0142[12]

As Chart 3.2 shows, the cumulative total number of registered EVs in Shetland increased from 25 in 2016, to 198 in 2022.

3.2.2 Existing council owned EVCI

The council owned EVCI have been mapped (see Figure 3.2); the majority of the EVCI network (approximately 86%) across Shetland is council owned and operated through the CPS network. Table 3.7 summarises the total number of existing EVCI, split by provider. The total number of existing EVCI is 26, the majority of which are AC 22kW chargers.

Table 3.7: Shetland Existing Council-Owned Chargers

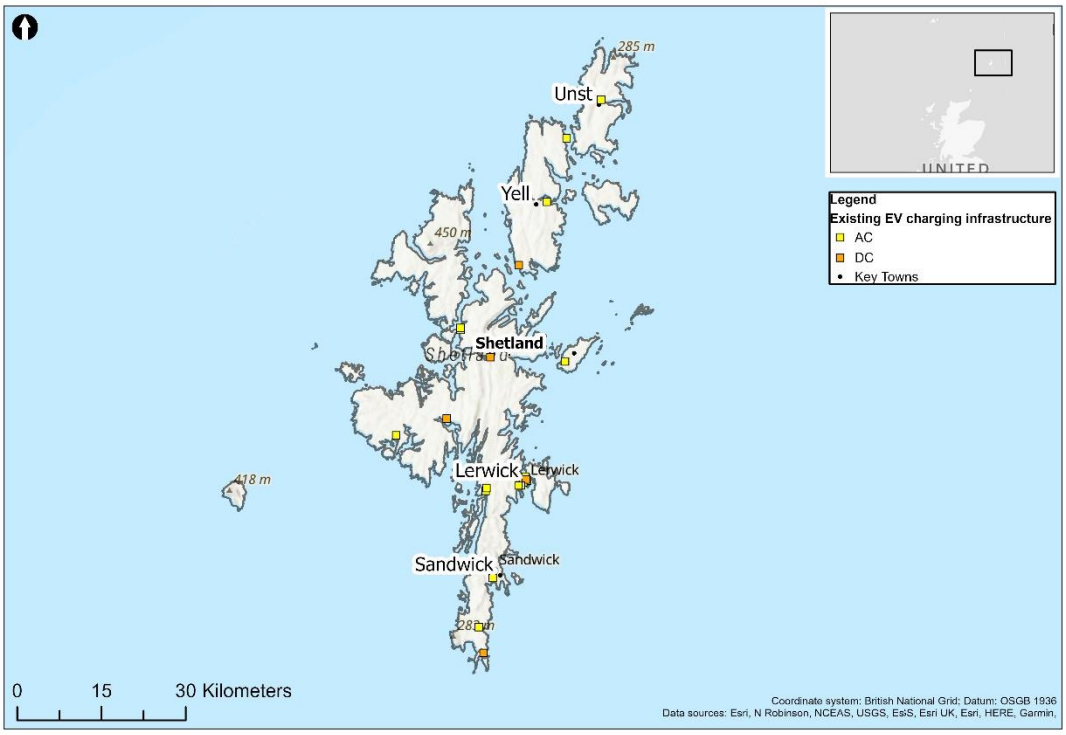
	AC (7kW)	AC (22kW)	DC (50kW)	Total
Shetland Existing	6	14	6	26

Source: Urban Foresight Evaluation Framework

Figure 3.2 below illustrates the current locations of the council-owned chargers across Shetland and additionally breaks down the charger type by AC/DC.

[12] Vehicle licensing statistics data tables - GOV.UK (www.gov.uk)

Figure 3.2: Existing Council-Owned EVCI Locations – Shetland



Source: Urban Foresight Evaluation Framework

Source: Urban Foresight

3.2.3 Utilisation

Shetland Islands Council provided usage data for existing charge points owned by the council, and operated by ChargePlace Scotland, for the period including 22nd July 2021 to 24th July 2022. Utilisation varies across the charging network with averages provided in Table 3.8. The minimum outputs are relatively low and are evident outliers, whereas the maximum represents the most used/in demand locations. Utilisation is subject to the conditions in 2022, such as EV forecast, availability of chargers, cost and location of EVCI.

Table 3.8: Minimum, Average and Maximum Charger Outputs by Type - Shetland

Charger Type	Charger Output (kW)	Minimum (kWh)	Average (kWh)	Maximum (kWh)
AC	7-22	423	6,807	32,375
DC	43+	1,380	13,603	37,228

Source: Charge Place Scotland

3.2.4 Tariff

Shetland Islands Council introduced tariffs for their existing EVCI network in April 2023. This tariff was set to cover operational and maintenance costs of the network, as well as ad-hoc costs that may arise.

The tariffs as per April 2023, are shown in Table 3.9Table 3.9.

Table 3.9: Tariff Information - Shetland

	Rapid (50kW) Chargers	Fast (7/22kW) Chargers
Price	57p	47p
Minimum Charge	No charge	No charge
Maximum Stay	No max stay	No max stay
Penalty for Overstay	No penalty	No penalty

Source: Urban Foresight Evaluation Framework

Source: Urban Foresight

Shetland Island Council have stated that while it is necessary for the regions tariffs to increase to ensure the longevity of the network, it is important that this happens gradually to not deter potential consumers from using the network or from transitioning to more sustainable vehicles.

3.3 Western Isles

3.3.1 Existing EV ownership

The Department for Transport (DfT) VEH0142 statistical dataset was utilised to analyse the existing number of registered EVs with Western Isles council area which can be found in Table 3.10Table 3.10.

Table 3.10: Newly Registered EVs Each Year in Shetland Between 2016 and 2022

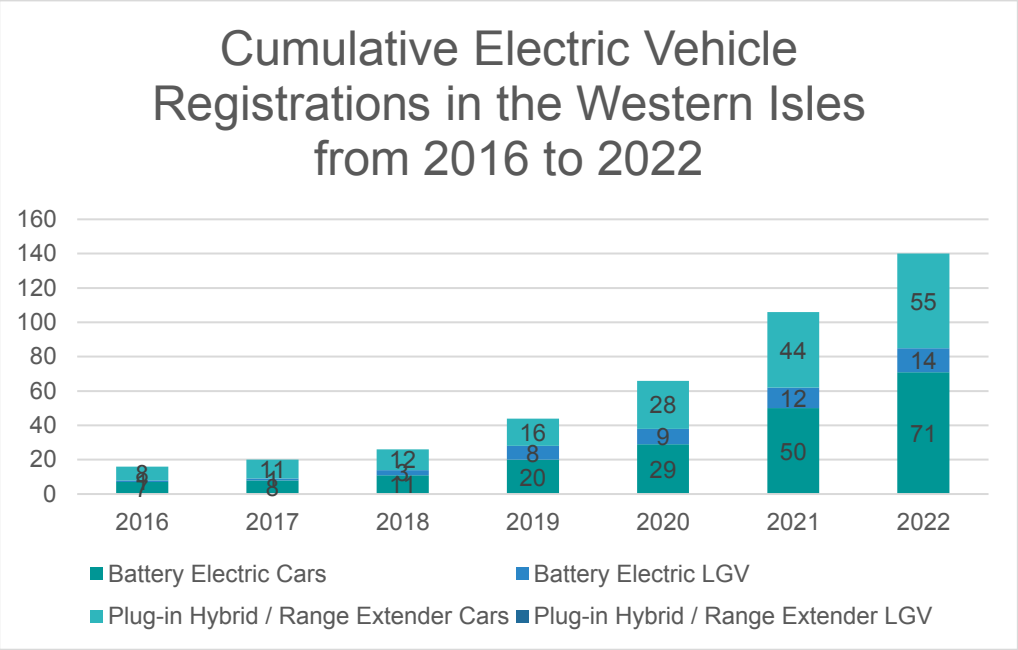
Year	Battery Electric		Plug-in Hybrid / Range Extender		Total Registered EVs
	Cars	LGV	Cars	LGV	
2016	7	1	8	0	16
2017	8	1	11	0	20
2018	11	3	12	0	26
2019	20	8	16	0	44
2020	29	9	28	0	66
2021	50	12	44	0	106
2022	71	14	55	0	140

Source: DfT Vehicle Statistics, Vehicle Licensing Statistics Data Tables, VEH0142[13]

Similarly to Orkney and Shetland, the number of battery electric vehicle registrations is higher than plug-in vehicle registrations on the Western Isles with a total of 85 and 55 respectively in 2022.

[13] Vehicle licensing statistics data tables - GOV.UK (www.gov.uk)

Chart 3.3 Cumulative Electric Vehicle Registrations in Western Isles by Type from 2016 to 2022



Source: DfT Vehicle Statistics, Vehicle Licensing Statistics Data Tables, VEH0142[14]

Chart 3.3 shows, the cumulative total number of electric vehicles registered on the Western Isles increased by 775% from 2016 to 2022.

3.3.2 Existing council owned EVCI

The majority of the EVCI network (approximately 62%) across the Western Isles is publicly owned and operated through the CPS network. Table 3.11 Table 3.11 summarises the total number of existing chargers, of which there are 31, the majority of which are AC 22kW chargers.

Table 3.11: Western Isles Existing Council-Owned Chargers

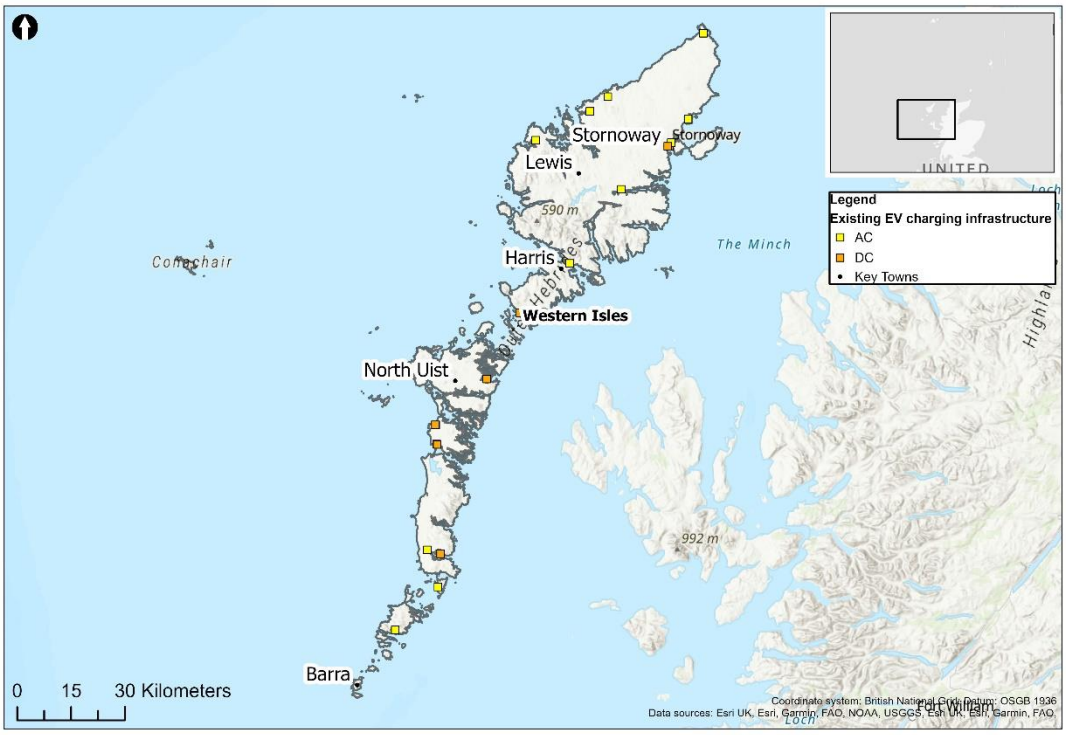
	AC (7kW)	AC (22kW)	DC (50kW)	Total
Western Isles	4	14	13	31

Source: Urban Foresight Evaluation Framework

Figure 3.3 below illustrates the current locations of the council owned EVCI across the Western Isles and additionally breaks down the charger type by AC/DC.

[14] Vehicle licensing statistics data tables - GOV.UK (www.gov.uk)

Figure 3.3: Existing Council Owned EVCI Locations – Western Isles



Source: Urban Foresight Evaluation Framework

3.3.3 Utilisation

Western Isles provided usage data for existing charge points owned by the council, and operated by CPS, for the period including 22nd July 2021 to 24th July 2022. Utilisation varies across the charging network with averages provided in Table 3.12. The minimum outputs are relatively low and are evident outliers, whereas the maximum represents the most used/in demand locations. Utilisation is subject to the conditions in 2022, such as EV forecast, availability of chargers, cost, and location of EVCI.

Table 3.12: Minimum, Average and Maximum Charger Outputs by Type – Western Isles

Charger Type	Charger Output (kW)	Minimum (kWh)	Average (kWh)	Maximum (kWh)
AC	7 - 22	21	3,263	19,361
DC	43+	7,853	12,563	18,752

Source: Charge Place Scotland

3.3.4 Tariff

The Western Isles were previously operating with a tariff of a flat rate of 20p per kWh for all charger types. An update tariff rate was introduced in May 2023 to ensure the council does not operate at a commercial loss. The new tariffs, introduced in May 2023 are outlined in Table 3.13.

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Table 3.13: Tariff Information – Western Isles

	Rapid (50kW) Chargers	Fast (7/22kW) Chargers
Price	59p	45p
Minimum Charge	£1	£1
Maximum Stay	45 minutes	No max stay
Penalty for Overstay	£1 per minute (£30 cap)	No penalty

Source: Urban ForesightThe Council's future approach to setting a tariff will be regularly reviewed to ensure currently volatile costs, such as electricity, are covered as part of future costs.

3.4 Summary

Table 3.14: Baseline summary

	Orkney	Shetland	Western Isles
No. new EV registrations (2022)	1,678	708	508
Existing EVCI	30	26	31
Average utilisation	AC - 4,025 DC - 12,045	AC – 6,807 DC – 13,603	AC – 3,263 DC – 12,563
Price per kW.	Fast – 30p Rapid - 38p	Fast – 47p Rapid 57p	Fast – 45p Rapid – 59p

This section has provided an overview of the EV and EVCI baseline across the Northern and Western Isles. As Table 3.14 shows, Orkney has had the highest number of EV registrations (as of 2022) at 1,678, and the Western Isles has had the least (508). However, although the number of existing council owned EVCI is largely similar across the three island authorities, the Western Isles have more EVCI than Orkney or Shetland. Pricing of tariffs is similar in Shetland and the Western Isles, but considerably cheaper in Orkney (approx. 15-17p cheaper for fast and 20p cheaper for rapid charging).

3.4.1 Utilisation summary

The average observed utilisation figures on each of the Northern and Western Isles are particularly low when compared to average values from mainland Scotland. This is not an unexpected finding given the low population levels and the challengers that PiV car owners would have to manage whilst living on the Isles. These challenges include:

- Charging anxiety
- Availability of publicly available chargers
- Cost of electricity
- Availability of electricity

The impact of these factors is the lower observed utilisation which is likely to be an ongoing challenge.

planning that is required to adapt to, and mitigate, climate change. The goals of the programme include:

- Proactive approach to Climate Change mitigation and adaption in Shetland, including Net Zero route maps and an upcoming Climate Change Strategy/Energy Strategy
- Progress a range of immediate actions and priority areas
- Act in partnership with other agencies, business, and communities'

Shetland Net Zero Living Project

The Shetland Rural Energy Hubs (SREH) project, is a collaboration between Shetland Islands Council (SIC) and Aquatera Ltd and Community Energy Scotland (CES), and is funded by the Net Zero Living: Pathfinder Places (NZLPP) programme from Innovate UK.

The SREH project aims to address the non-technical systemic barriers to decarbonisation in Shetland, by creating a network or energy hubs in Shetland, focusing on rural areas. The ambition is for these energy hubs to incorporate EVCI and on-site community renewable energy generation and storage, fleet vehicles, information, training and recycling facilities. This presents an opportunity to provide a whole systems approach to decarbonisation. The project notes however, that these hubs may be more challenging to implement in rural localities as they than more urbanised areas of Shetland, due to low population density, remote settlements, grid constraints and lack of skills capacity.

The study will determine achievable pathways for decarbonising key sectors and reaching net zero through an integrated energy hub network, seeking to address the following barriers which have been encountered so far: regulation, grid capacity, resource (skills/capacity), behavioural change and lack of data[32].

5.1.3.3 Western Isles

Outer Hebrides Local Transport Strategy 2020-2030[33]

The strategy portrays the vision for enhancing transport and travel across and within the islands, and to key destinations beyond. The intent is to provide a tool for implementing actions to achieve the vision and identifying where support is required to deliver local services, whilst helping the Outer Hebrides become a contributor to the national economy.

The strategy provides a transport baseline and associated challenges, some of which are long established and others which emerged as a result of the Covid-19 pandemic; some of which include, inadequate funding for maintenance (of roads, bridges, and causeways), congestion and parking pressures in town centres, active travel challenges in rural areas where there is a lack of footpaths, and declining budgets reducing bus frequency, resulting in lower patronage levels.

The strategy recognises the role of transport in contributing to the production of carbon emissions and the need to focus on local carbon transport solutions to ensure the Scottish Government Net Zero Carbon targets are met by 2045. However, the strategy highlights recent progress with alternative fuels, indicating that there is now a good coverage of EV charging infrastructure in the Outer Hebrides with phased implementation of charging infrastructure since 2012.

[32] Net Zero Living Pathfinder Places Shetland Rural Energy Hub, Aquatera environmental services and products, Report to Innovate UK.

[33] Outer Hebrides Local Transport Strategy 2020-2030, Comhairle nan Eilean Siar. Accessed here: Local Transport Strategy (cne-siar.gov.uk)

4 Stakeholder Engagement

This section describes the consultation and stakeholder engagement undertaken as part of the project, the key findings and how they have informed the Strategy and Expansion Plan.

4.1 Stakeholder Identification

Working with HITRANS and each of the three islands authorities, a list of stakeholders was identified who – through targeted consultations sessions – could contribute to the development of the Strategy and Expansion Plan. Stakeholders were classified into four categories based on the level of influence they are likely to have on the development of the strategy:

- Core Stakeholders
- Major Stakeholders
- Minor Stakeholders
- Private CPOs

The Stakeholder Engagement Plan (attached as Appendix B) identifies each of the organisations where engagement was sought, alongside the stakeholder category.

While most stakeholders have been engaged through this work, further engagement is ongoing to capture the inputs of those who were unable to contribute as part of this exercise. This will be undertaken as part of ongoing discussions between HITRANS and the three island authorities and will support the identification of a preferred commercial model.

4.1.1 Engagement with Core Stakeholders

Engagement with core stakeholders (defined as HITRANS and the three island authorities), has informed the baseline of this work whilst underpinning the strategic rationale and case for investment. Regular meetings have been undertaken with HITRANS and the each Council; ensuring the strategy and expansion plan is representative of the collective ambitions of the region.

4.1.2 Engagement with Major Stakeholders

Engagement with major stakeholders has ensured that the Strategy and Expansion Plan complements the needs and requirements of organisations either within or with a defined interest in the region. These discussions have been central to reaffirming the strategic rationale, whilst offering insights into the potential commercial models which are considered as part of this report.

Specific engagement with major stakeholders also offered an understanding of asset owners' current EVCI provision (as well as future plans); allowing the team to identify opportunities which could be incorporated into the overarching strategy and expansion plan. This engagement also allowed for deeper understanding of potential fleet EVCI requirements as organisations transition to electric and low-emission fleets.

Finally, engagement with DNOs allowed the study team to identify potential grid capacity constraints while additionally exploring the potential to link EVCI to renewable energy generation.

4.1.3 Engagement with Minor Stakeholders

The minor stakeholder group was predominantly composed of local community groups and fleet operators. Given the timescales associated with developing this strategy, little engagement has been undertaken with this group. These stakeholders can offer valuable local insights and it is therefore recommended that engagement with these groups continues as the Strategy and Expansion Plan develops.

4.1.4 Engagement with Charge Point Operators (CPOs)

Engagement with CPOs was also undertaken in order to understand the commercial appetite for delivering EVCI on the islands. These meetings have helped informed our analysis around the potential commercial models which are discussed in the Commercial Case section of this report.

5 Strategic Case

This section of the report presents a vision for the development of EVCI within the context of national, regional, and local policy, and the economic growth ambitions of all three island councils.

The policy review provides an overarching context for the vision and objectives for the EVCI network across the three island authorities. The policy review considers national policy objectives, whilst also the regional and local policy to ensure the unique and localised challenges and opportunities that stem from the archipelagic nature of the study area, are reflected in the shared vision.

5.1 Policy Context

A range of national, regional, and local policy has been analysed for the purposes of this report.

5.1.1 National Strategy

Taking Charge: The Electric Vehicle Infrastructure Strategy (2022)[15]

Taking Charge represents a UK Government strategy outlining the interventions to achieve net zero road transport through implementing EVCI. States the network must be accessible for all, extensive across the country, simple to use, integrates with the smart energy system and is market-led.

A Network Fit for the Future: Draft Vision for Scotland's Public Electric Vehicle Charging Network (2022)[16]

The vision highlights that the public EV charging network in Scotland is open for everyone, regardless of age, health, income or other needs. The document highlights the desire to secure private sector investment to expand the public charging network. In addition, the network should be innovative and capitalise on renewable energy.

The Transitioning to Zero Emission Cars and Vans: 2035 Delivery Plan (2021)[17]

The plan Illustrates the required interventions required to meet the 2035 ban on ICE cars and vans. This will primarily be driven by financial incentives to encourage the uptake of EVs, which includes investing £582 million for plug-in grants, expansion of the motorway charging networks and continuing favourable company car tax rates to zero emission vehicles until at least March 2025.

Electric Vehicle Charging Infrastructure Report (2021)[18]

The Report sets out the current landscape of electric vehicle charging in Scotland and indicates a new policy shift away from grant-based subsidy of public sector EV chargers and towards a

[15] Taking charge: the electric vehicle infrastructure strategy, (2022) GOV.UK. Accessed here: UK electric vehicle infrastructure strategy - GOV.UK (www.gov.uk)

[16] A Network fit for the Future: Draft Vision for Scotland's Public Electric Vehicle Charging Network, Transport Scotland, (2022). Accessed here: A Network fit for the Future: Draft Vision for Scotland's Public Electric Vehicle Charging Network | Transport Scotland

[17] Transitioning to zero emission cars and vans: 2035 delivery plan, (2021), GOV.UK. Accessed here: Transitioning to zero emission cars and vans: 2035 delivery plan - GOV.UK (www.gov.uk)

[18] Electric Vehicle Charging Infrastructure Report, Scottish Futures Trust. July 2021. Available at: New report published on the future of public EV charging infrastructure - Scottish Futures Trust

largely private sector investment driven model. The government will continue to provide a level of support to ensure there is a fair and just transition towards a zero-emission transport network.

Decarbonising the Scottish Transport Sector (2021)[19]

The study analyses the required policy interventions required to meet the Scottish Government's decarbonisation transport targets. It considers potential outcomes for future EV uptake and travel behaviour interventions to understand the level of change required to meet the goals.

Switched on Scotland Phase 2: An Action Plan for Growth (2017)[20]

An action plan produced by Transport Scotland outlining the methods to accelerate the growth of EVs, through the development of business models, technologies, charging network expansion and incentives to encourage new customers into the market for EVs.

Incorporating EV Chargepoints into Local Planning Policies for New Developments (2020)[21]

The document presents a guide which explores options for how local authorities can encourage new developments to implement EV chargers during the design change. This would provide a range of suitable home and workplace charging infrastructure. Provides advice on other supporting measures for local authorities to implement charging infrastructure.

The National Plan for Scotland's Islands (2019)[22]

The plan highlights the challenges, opportunities, and unique needs of Scotland's islands and how these differ from the mainland. Transport links are essential for enabling mobility within and between the island communities. The plan highlights the importance of adequate infrastructure and quality transport networks as a lack of both can leave island communities at a disadvantage to mainland communities.

5.1.2 Regional Strategy and Policy

HITRANS Regional Transport Strategy Draft Update (2017)[23]

First published in 2008, the Regional Transport Strategy has been updated to reflect changes to policy and a changing social, economic and environmental context, and sets out the key policies and proposals required to deliver the regional vision and reflects The strategy captures the committed projects happening in the region to improve transport and identifies the need for further action to support sustainable economic growth and reducing barriers to employment, learning, social, leisure, health, and cultural activity in the region.

The refreshed strategy promotes the use of alternative fuels particularly focusing on electric and the roll out, support and maintenance of EVs and the required infrastructure.

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[19] Decarbonising the Scottish transport sector (2021), Transport Scotland. Accessed here: Decarbonising the Scottish transport sector | Transport Scotland

[20] Switched on Scotland Phase 2: An Action Plan for Growth (2017), Transport Scotland. Accessed here: transport.gov.scot/media/39306/switched-on-scotland-phase-2.pdf#:~:text=This action plan defines the activities that Transport,sustainable transport system and a smart energy grid.

[21] Incorporating EV Chargepoints into Local Planning Policies for New Developments (2020), Energy Saving Trust. Accessed here: EST0013-Local-Authority-Guidance-Document-Incorporating-chargepoints-into-local-planning-policies-WEB.pdf (energysavingtrust.org.uk)

[22] The National Plan for Scotland's Islands, (2019), Scottish Government. Accessed here: The National Plan for Scotland's Islands - gov.scot (www.gov.scot)

[23] HITRANS Draft Updated Regional Transport Strategy, May2017, HITRANS. Accessed here: HITRANS - Highlands and Islands Transport Partnership

HITRANS Electric Vehicle Strategy[24]

The strategy sets out the vision for the HIRANS region in the context of national commitments for low emission transport and delivering social, economic, and environmental benefits to communities across the region, and for increasing the use of battery electric and plug-in hybrid vehicles (EVs). HITRANS vision is for the region to be an exemplar for how a transition to a low carbon transport system can be achieved in rural communities. The strategy identifies the key challenges currently facing the region, and opportunities to increase widespread adoption of electric vehicles.

Although there are aspects of the strategy which remain relevant here, it should be noted that the strategy requires a review as it was published in 2018 and the pace of change within the industry ia fast and thus, could be considered outdated.

5.1.3 Local Strategy and Policy

5.1.3.1 Orkney Council

Orkney's Electric Vehicle Infrastructure Strategy (2014)[25]

Supported by HITRANS and the Orkney Renewable Energy Forum (OREF), the strategy reflects both the national vision for Scotland outlined in Transport Scotland's 'Switched on Scotland, and the local goals and objectives outlined in Orkney's Local Transport Strategy and Low Carbon Strategy which set out a series of goals and measures needed to reduce carbon emission from vehicles. Orkney's EV strategy sets out the overarching plan for charging infrastructure, providing targets and locations for infrastructure roll-out, to provide the infrastructure necessary to support the use of Evs across the county. The strategy is underpinned by four key principles including, policy, infrastructure, vehicles and communication and education. These principles will promote and encourage widespread adoption of Evs by developing an accessible, comprehensive network of infrastructure and increasing awareness of local opportunities.

Orkney's Green Travel Plan (2016)[26]

The plan recognises the need to develop a low-carbon, multi-modal and integrated transport system for now and future generations and outlines the vision for a sustainable future of transport. The plan aims to:

- Contribute to health and wellbeing
- Promote, encourage, and enable safe, active and sustainable travel so they become the modal choice, reducing Orkney's carbon footprint
- Improve cycling and walking by connecting current infrastructure and providing a comprehensive network
- Reducing parking congestion problems at workplaces, reduce business milage and costs.

Whilst a large focus is on active modes, The Green Travel Plan highlights several local advantages that could facilitate the roll-out EVs in the region including:

- Lower than average commuting distances

[24] HITRANS Electric Vehicle Strategy (2018), HITRANS. Accessed here: HITRANS - Highlands and Islands Transport Partnership

[25] Orkney's Electric Vehicle infrastructure Strategy (May 2014), Orkney Islands Council. Accessed here: Orkney's Electric Vehicle Infrastructure Strategy

[26] Orkney's Green Travel Plan (June 2016), Orkney Islands Council. Accessed here: Orkney's Green Travel Plan

- Surplus of renewably produced electricity (renewables often produce twice the electricity demand; currently constrained by the grid from producing anymore. If the surplus electricity was utilised, this archipelago would be a completely zero carbon model).

Orkney Sustainable Energy Strategy (2017-2025)[27]

The strategy identifies the local strengths Orkney is positioned to take advantage to develop low carbon transport opportunities. Thus far, Evs have a higher adoption rate in Orkney than in other parts of the country and there are opportunities to increase this further with integration with a local smart grid to provide an integrated energy systems approach.

Orkney ReFLEX Project

ReFLEX Orkney is an integrated, low-carbon energy system which is designed with the future in mind, and to be affordable. The pojrect is funded by UKRI through the Industrial Strategy Challenge Fund, and led by the European Marine Energy Centre (EMEC) with cross-sector partners.

The ReFLEX project aims to interlink local heat, electricity, and transport networks into one controllable, overarching system, digitally connecting distributed and variable renewable generation to flexible demand. Underpinned by flexibility, the project uses technologies including battery storage, EVs, smart chargers and smart meters, aiming to initiate larger-scale and community-focused initiatives such as electric buses, a local electric car club and the integration of green hydrogen for storage and transport[28].

5.1.3.2 Shetland Council

Shetland Transport Strategy Refresh (2018-2028)[29]

The strategy is a statutory document which sets out the actions taken by the Shetland Regional Transport Partnership, ZetTrans, will do to maintain, enhance, and improve transport across the Shetland Isles. The accompanying Delivery Plan[30] provides details on how, when where and how much will be addressed. Replacing its predecessor published in 2008, this strategy provides a refreshed vision for ZetTrans, identify the main issues which must be addressed, define the strategic objectives, and outline the necessary interventions to address these issues, meet the objectives and fulfil the vision.

Reducing carbon emissions is identified as one of the core issues with transport in Shetland; although electric vehicles are not included in the strategy, objective 3 highlights the commitment to *'conserving and enhancing Shetland's unique natural environment by developing and promoting healthy, sustainable and low-carbon travel choices.'* Supporting the transition to Evs can help to achieve this.

Shetland Islands Council Climate Change Programme (2020)[31]

In January 2020, Shetland Council recognised the global climate emergency and published a new strategic programme. The purpose of which is to outline targeted development and action

[27] Orkney Sustainable Energy Strategy (2017-2025), Energy of Orkney. Accessed here: Orkney-Sustainable-Energy-Strategy-2017-2025-1.pdf (oref.co.uk)

[28] ReFLEC Orkney About ReFLEX | ReFLEX Orkney

[29] Shetland Transport Strategy 2018-2028, November 2018, ZetTrans. Accessed here: Shetland Transport Strategy 2018-2028 | ZetTrans

[30] Shetland Transport Strategy Delivery Plan 2019-2020, ZetTrans. Accessed here: Shetland Transport Strategy 2018-2028 | ZetTrans

[31] Shetland Council Climate Change Programme (2020), Shetland Islands Council. Accessed here: What are we doing? – Shetland Islands Council

Despite progress, the strategy indicates that there are further sites which demonstrate opportunities to enhance and strengthen the existing network, particularly with rapid chargers. The demand for EV charging infrastructure on the islands is increasing and the islands represent an opportunity to use surplus, locally generated renewable electricity to duel growing demand.

Comhairle nan Eilean Siar Climate Change Strategy 2022-2027[34]

The Climate Change Strategy sets out how the Comhairle islands will decarbonise and work towards Net Zero whilst strengthening resilience to climate change and its increasingly threatening impacts. The strategy aligns with The Climate Change Act (Scotland) 2019 which commits Scotland to Net Zero by 2045 and outlines three strategic priorities which align with national priorities, these include:

1. 'Carbon Neutral Comhairle – zero direct emissions by 2038 and minimal indirect emissions
2. Net Zero Islands – support the islands towards net zero by 2045
3. Climate Resilient Islands – support improved climate resilience throughout our islands'

Furthermore, the strategy highlights how transport emissions are the single biggest source of greenhouse gas emissions in Scotland; the document also signifies the national commitment to phase-out new petrol and diesel cars and vans by 2030 and in turn, Comhairle's commitment in ensuring the islands are ready for this transition through the roll-out of EV charging infrastructure.

5.2 Vision, Outcomes and Priorities

This section outlines the vision and objectives for the HITRANS EV Expansion Plan.

5.2.1 Vision

The combined vision for the EVCI network across the three islands is as follows:

*The EV charging network in the Highlands and Islands will be one which **works for everyone**, prioritising **equity** and fair pricing, **ease of use**, and **accessibility** to support a just and inclusive transition.*

***Strategically placed chargepoints** will be the initial focus for infrastructure roll-out, providing connectivity across the island chains. This will support sustainable economic growth and tourism for visitors and residents alike.*

*Strategic charging hubsand local upskilling will reinforce the network, allowing for **easier maintenance** and improved reliability, inspiring **confidence** and providing a **comprehensive coverage** across the Northern and Western Isles.*

*The **long-term roll out of infrastructure to villages** will provide access to those without off-street parking ensuring **no community is excluded** from the transition to low carbon transport.*

***Public chargers** will be strategically located in places **where people need and use them**, particularly focusing on onward journeys for visitors and residents alike, promoting a reduction in car miles in areas currently highly dependent.*

*This will provide a **just transition to Net Zero by 2045** in alignment with the Scottish Government targets. Where possible, the EV network will be powered by renewable energy to utilise local advantages and ease grid capacity pressures.*

[34] Comhairle nan Eilean Siar Climate Change Strategy 2022-2027. Accessed here: Climate Change Strategy 2022-2027 (cne-siar.gov.uk)

5.2.2 Objectives

As part of the above vision development process, a number of key objectives and priorities for the expansion plan across the three island councils were identified; Figure 5.1 illustrates the objectives which comprise the vision. Further to this, there were several more localised objectives that make this project differ from those on the mainland, taking into consideration nuances that stem from the geographical nature of the archipelago character.

The key objectives for the network include:

- People-focused: residents and visitors alike
- Reliability and inspire confidence in the network.
- Long-term rapid rollout to support onward journeys.
- Place principle: a comprehensive network developed through collaboration with all parties.
- Strategically placed hubs: to provide connectivity and charging across the islands, increase utilisation to attract private investment, and make maintenance easier.
- Holistically embedded in the wider transport network.
- Support local connectivity and sustainable tourism and economic growth.
- Provide a just transition: accessibility, ease of use, fair pricing, network coverage which supports all demographics.

Figure 5.1: Key Objectives Identified

Source: Mott MacDonald

5.2.3 Local objectives

There were several objectives identified in the existing evaluation frameworks that pointed towards particular aspects of the network that were important on an individual basis or which highlighted the importance of noting the difference between mainland EV infrastructure development, and that across the island chains which make up this study area. These include:

- The Orkney Location Themes 1-3 for EVCI instalment to ensure a comprehensive charging network:
  - Theme 1: Community Buildings and Schools
  - Theme 2: Transport Terminals
  - Theme 3: Site Duplication
- Geographical considerations on accessibility (shelters and rest stops due to rural/isolated nature)
- Strategic hubs as a short-term priority
- Inclusion of peripheral communities and residential connectivity to villages as a longer-term priority (as these areas will largely be covered by home-charging) and strategic hubs will create provision for those without access to off-street parking.
- Significance of tourism and visitor demand
- Islands will require different maintenance, response times, grid connectivity, communication and weather-related issue may impact the network differently. Upskilling of local residents will enable the ability of the councils to control their own chargers, improving local resilience.
- Increase utilisation/EV uptake, particularly in the Western Isles.

6 Economic Case

This section outlines the demand forecasting undertaken to determine the likely required number of public EVCI to support the growth in EV uptake across the island authorities. In addition, site identification and the associated capital cost estimates are also outlined.

The economic case provides the potential requirements from an EVCI network perspective to meet the wider goals as per the Strategic Case and the Transport Scotland Vision for the Public EV Charging Network. This section builds on the work undertaken in the 'Evaluation Frameworks' produced by Urban Foresight for HITRANS which cover the three island authorities.

6.1 Electric Vehicle Forecasting Results

To determine the potential demand for EV charging, analysis was undertaken by Urban Foresight to determine the potential uptake of EVs across the three island authorities.

The forecasting applies the Climate Change Committee Net Zero Pathways[35] to observed vehicle registration data for the three island authorities to determine the potential uptake in demand over the subsequent demand years. The results of the forecasting are outlined in Table 6.1Table 6.1.

Table 6.1: Forecast Plug in Vehicle Uptake for Orkney, Shetland and Western Isles

Forecast PiV Uptake	2025/26	2030/31
Orkney	3,835	10,598
Shetland	2,461	6,800
Western	3,726	7,731
Total	**10,022**	**25,129**

Source: Urban Foresight

The results illustrate a significant increase in EV uptake in 2025/26 and further growth by 2030/31. As with any forecasts, there are uncertainties which may influence the potential outcomes outlined above. Some of the key influencing uncertainty factors which may affect this are listed as follows:

- Average vehicle age.
- Household income.
- Daily vehicle mileage within the Northern and Western Isles.
- Date of price parity of EV to Internal Combustion Engine (ICE) vehicles.
- The addition or removal of government incentives, including for fleet vehicles
- Availability of existing charging infrastructure.
- The extent of EVCI coverage, including home chargers.
- New charging alternatives such as, home charging.

[35] Climate Change Committee, 2020. Sixth Carbon Budget. Available at: https://www.theccc.org.uk/publication/sixth-carbon-budget/

6.2 Preferred Charge Point Mix

6.2.1 Approaches to Electric Vehicle Charging

There are a range of potential approaches to installing charging infrastructure to meet demand, which differ from the traditional petrol filling station model. These can be broadly categorised as follows:

- **Private off-street**: Charging undertaken on private property with off-street parking in a domestic or non-domestic setting, such as driveways, garages or private car parks. When vehicles can charge on private property to fulfil much of their charging needs, their subsequent demand on the public network is less. This is expected to account for much of the charging demand on the islands.
- **Residential:** typically located on-street outside or close in proximity to residential properties. These can be mounted on lampposts depending on the location relative to the pavement, bollards or using regular chargers in a residential car park. Residential chargers should be prioritised where households do not have access to off-street parking, such as flats. These are designed to be used during long dwell times, such as overnight, and are assumed to have a power output of up to 7kW.
- **Destination:** these are located at areas where they attract significant volumes of visitors such as supermarkets, retail parks and country parks, where the typical length of stay is typically upwards of one hour. These are considered to provide opportunity charging for drivers, with typical power output of between 7 and 50kW.
- **Journey**: these are typically located where the duration of visit is less than an hour, such as at a motorway service station or petrol station. The priority is charging speed and are typically used mid-journey or where the sole purpose of the journey is to charge a vehicle. It is expected that these would be installed as part of hubs with multiple chargers available. Typical power output has conservatively been assumed as 50kW due to the present prohibitive cost of ultra-rapid EVCI in a constrained power grid setting like the islands.

6.2.2 Variables

Urban Foresight worked with the local authorities and HITRANS to determine a preferred approach to charge point mix by accounting for a range of factors as outlined in the following sections.

Type of EV

The different types of EV outlined in Section 1 have an impact on the required charging infrastructure. The EV compositions between BEV and PHEV are typically separated due to:

- BEV and PHEV users have different preferences towards recharging, as PHEVs can fall back on the ICE when required.
- PHEVs require less electrical energy than BEV due to the backup ICE and smaller battery capacity.

Household Parking Availability

Household parking availability data is based on the Scottish Household Survey outputs[36]. The access to off-street parking at a household (e.g., garage or parking space on site) influences how drivers will recharge their vehicle. Households which have access to off-street parking are assumed to primarily recharge privately at home, and not primarily reliant on the public charging network, unlike drivers which do not have off-street parking.

[36] Scottish House Condition Survey: Additional Analysis, Scottish Government. September 2020.

For example, the Northern and Western Isles have a relatively high proportion of households with access to off-street parking, 66% (Shetland), 77% (Western Isles) and 81% (Orkney). This means that it can be assumed that drivers are less reliant on publicly available EVCI and the demand for public EVCI will be predominately tourists, visitors with some top up for residents.

Vehicle Type

The types of vehicles accessing the charging network also has implications on the suitability of different charging infrastructure and the charging speeds required to fulfil day to day operations. For example, if the availability of private parking and/or availability of EVCI is low for commercial premises, then LGV drivers may use the public network more. Taxis or private hires will also be reliant on the public network to fulfil charging needs between jobs.

6.3 EVCI Demand Forecast

6.3.1 Forecast Results

The forecast charging infrastructure requirement for each of the council areas for 2025/26 and 2030/31 is outlined below. This forecast includes EVCI anticipated to be provided by both independent providers and the island authorities through EVIF.

Table 6.2 outlines the total forecast EVCI requirements for the Orkney Islands.

Table 6.2: Forecast EV Charging Infrastructure Requirement for the Orkney Islands

Orkney Islands	2025/26	2030/31
Total Fast (7 to 22kW) Chargers	55	123
Total Rapid (50kW+) Chargers	20	35
Total Charging Devices	**75**	**158**

Source: Urban Foresight

Table 6.3 illustrates the total forecast EVCI requirements for the Shetland Islands.

Table 6.3: Forecast EV Charging Infrastructure Requirement for the Shetland Islands

Shetland Islands	2025/26	2030/31
Total Fast (7 to 22kW) Chargers	39	87
Total Rapid (50kW+) Chargers	13	23
Total Charging Devices	**51**	**110**

Source: Urban Foresight

Table 6.4 outlines the overall EVCI requirements for the Western Isles.

Table 6.4: Forecast EV Charging Infrastructure Requirement for the Western Isles

Western Isles	2025/26	2030/31
Total Fast (7 to 22kW) Chargers	45	82
Total Rapid (50kW+) Chargers	26	39

Western Isles	2025/26	2030/31
Total Charging Devices	**71**	**121**

Source: Urban Foresight

6.4 Provision included in the EVIF Application

It is anticipated that a proportion of the forecast identified above will be met by independent providers, without any intervention from the public sector. Taking this into account, the number of additional sites and chargers identified from the previous study stage to be progressed in conjunction with HITRANS and the councils for EVIF are summarised in Table 6.5. These are expected to be installed by 2025/26 to complement the existing public charging network.

Table 6.5: Target Additional Council EV Charging Infrastructure to be Installed by 2025/26

2025/26	Number of Additional Sites as part of EVIF	Additional AC (7 to 22kW) Chargers	Additional Rapid (50kW+) Chargers
Orkney	22	26	9
Shetland	7	12	12
Western Isles	4	6	14
Total	**33**	**44**	**35**

Source: Urban Foresight and HITRANS

These additional chargers will allow for a council provided network as captured in Table 6.6.

Table 6.6: Summary of existing and planned EVCI to be provided through the EVIF

	AC (7kW)	AC (22kW)	DC (50kW)	Subtotal council provision	Total council provision (Existing & Planned)
Orkney Existing	8	11	11	30	65
Orkney Planned	15	11	9	35	
Shetland Existing	6	14	6	26	50
Shetland Planned	12	0	12	24	
Western isles Existing	4	14	13	31	51
Western isles Planned	6	0	14	20	

Source: Urban Foresight

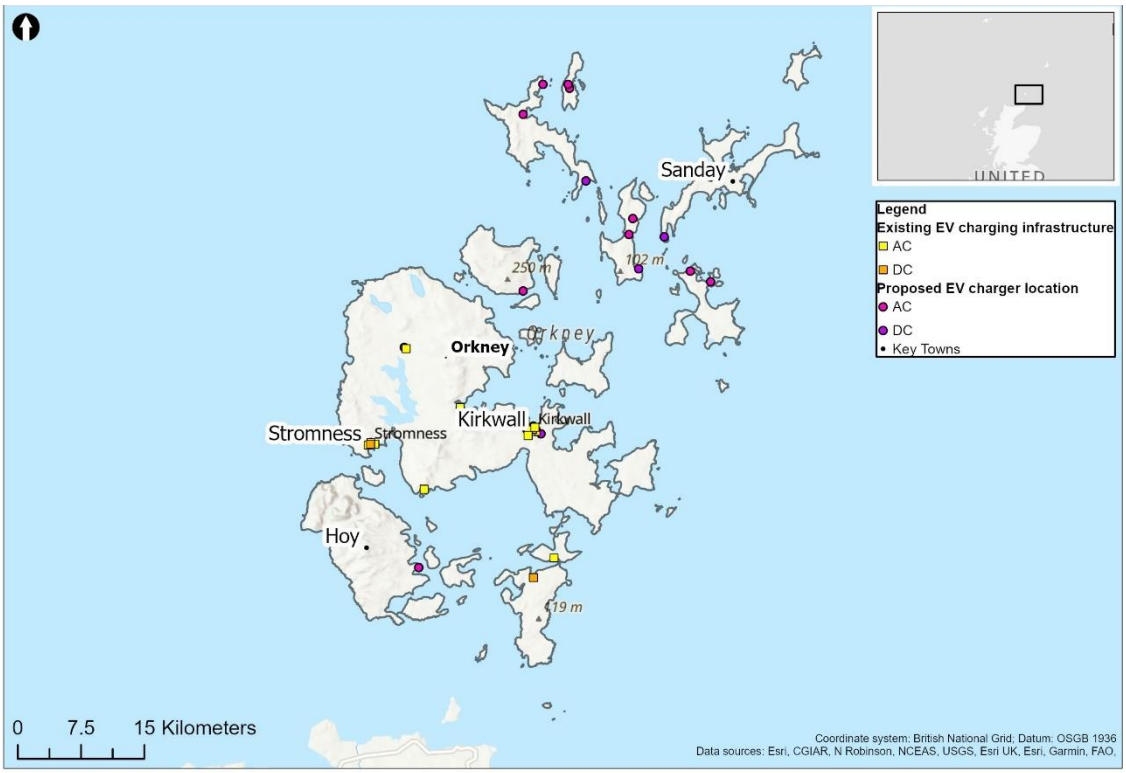
6.5 Site Identification

As required by the SFT template, locations for the 2025/26 charger demand have been identified. The preferred approach to types of planned charging infrastructure varies by council area. This can be summarised as follows:

- For Shetland and the Western Isles, EVCI demand is assumed to be met by charging hubs to centralise the infrastructure. The objective of charging hubs is multi-purpose (for example, supporting tourism, allowing interchange with other modes, enabling greater connectivity) but also to improve maintenance upkeep by focusing charging infrastructure in fewer locations. These hubs will feature multiple journey and destination chargers to cater for different needs. This approach will also support fleet vehicles, including LGVs.
- For Orkney, additional EVCI demand is assumed to be met at existing destinations. This would allow users to access charging infrastructure as part of day-to-day trips to existing destinations. These predominantly consist of destination-type chargers with several additional journey chargers to meet rapid charging needs.

These preferred approaches were discussed and agreed between the individual island authorities and HITRANS. Based on this approach, The locations of the existing and proposed 2025/2026 network are illustrated in Figure 6.1 to Figure 6.3**.**

Figure 6.1: Proposed Orkney Council Public Charging Network by 2025/26

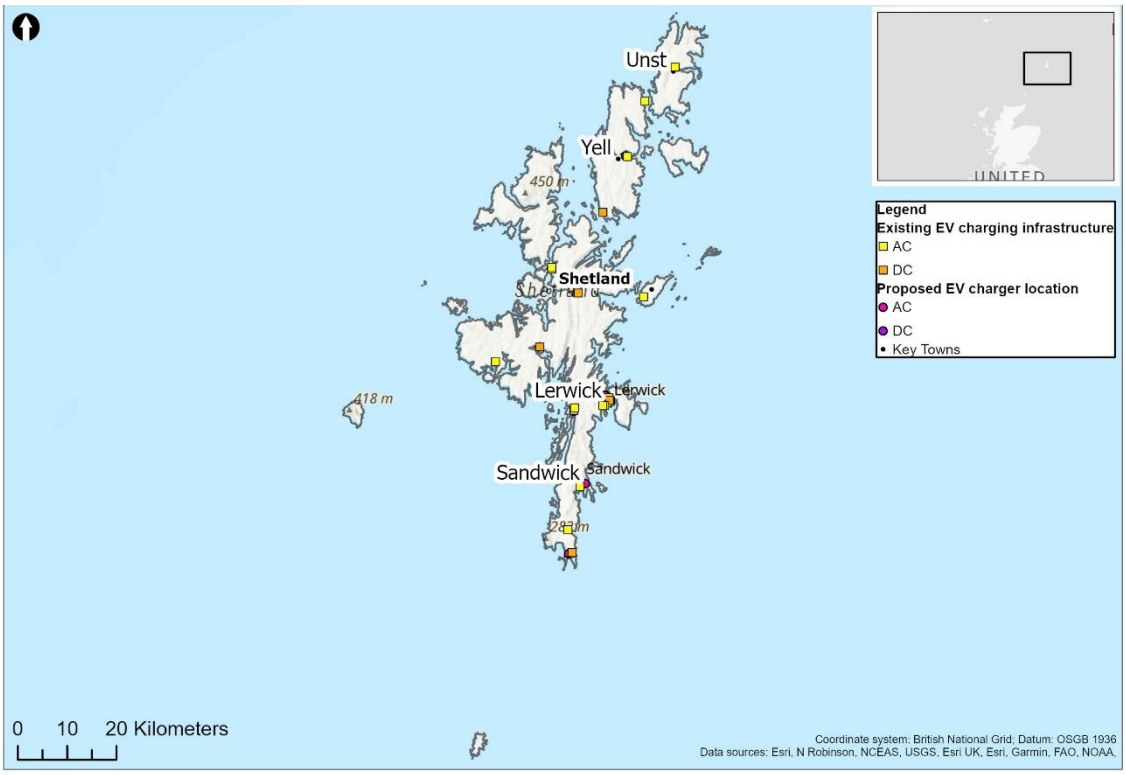


Source: Mott MacDonald

The Orkney Islands approach is to install infrastructure at key trip attractors and destinations to support other land uses and provide convenient locations for charging.

The resulting charging network following the analysis and engagement for Shetland is shown in Figure 6.2.

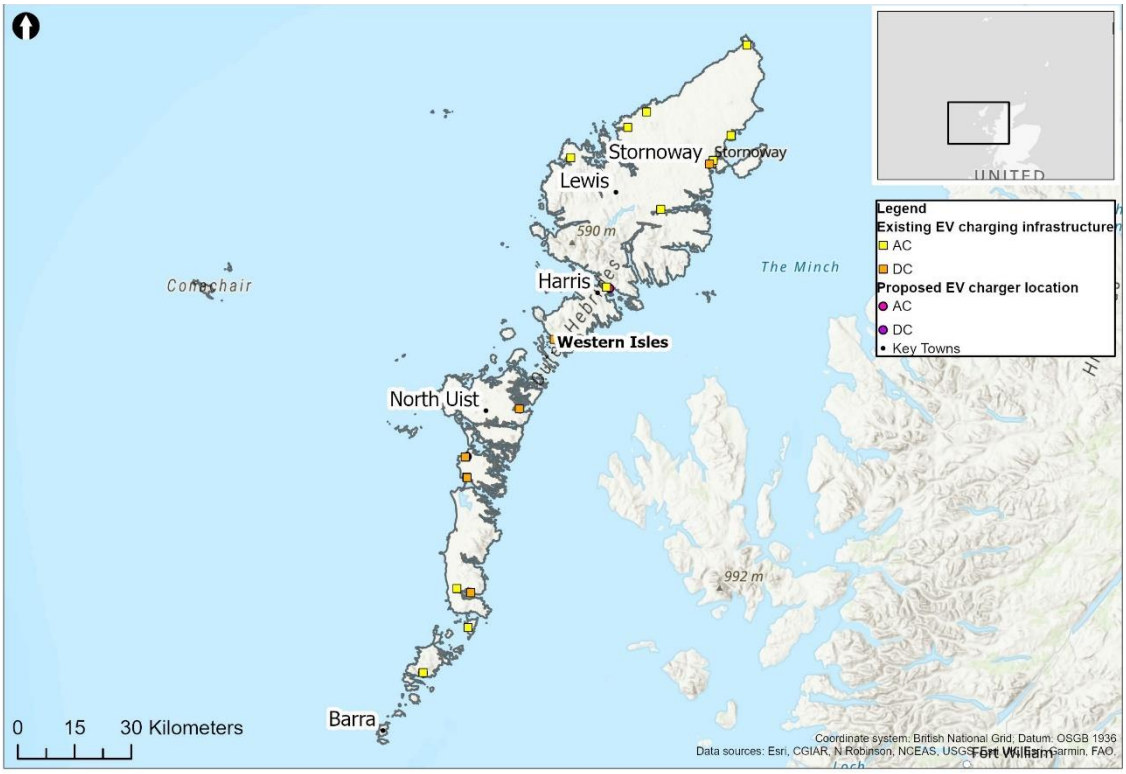
Figure 6.2: Proposed Shetland Council Public Charging Network by 2025/26



Source: Mott MacDonald

The overall charging network for the Western Isles, including existing and proposed units, are shown in Figure 6.3.

Figure 6.3: Proposed Western Isles Council Public Charging Network by 2025/26



Source: Mott MacDonald

The identified sites are based on the following considerations:

- **Trip attractors –** including key public buildings such as community centres, schools, hospitals, leisure centres and parks, as well as other sites that may require council support.
- **Main roads –** proximity to well trafficked routes across the islands.
- **Key communities –** locations which are focal points of the community, which may attract users journeying to or passing by the community identified.
- **Existing charging facilities –** locations where existing chargers are present may be supplemented in some instances to co-locate infrastructure and increase provision. Alternatively, if existing infrastructure is present then this has been accounted for and the additional infrastructure is located away to increase the coverage as part of the comprehensive charging network objective of the Transport Scotland vision.
- **Placemaking criteria –** consider the placement of EVCI in promoting high streets and town centres, such as in public car parks near high streets.
- **Transport hubs –** integration with other modes of transport, particularly airports, bus stops and ferry terminals were analysed to ensure the charging network encourages public transport modes.
- **Active travel routes –** consideration of where active travel corridors exist and/or locate infrastructure within walking or wheeling distances to town or village centres.

The proposed provision outlined above is indicative only. Final locations and charger mix will be dependent on the preferred approach by the CPO and council, and the subsequent engagement required with the DNO.

6.5.1 Council chargers per 100,000 capita

Table 6.7 shows the number of council chargers provided per 100,000 capita in 2022 before the installation of chargers funded by the EVIF, and the full council network in 2025/26 once the planned chargers are in situ.

In the specific case of the Northern and Western Isles where the population is less than 100,000 people, this metric would appear to have little merit however has been provided to enable comparison to other local authorities in Scotland with larger populations.

Table 6.7: Council provided chargers per 100,000 capita

Island authority	2022/23	2025/26
Orkney	**133**	**288**
Shetland	**113**	**218**
Western Isles	**73**	**119**
Combined	**99**	**188**

Source: Urban Foresight and HITRANS

6.5.2 EV to charger Ratio

Table **6.8** shows the ratio of PiVs to council chargers for the 2022/23 council network and the proposed 2025/26 council network.

Table 6.8: Ratio of PiVs to council charge points

2025/26	2022/23	2025/26
Orkney	**35**	**59**
Shetland	**26**	**49**
Western Isles	**39**	**73**
Combined	**34**	**60**

Source: Urban Foresight and HITRANS

In the table above, the number of PiVs per council charger increases in 2025/26 from the baseline despite the introduction of additional council chargers. However, we note that the proportion of rapid chargers is high and additional chargers are also anticipated to be installed by independent providers.

6.5.3 Supporting the Transport Hierarchy

A key aspect of the Transport Scotland Vision for the public charging network is the integration with active travel modes and public transport. Therefore, as part of the analysis in determining charge point locations, the locations of bus stops, active travel routes, ferry terminals and airports have been analysed in context of nearby charging infrastructure. This analysis is illustrated in Figure 6.4 to Figure 6.6.

Figure 6.4: Orkney Active Travel and Public Transport Alignment with Proposals

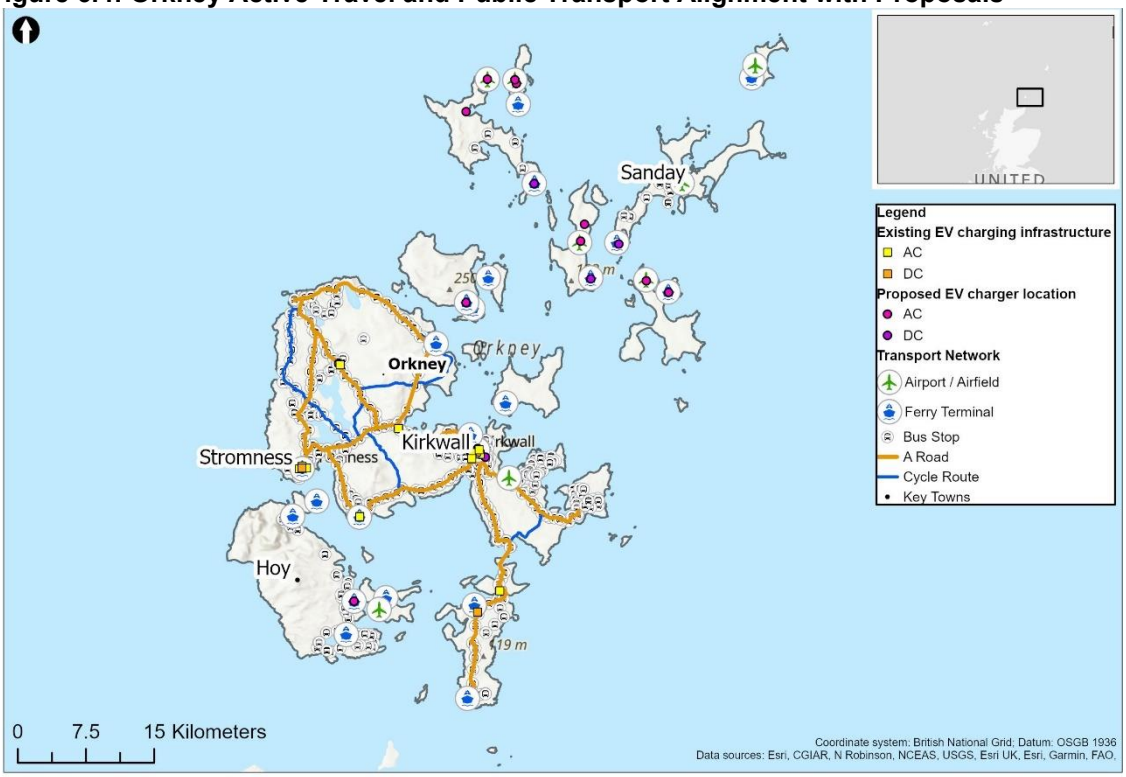


Figure 6.5:Shetland Active Travel and Public Transport Alignment with Proposals

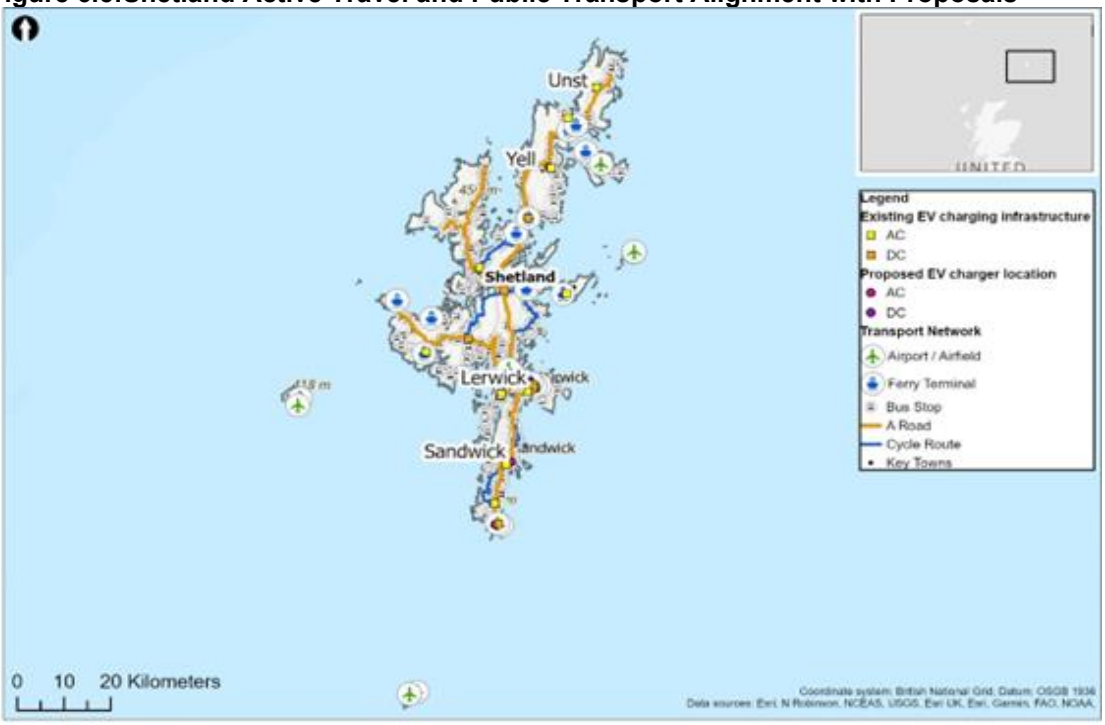
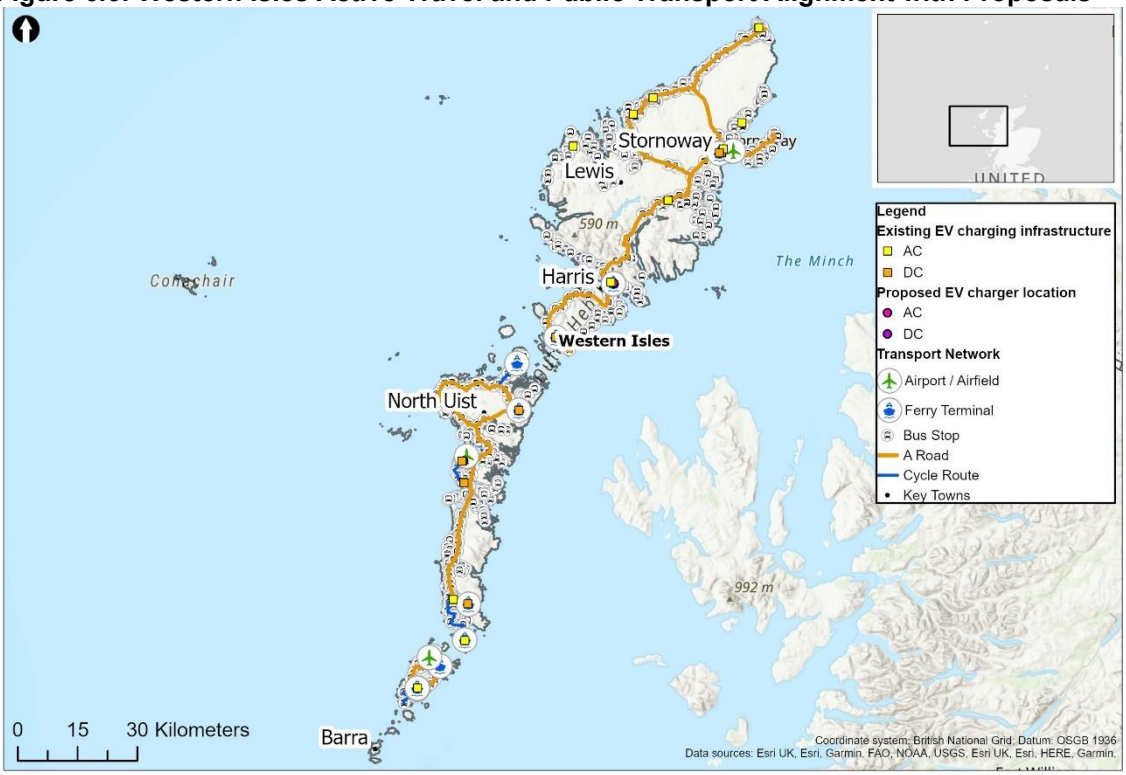


Figure 6.6: Western Isles Active Travel and Public Transport Alignment with Proposals



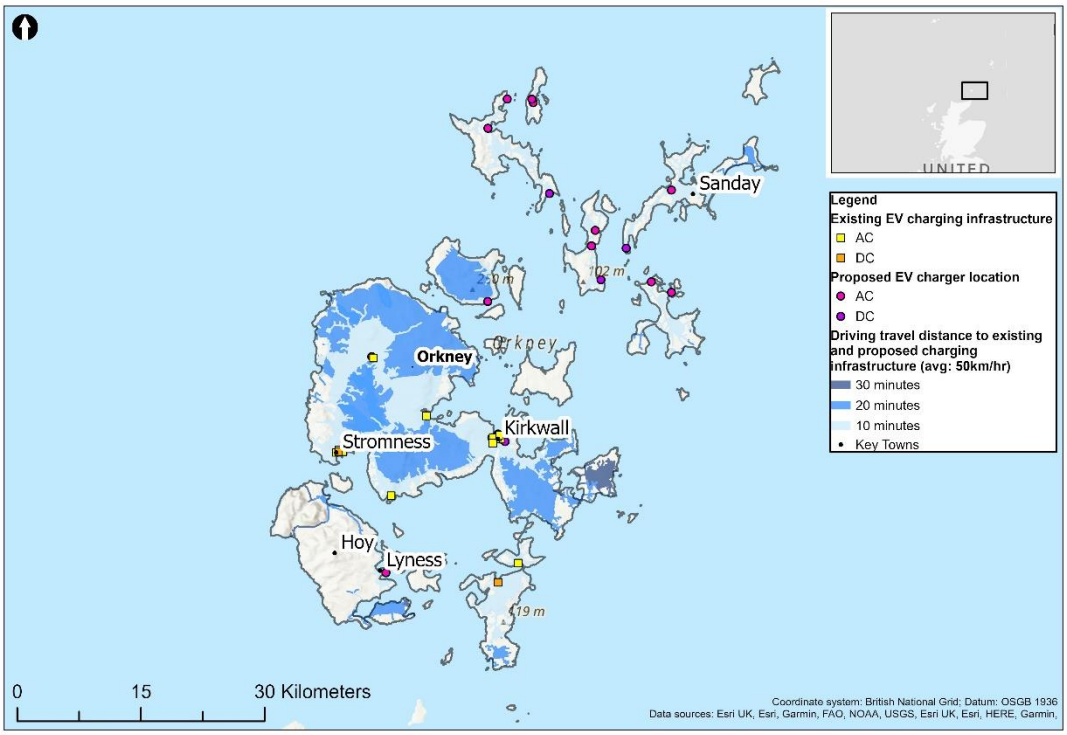
The figures illustrate that a large proportion of the proposed EVCI locations in the three island authorities are located at Airports and Ferry Terminals, and many of the existing EVCI locations are situated at key points along the strategic road network. It is also evident that in and around key towns there are clusters of EVCI.

6.5.4 Rural Proofing Analysis

Key objectives of the Transport Scotland vision for the public EV charging network focus around providing a comprehensive charging network across Scotland, creating a people-focused network that works for everyone and ensuring a just transition. These objectives apply just as much in rural locations as in urban areas. A rural proofing analysis has been undertaken to review how the proposed network meets these objectives and to address any shortfalls where identified.

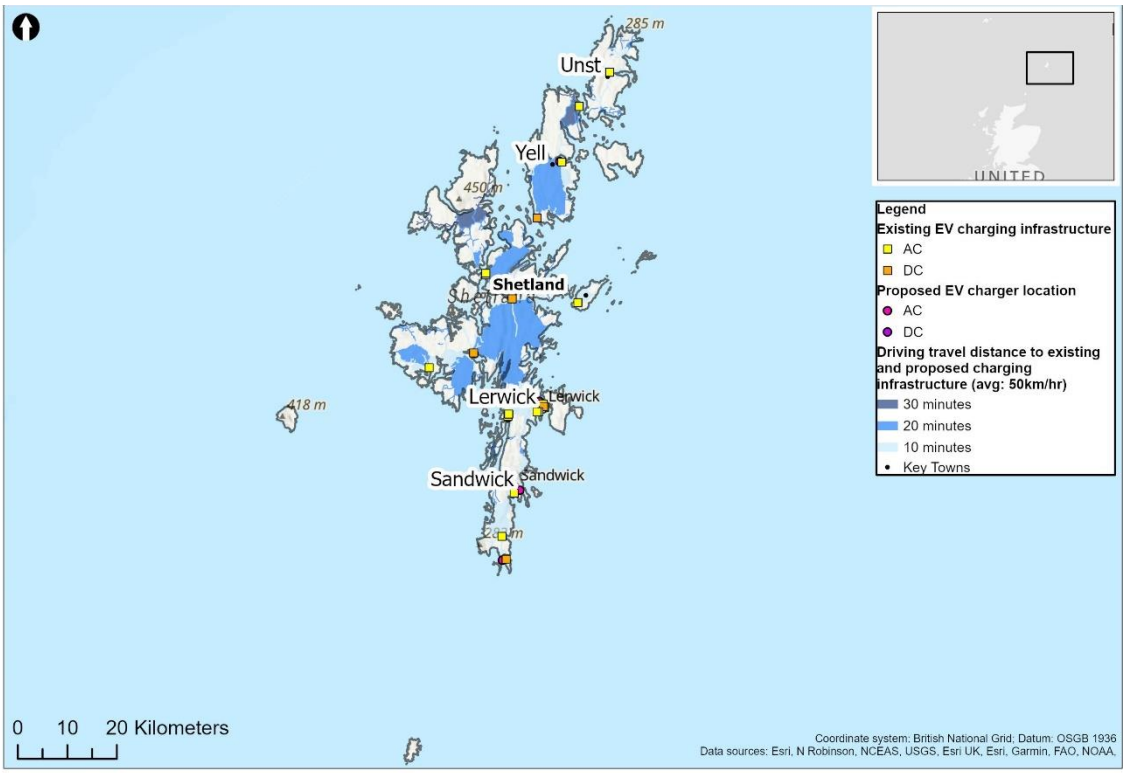
The analysis creates 10-, 20- and 30-minute driving catchments (at 50km/h) around all known existing and proposed publicly accessible EVCI. The results are illustrated in Figure 6.7 to Figure 6.9.

Figure 6.7: Orkney Council Rural Proofing Analysis of the Proposals



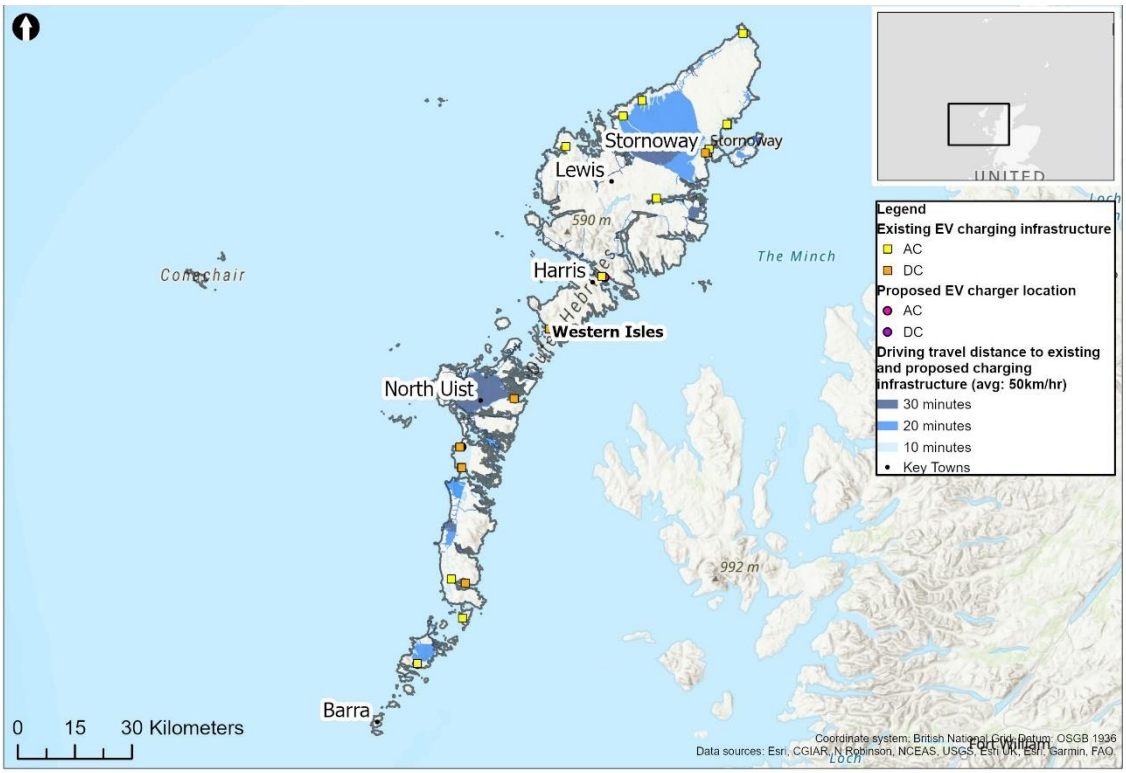
Source: Mott MacDonald

Figure 6.8: Shetland Council Rural Proofing Analysis of the Proposals



Source: Mott MacDonald

Figure 6.9: Western Isles Rural Proofing Analysis of the Proposals



Source: Mott MacDonald

Figure 6.7 illustrates that the main road network on Orkney is covered. Large parts of the main island can access an EV charger within 30 minutes. Towards the northern extent of the island in and around Westray, Eday and Stronsay, a large proportion of the proposed EV charger locations are expected to be accessible within 10-20 minutes. Although EVCI is accessible within 30 minutes across the majority of Orkney, as the map indicates, only some parts of the eastern edge of the island of Hoy are within 30 minutes of a charger and this is due to the majority of the island being very rural and not covered by the road network. The village of Lyness is a proposed location for a charge point.

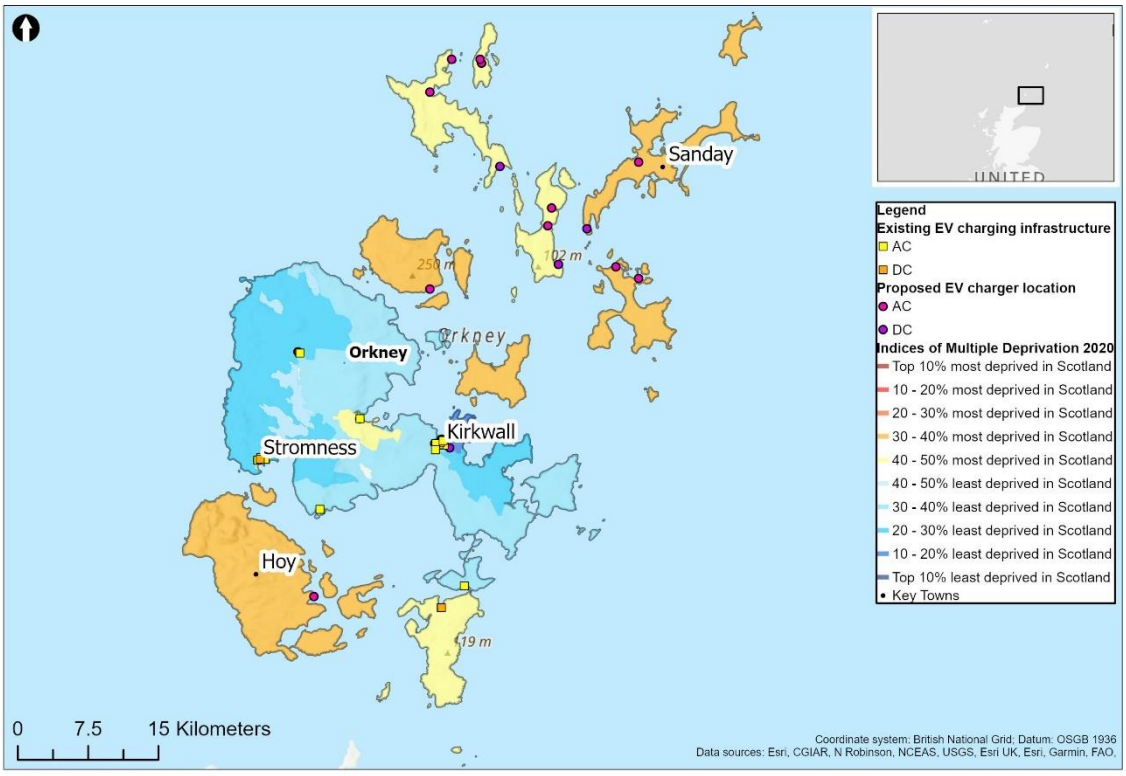
Figure 6.8 indicates that the main road network in Shetland is covered in the area of North Uist and Stornoway. People living in and around Lewis and Harris can access an EVCI within 30 minutes, but the driving catchment is significantly smaller when compared to Stornoway and North Uist which have a larger and more developed road network.

Figure 6.9 also illustrates that the majority of the main road network in the Western Isles is covered. People living in and around Sandwick, Lerwick and Unst can access an EVCI within 10 minutes. EVCI situated elsewhere on the islands is accessible within 30 minutes.

6.5.5 Scottish Index of Multiple Deprivation

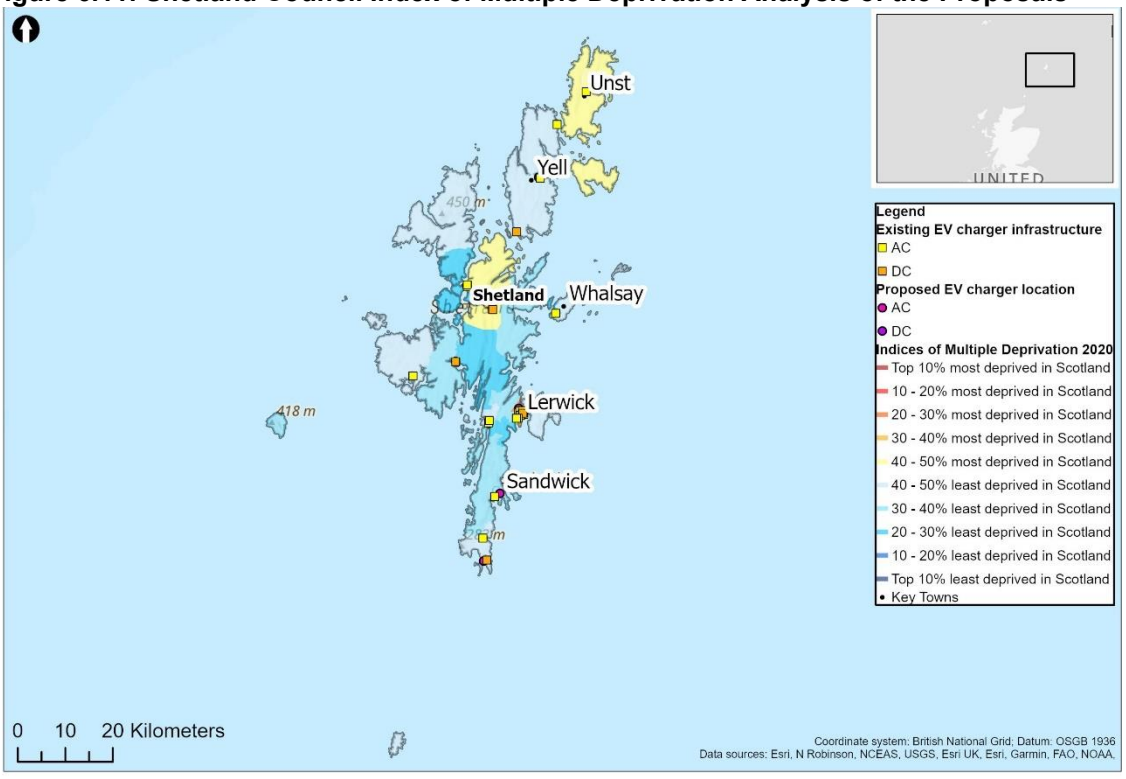
To aid the understanding of deprivation and economic disadvantage, the Scottish Indices of Multiple Deprivation (SIMD) are mapped to understand the spatial distribution within the three island authorities relative to the proposed charging network. Figure 6.10 to Figure 6.12 illustrate the findings of the analysis, showing the SIMD deciles relative to the existing and proposed infrastructure.

Figure 6.10: Orkney Council Index of Multiple Deprivation Analysis of the Proposals



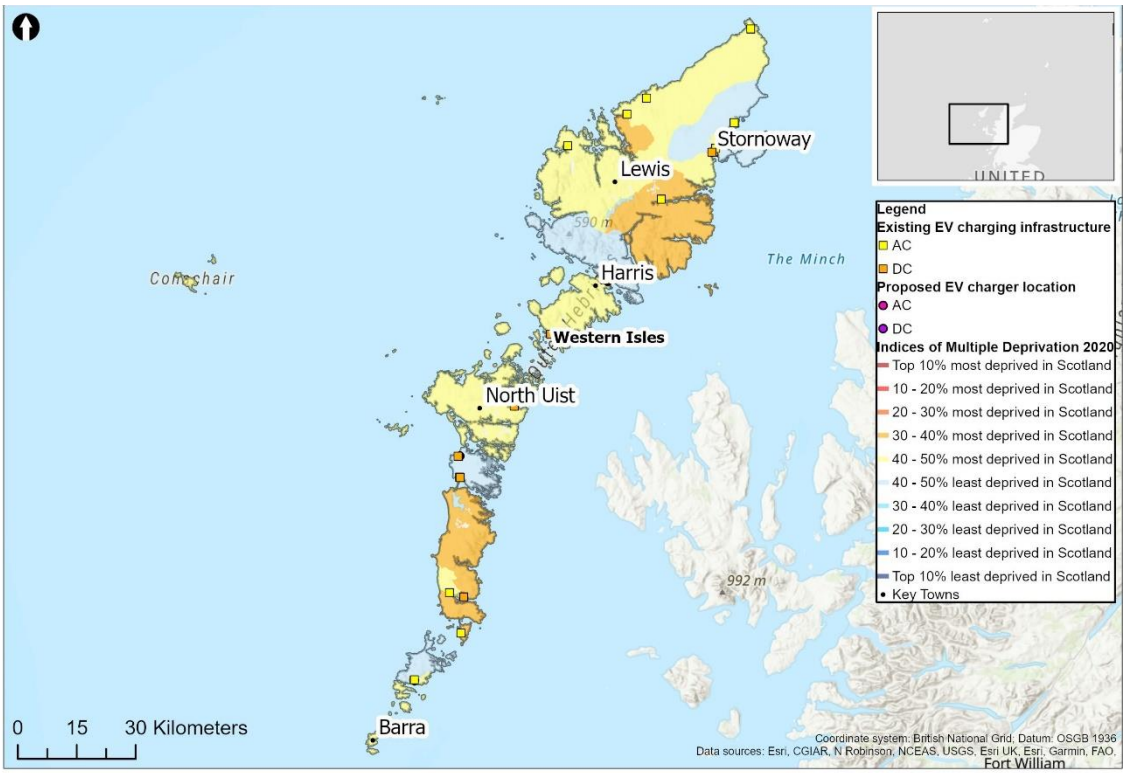
Source: Mott MacDonald and SIMD

Figure 6.11: Shetland Council Index of Multiple Deprivation Analysis of the Proposals



Source: Mott MacDonald and SIMD

Figure 6.12: Western Isles Index of Multiple Deprivation Analysis of the Proposals



Source: Mott MacDonald and SIMD

As discussed in Section 2 deprivation levels are moderately low across Orkney, with the northern and southern isles indicating slightly higher levels of deprivation. **Figure 6.**10 shows that there is an even distribution of EVCI across the northern isles, however across the southern isles there are fewer due to the spread of the population.

The majority of Shetland sits within the 10-30% least deprived in Scotland. The map indicates that there is an even distribution of EVCI across the island.

Deprivation levels across the Western Isles are contrastingly higher when compared to Orkney and Shetland. When existing and proposed EVCI are combined, the map indicates that there is a relatively even distribution of EVCI locations. It is noted that residential uptake of EVCI on the Western isles is low and the strategy largely caters for onward journeys, not residential charging.

6.6 Capital Investment Pipeline and Estimated Costs

The capital investment costs in a charging network can vary considerably based on a range of variables. This can depend on factors such as the location, the type of EVCI, the capacity of the local and regional electricity grid and the scale of civil engineering works required. Detailed site surveys and extensive engagement with the DNO are required prior to construction to ensure the likely capital works costs are known and that the proposed infrastructure can be accommodated.

The capital works costs were estimated to provide input to the **Financial Case** and the Feasibility Model, based on a sample dataset of EVCI installation costs and grid upgrade quotes. Typically, these costs were around 50% greater than the costs noted in the Planning

Assumptions[37] provided by the SFT. Therefore, a 50% cost was applied to the Planning Assumptions to account for the observed installation challenges for remote and rural areas from the evidence base, which impacts costs across the installation process.

The following cost estimates are provided as part of this section:

- CapEx:
  - Enabling works and EVCI installation costs.
  - DNO and grid connection cost estimates.
- OpEx:
  - Transaction costs.
  - Maintenance costs.

6.6.1 Enabling and EVCI Installation Costs

The following costs were estimated for the enabling works associated with EVCI, and the installation of the infrastructure for each type of charger, as per Table 6.9.

Table 6.9: Enabling and Installation Costs Assumed per charger.

Enabling & Installation Costs	7kW	22kW	50kW
SFT Planning Assumption	£ 9,800	£ 10,300	£ 46,800
Revised Rural Costs	£ 14,000	£ 14,600	£ 66,600

Source: SFT and Mott MacDonald

The outlined costs include the assumed cost of the charger unit, enabling works, preliminaries, overheads and profit allowance, risk and contingency (at 25%). It is assumed that no other works are required to the existing parking provision or road network around the proposed sites.

No utility diversions and associated works costs have been accounted for within the cost estimates. The above does not include electricity grid connection costs, for which the calculations are outlined in the subsequent section.

6.6.2 DNO Cost Estimates

The costs to connect the proposed charging infrastructure to the electricity grid are unknown at this stage and are dependent on the site location and localised grid constraints. Early engagement has taken place with the DNO, Scottish and Southern Electricity Networks (SSEN). Ongoing engagement with SSEN is required as the lead in times can be many months or years where grid reinforcement is required, as upstream upgrades may be required beyond the proposed site location and immediate vicinity.

There are changes underway for DNO connection charges following a review by Ofgem in April 2023. Under the current system, the cost burden for connection charges are shared between the connecting customer and the wider distribution network customers. Any reinforcement two voltage levels above the voltage at the point is connection is paid for by the DNO's wider customer base (subject to a cap).

The proposed changes would result in the following:

- Reduced overall connection charge.
- Charge for wider distribution network reinforcement is removed, with limited exceptions.

[37] Scottish Futures Trust, 2023. Electric Vehicle Infrastructure Fund – Strategy and Expansion Plans Planning Assumptions v1.5. 17th March 2023.

- Connection charges remain as they are for any 'extension assets' (e.g. sole use).

Future connection charges will be reduced in future following the removal of the wider network reinforcement fees, e.g. the upstream grid infrastructure upgrades required as a result of the scheme. This cost instead is passed onto wider customers.

For the purposes of this study, the following DNO connection costs have been assumed. Similar to the enabling and EVCI installation costs, the SFT Planning Assumptions have been used as a basis with an 80% rural cost penalty applied as demonstrated in Table 6.10.

Table 6.10: Summary of Assumed DNO Connection Costs per Charger

DNO Costs	7kW	22kW	50kW
SFT Planning Assumption	£2,000	£2,000	£4,000
Revised Rural Costs	£3,600	£3,600	£7,200

Source: SFT and Mott MacDonald

The cost penalty reflects quotations received for grid connection upgrades in rural areas, prior to the proposed changes to the connection cost system.

6.6.3 Transaction Costs

These costs reflect payment processing fees when payment is made at charge points, which vary depending on the method of payment used. Typically, these payment methods can include:

- **Contactless reader:** transaction costs are usually a percentage (1.5% to 3.0%) of the total payment, depending on the type of payment card network (e.g., Visa, Mastercard or American Express).
- **App-based payment:** costs are usually similar to using credit/debit cards on contactless readers, as the app processes payment via a vendor like when using contactless.
- **RFID card or subscription:** typically, these have lower transaction costs due to monthly billing cycles depending on usage levels. Payment is taken as a lump sum at the end of the billing cycle, depending on the CPO.

The suggested transaction costs in the SFT Planning Assumptions were used to ensure consistency with other EVIF business cases, as these are found to be a good representation on typical annual transaction costs. They present a good average representing a range of payment types and utilisation levels. These assumed transaction costs are:

- AC Annual Transaction Cost: £146
- DC Annual Transaction Cost: £365

6.6.4 Planned Maintenance Costs

The planned maintenance costs are the annual maintenance required on charging infrastructure, covering aspects such as general wear and tear, and replacement of consumable parts. These costs are expected and are part of the annual maintenance regime of the CPO to ensure smooth operations.

To ensure costs are adequately represented for a rural context, a rural penalty has been applied to the assumed maintenance costs. These are shown in Table 6.11.

Table 6.11: Summary of Assumed Planned Maintenance Costs per Charge Point

DNO Costs	7kW	22kW	50kW
SFT Planning Assumption	£400	£400	£1,800

DNO Costs	7kW	22kW	50kW
Revised Rural Costs	£600	£600	£2,600

Source: SFT and Mott MacDonald

These increased costs over the SFT Planning Assumptions are to account for factors including:

- Greater exposure of EVCI to inclement weather.
- Greater travel costs to remote locations.
- Greater risk of vandalism or misuse in remote locations.
- Higher labour costs to cover a greater area.

6.7 Communications and Maintenance Reliability

A key priority to be addressed as part of the ongoing operation of the public charging network across each of the council areas is ensuring reliable charge points with an adequate maintenance schedule. The isolation of the islands presents challenges for ensuring the infrastructure is well maintained and reliable, especially around timely repairs and adequate data connections for processing payments.

Local maintenance provision is essential for the island authorities. For ly occasional example Shetland island Council electricians have been maintaining the public and fleet EVCI network for many years with only a backup service from the CPO. Shetland Council officers report that around 90% of issues are basic faults with only occasional visits required by specialist engineers.

To improve the operational reliability and ease of maintenance, the EVCI proposed in Shetland and Western Isles are bundled together as charging hubs. This allows maintenance to be carried out in a reduced number of locations than if these were spread across the islands. There are further opportunities to incorporate maintenance of electric fleet vehicles in addition to the EVCI.

At present the University of Highlands and Island (UHI) do not offer EV related maintenance or engineering courses, but implementing such a course would help develop a local skills base for CPOs to employ as maintenance contractors or EV engineers. Skills could include:

- Training charging infrastructure engineers in deploying and maintaining the charging network.
- EV maintenance and repairs
- EV sales

A local skills base could help reduce labour costs for CPOs to mitigate the need for full training courses or relocating staff to the area. It is the ambition of the three island authorities to increase local resilience through upskilling residents to provide greater control over reliability of charge points. There is an opportunity to improve retention of young people to a working age through training and upskilling in a growing sector; over time, this would enable economic growth in the Northern and Western Isles.

7 Commercial Case

This section explores the commercial models and procurement options for the future delivery of public charging networks across the three island authorities. The commercial case provides analysis on the ability to mobilise and manage EVCI in an island setting, focusing particularly from delivery. In light of the ChargePlace Scotland (CPS) network ending in 2025, there is a need to consider how the current EVCI network can be managed to ensure seamless delivery and service to end-users.

7.1 Commercial Objectives

Based on discussions with both HITRANS and the three island authorities, a number of commercial objectives were identified which underpin the future expansion of EVCI across the region:

- **Support for authority social objectives:** supporting local authority objectives around a socially just transition to widespread EV rollout, including around coverage and access and pricing levels.
- **Value for money:** preference for commercial models that maximise the efficiency of delivery and operations/maintenance so as to minimise costs borne by users and taxpayers.
- **Affordability:** ensuring that a scheme's public sector capital investment demand falls within local authority capital access limits.
- **Resourcing:** preference for models that minimise resourcing requirements on local authority, both at the procurement and the operations/maintenance phase.
- **Contestability:** seeking to ensure a long-term competitive market that avoids private sector monopolistic conditions or public sector over-regulation.
- **Transition**: seeking approaches that can cost effectively transfer existing assets to the new commercial arrangements.

7.2 Findings from Stakeholder Engagement

As described in Section 4, stakeholder engagement sessions were conducted with key stakeholders in the EV sector. The main objective of this exercise was to identify opportunities for potential collaboration and linked strategies between stakeholders and the three island authorities. For example, engagement was undertaken with CPOs[38] to understand their own plans and aspirations for deploying EVCI across the Northern and Western Isles. The following findings are relevant to the Commercial Case:

There is limited interest to date from established CPOs but further engagement is necessary to understand commercial viability which governs interest.

- At the time of writing this report, there has been limited private sector interest in widespread EVCI investment across the Northern and Western Isles, with existing infrastructure provided predominantly by local authorities and other providers.
- Private sector interest to date has been focused on providing infrastructure and operations/maintenance. CPOs have not been actively considering concession structures in these areas due to limited scale and existing demand requirement.
- The nature of private sector involvement is dependent on commercial viability of charging networks across the region which certain CPOs (e.g., Blink, SWARCO) are seeking to clarify

[38] See Stakeholder Engagement Plan nin Appendix B

with assessments of current and future charging infrastructure. Understanding the propensity of the private sector to invest will require further engagement.

Greatest interest from alternative providers such as Reflex

- Greatest interest documented to date has been from alternative energy providers such as Reflex who are due to take over existing EVCI and develop community training in Orkney (Reflex are looking to replicate this initiative in both Shetland and Western Isles).
- Reflex aims to create synergies within the combined strategy for EVCI across Shetland, Orkney and Western Isles.

Transition arrangement issues

- There was a divergence of views between stakeholders on the challenges associated with the transfer of existing assets.
- Transport Scotland noted that there have been limited issues to date (e.g. compatibility, connectivity) with transition from the CPS model to the private sector and that these have been addressed by CPOs.
- Conversely, some CPOs identified challenges with regards to maintenance of the existing assets, which would transfer higher risks on warranties and maintenance responsibilities.

Fleet requirements

- All fleet stakeholders had experienced issues around capacity, availability, costs, timeframes and the speed of handling DNO connection requests with EVCI.
- Fleet stakeholders expressed a willingness to share assets for fleet charging with local authorities but practicalities are yet to be defined. The types of charging being discussed are falling into two separate lots; one for staff/general public with associated tariffs, and another for fleet. For instance, NHS and Blue Light are currently focused on fleet and are only starting to consider the needs of staff and visitors. Discussions will involve multiple NHS boards and will take considerable time.
- NHS Scotland expressed an interest in mobility hubs at charging sites and, ideally, initial locations should consider all public sector services.

Future funding and innovative solutions

- Transport Scotland views attracting private investment as crucial to supporting the future expansion of EVCI across Scotland. However, it is recognised that alternative models to concessions may be required (noting the limited scale and complex geography of the islands).

At the time of writing this report, stakeholder engagement is ongoing. Several additional stakeholder engagement sessions are planned to confirm and refine the private sector perspective on EVCI expansion in this context. For example, ongoing discussions are required to confirm interest in the market of alternate investment partners and use of renewable energy for cost efficiencies (following council example of bulk procured 100% renewable energy from EDF).

Alternate investment partners could include private-sector investors who are not specialists in EVCI, for example energy, utility companies or community owners. Those to be contacted will include stakeholders from energy (SSEN), environment (Aquatera), and others identified over the course of the discussion period, which will take account for potential inter-island possibilities. Additional engagement sessions with concessionaires will also be conducted to understand how appropriate this model is in practise, and commercial interest generally. These discussions will be ongoing and will likely take considerable time.

7.3 Findings from Literature Review

A literature review was conducted to identify national and international examples of sustainable EVCI in an island context. Case study examples for this assessment were selected based on their relevance to the Strategy and Expansion Plans in the three island authorities.

Table 7.1 summarises the best international practices for creating sustainable EVCI on islands.

Table 7.1: International Best Practice Examples

Common Themes	Island location
Utilities Lead	Faroe Islands
	Isle of Man
	Caribbean Islands (e.g., Jamaica)
Mobilising Private Sector Investment	Isle of Wight
	Barbados
Stabilising the Grid (smart Charging)	Isle of Wight
	Bornholm (Denmark)
	Faroe Islands
Smart Island (renewable self-sufficiency)	Porto Santo (Portugal)
	Belle-Île-en-Mer (France)
Renewable Energy Integration	Kangaroo Island (Australia)
	Jeju (South Korea)

Source: Various

The key findings from the literature review are set out below.

7.3.1 Grid Demand

The need to balance demand on the grid on remote islands is a common theme, reflecting that most are not connected to 'mainland' network transmission infrastructure. To mitigate the effects of EVCI energy demand, there are many examples of deploying smart charging which balances energy output from chargers with the demand on the grid. The implementation of smart charging is more relevant for longer-stay charging (e.g. destination chargers).

There is also the opportunity to utilise electric cars (and second-life batteries) as temporary storage for renewable energy to smooth supply. Vehicle-to-Grid (V2G) charging allows EVs to feed electricity back into the grid, however this is constrained by functionality of vehicles with very few able to facilitate this at present.

Bornholm, Denmark

About: 11 chargepoints were delivered by a public private partnership between the government and Federation of Danish Motorists (FDM), more than doubling CP offer. The network uses 100% renewable electricity.

Managing the network:

The government financed underground electrical works, and FDM supply, operate and maintain chargepoints. Draws parallels with findings from engagement with Aberdeen and Highland Pathfinder, which indicated operators would be interested in the public sector funding DNO works for an investable package.

The chargepoint network uses an app for payment (for the end user).

The municipality has chargepoints Supplied by Nuvve for 19 EVs facilitating Vehicle-to-Grid (V2G) technology. These are used to stabilise the grid such that excess charge is transferred from EVs back to the grid

Isle of Wight

About: During 2022-23 the council will be installing an initial network of off-street and on-street chargepoints, with a full network envisaged to be in the low hundreds of chargepoints. In the Isle of Wight EVCI Strategy, it is highlighted that going forward there is a need for smart functionality in all domestic chargepoints, but there is also opportunity for smart charging at visitor sites (with longer dwell times) to reduce the extent of grid upgrades. The extent to which current and future public chargepoints will have/need smart functionality will depend on their envisaged use (e.g., overnight).

Managing the network:

Procurement through Central Southern Region (CSR) framework set up by Hampshire County Council in 2018
All the chargepoints, both off-street and on-street, will be operated by Joju.
The intention is to utilise LEVI funding to facilitate network expansion.
Smart charging (residential / overnight) proposed in the interim given network disruption expected in peak tourism periods. Delays / reduces extent of network upgrades.

7.3.2 Utilities Collaboration

There are many instances of utilities collaborating with public sector authorities to roll out EVCI (e.g. Faroe Islands SEV Network, Manx Utilities, Caribbean Islands). This is largely because of the ability to integrate the EVCI network into the grid and potential low likelihood of private sector investment.

Isle of Man

About: Manx Utilities Authority (providers of IoM electricity) have rolled out an EVCI network on the IoM, partnering with Pod Point. As of 2020, Manx had a network of 37 CPs with another 30 planned for rollout.

Managing the network:

This is a ‘pay-as-you-go’ network, after initially Manx introduced infrastructure residents could use for free to encourage EV adoption.
Manx have introduced an EV charging tariff (in line with meter introduction) which makes the distinction between peak and off-peak charging (latter 33% cheaper).
Operation of the network appears to be conducted by Pod Point, with maintenance by Manx Utilities.
The electricity network uses both electricity generated on the island and sub-sea imports.

Caribbean Islands

About: In a study into e-mobility in the Caribbean (Barbados, Bermuda, the Cayman Islands, Jamaica, and the Dominican Republic) key findings include current infrastructure insufficient to support large numbers of EVs (affecting consumer confidence) but utilities and independent providers are rolling out EVCI.

Managing the network:
Across the Caribbean there has been investment by Utilities however there are regulatory issues surrounding the sale of electricity. Monopolies around the sale of electricity are limiting private sector investment.
The study frames the role of utilities to be enabler of basic initial infrastructure but should not block private sector investment. Investment by utilities is framed to diversify and expand their business.
E.g., Jamaica Public Service Limited (JPS) announced they would be constructing 12 new EV charging stations in 2023, bringing the total number of charging stations operated by JPS to 22. Several of the charging stations are being constructed in partnership with gasoline retailers who host the chargepoint sites (e.g., Texaco, Total and Boots Gas Station).
E.g., Caribbean Utilities Company Ltd (CUC) has announced an Electric Vehicle Charging Station Programme. The goal is to install multiple stations with corporate partners and residential complexes. CUC is to supply EV charging equipment also paying up to 100% of installation, operation and maintenance costs, charging a monthly service fee to participating properties of CI$79.00 per station.
In contrast Megapower, the leading EV provider in Barbados, have set up 50 charging stations on the island and a handful of solar car ports. Such solar hubs provide renewable electricity directly, and Megapower's other solar panels feed into the grid to offset the equivalent of non-renewable power usage. Megapower are now looking to branch out into other Caribbean islands.

Faroe Islands

About: SEV network is the community owned electricity supplier to 97% of the archipelago - needed to build an EV charging ecosystem that would serve its residents reliably while ensuring a stable grid.

Managing the network:

The chargepoint network is a blend of public, semi-public and private chargepoints
SEV has procured nearly 700 chargepoints from Etrel which designed for complex charging locations with limited power supply and to endure tough conditions (aluminium casing). They are armed with Autonomous Frequency Regulation functionality giving them the ability to respond to grid conditions in time of excess demand to reduce power output of chargers.
Chargepoints are operated by SEV using Etrel's back-office.
Charging prices vary according to time of day and charging speed.

7.3.3 Co-Location of Renewable Energy Generation (Innovative Projects)

There are instances of co-location of renewable energy generation, but the extent to which this is relevant needs further assessment and stakeholder engagement on the three island authorities.

The form of generation in these areas is solar (e.g. Kangaroo Island and Jeju), whereas the climate in Scotland means wind is the most viable renewable energy source.

Kangaroo Island (Australia)

About: The visible solar project (funded by the RenewableSA programme) saw the implementation of advanced solar power tracking technology. The solar array tracks the sun, increasing energy output by 40% vs fixed system. As part of this project the council installed infrastructure to recharge electric cars at five sites, as well as leasing a small fleet of electric vehicles.

Managing the network:

There are 20 EV chargepoints on the Island in five locations.
Most chargepoints are operated through the ChargePoint network, in line with Australia.There are issues envisaged with charging now that ChargePoint have withdrawn from Australia.
Chargepoints facilitate charging of a fleet of (three) Nissan Leaf EVs, two of which are available to hire.
The key finding is about the use of innovative methods to implement EVCI but also reliance on private sector (chargepoint withdrawal notes potential issues with chargers from an operational perspective).

Jeju (South Korea)

About: The long term-plan of the Jeju government is to make the island carbon free by 2030. Jeju is a large island with both a significant population, and large numbers of annual visitors. The scale of the island's demand

Managing the network:

At April 2021 there were 21,906 EVs (5% of all vehicles) in Jeju and 17,965 EV chargers (4,434 Open Type Chargers)
Ownership of such chargers are split as follows: 7% government, 17% private business, 75% personal.
A portion of chargepoints utilise a system that supplies EV chargers with electricity from renewable energy (solar) and sells the remaining electricity to the power grid.
System looking to utilise V2G (two-way power transmission) charging and is exploring the use of Green Hydrogen for charging.
Looking to grow into almost an entirely renewable generation island utilising wind and sun.
Looking to move into 'green hydrogen' to facilitate hydrogen powered cars.

7.3.4 Smart Islands

- Several islands (such and Porto Santo and Belle-Île-en-Mer) intend to become 100% self-sustainable on renewable energy. These projects aim to use EVs as a mechanism to facilitate this by using EVs as storage, also using excess electricity to charge a shared pool of cars.
- This solution is likely to be more suitable to smaller islands.

Porto Santo (Portugal)

About: Porto Santo was the first European 'smart island' with the aim to be self-sufficient in renewable energy. In 2017 Groupe Reneault cooperated with the Electricity company of Maderia and technology provider The Mobility House to launch an experiment of storing energy generated by renewable sources using electric car batteries.

Managing the network:

20 Renault EVs driven by inhabitants are used as mobile storage (V2G) as well as two mobile storage units using second-life car batteries to smooth supply of renewable electricity.
40 connected public and private charging points were set up by Electricity Company of Madeira and Renault that can benefit from smart charging.

Belle-Île-en-Mer FlexMob'île programme (France)

About: Groupe Renault, Morbihan Energie, Les Cars Bleus and Enedis joined forces to facilitate energy transition on Belle-Île-en-Mer. The smart electric ecosystem is founded on three core activities: the sharing of (seven) electric vehicles, the stationary storage of solar energy and smart charging. There is however resistance to wind power deployment due to concerns surrounding effect on scenic landscape.

Managing the network:

Electric cars are powered by surplus electricity from photovoltaic panels.
The car batteries also serve as backup storage for electricity that can be reinjected into the grid.
The network also utilises second-life Renault ZOE batteries for storage for excess supply.
Limited information about operation of network but envisaged Groupe Renault responsible given provision of cars to be shared, and their involvement in Porto Santo.

7.4 Commercial Model Options

Following stakeholder engagement and subsequent literature review of EVCI in island settings, three potential commercial delivery models have been identified that could be suitable in an island setting:

- Own and operate model
- Concession model (potentially across multiple authorities to generate scale in procurement)
- Alternate Investment Partner model

7.4.1 Own-and-Operate Model

The public own-and-operate model for is an approach adopted by local authorities to develop an EVCI network. The responsibility for the funding, procurement, operation, and maintenance of EVCI lies with the public sector, with authorities often supported in rollout and operation by the private sector.

In the procurement phase, the public sector controls identification of suitable EVCI locations in coordination with relevant stakeholders such as businesses and residential communities. Local authorities are responsible for procurement of EVCI and coordinating installation including taking responsibility for below ground works.

Guidance from the Energy Savings Trust (EST) states that when employing the own-and-operate model, maintenance and operation contracts are agreed with suppliers; often the same chargepoint supplier[39]. In the event a local authority contracts out operation (otherwise referred to as back-office management in this context) and maintenance, the public sector retains ownership of the charging infrastructure, and remain responsible for the charging network.

The own-and-operate model places all responsibility for ongoing costs (including insurance, back-office software, electricity supply and maintenance) on the public sector. The own-and-operate model does, however, ensure the public sector has control over setting tariffs, in addition to receiving all the revenue generated by the charging network.

7.4.2 Concession Model

A concession model may be adopted by a local authority to alleviate pressure on finance and resource demands. Concessions involve a contractual arrangement between a local authority

[39] Energy Savings Trust, 2020. Available at: https://energysavingtrust.org.uk/wp-content/uploads/2020/10/EST0038-01-Procuring-Electric-Vehicle-Charging-Guide-03.pdf [Accessed on August 2023]

and an economic operator (i.e. the concession holder). Assets are funded either entirely through mobilising private sector investment or through part subsidy (e.g. from public grant-in-aid).

The concession model can reduce the initial capital burden of deploying EVCI, and reduces the ongoing resourcing requirement from an operations perspective. The specific arrangement agreed between island authorities and their concessionaire will determine the apportionment of revenue and risk, but; compared to the own-and-operate model, the public sector collects less revenue while holding less risk. Even so, the public sector retains some control over charger locations and tariff levels, reducing the risk of chargers being deployed solely on the private sector profit motive.

In the context of Orkney, Shetland, and the Western Isles, it may be necessary to pursue joint procurement either between some or all of the three island authorities. The benefits of this centre around procurement at scale, with each authority benefitting from economies of scale, and the higher viability of concession offered to the private sector encouraging greater interest and likelihood of investment. Where commercial viability is not sufficient with joint procurement, it could be necessary to pursue joint procurement with mainland authorities (e.g. Highland Council) which proposes the opportunity to give sufficient scale to concession.

Concession models can be used where the local authority will invest in charge points that are available to both fleet vehicles and the public, which may include non-fleet staff vehicles. Commercial viability is the prime consideration for employing this delivery model, and private sector interest and propensity to invest will govern the ability to implement it.

7.4.3 Alternate Investment Partner Model

The alternate investment partner model has been identified as an option in review of EVCI strategies in other island settings. This often involves a private-sector investor (generally not a specialist in EVCI) leading the rollout of EVCI which reduces the hands-on involvement of island authorities. For example, in many islands, the electricity utility companies have provided EVCI. These investments appear to generally be made on a ‘land lease’ basis, with the local authority providing access to its assets (e.g. highway infrastructure) in exchange for a (potentially nominal) lease payment.

Example - Faroe Islands

The power company SEV is the community owned electricity supplier to 97% of the Faroe Islands. Given SEV’s full responsibility for the islands’ energy production and supply, it needed to build an EV charging ecosystem that would serve its residents reliably while ensuring a stable grid.

SEV has procured nearly 700 chargepoints from Etrel that are designed for complex charging locations with limited power supply and to endure tough conditions. Such chargepoints are armed with Autonomous Frequency Regulation functionality, ensuring ability to respond to grid conditions in time of excess demand to reduce power output of chargers. These chargepoints are operated by SEV using Etrel’s back-office.

Relevant partners are contextual to an island setting, however, the common theme is that utility providers lead the rollout of infrastructure through this option. This can take the form of the own-and-operate model but from the perspective of the partner, removing majority of responsibility from island authorities. From an island authority perspective, it is still necessary to continually engage with partner regarding network operation and expansion to ensure the needs of respective communities are met.

7.4.4 Commercial Model Option Comparison

The EVCI network the three island authorities choose to implement will generate capital and operating costs as well as operating revenue. The commercial models described in this section determine how costs and revenues are distributed across public and private sector parties.

Table 7.2 summarises the main three commercial models to consider.

Table 7.2: Differences Across Models

	A – Public sector owned and operator	B – Concession	C – Alternate Investment Partner
Approach	Public sector ownership and operation of network	Public sector ownership of EVCI assets with private sector shared-risk/revenue operation.	Investment partner takes responsibility for existing assets, and invests on basis of partnership agreement.
Existing and new EVCI asset ownership	Public	Public / Private	
Operator	Public (with private sector support)	Private	Private
Risk to Local Authorities	Yes	Limited (determined by concession agreement)	Limited (determined by partnership agreement)
Revenue stream to Local Authorities	Yes	Limited (determined by concession agreement)	Limited (determined by partnership agreement)
Tariff setting	Public	Private / Public	Private / Public

Source: Mott MacDonald

7.5 Joint Procurement

As part of the potential strategies to ensure cost efficiencies in the delivery of EVCI asw well as encourage private investment, joint procurement could be addressed as a potential collaboration with CPOs.

Island authorities could consider whether to procure charging infrastructure separately or as joint buyers. This prospective collaboration opportunity would entail the integration of management strategies for current networks and the expansion of EVCI offerings within each island.

Joint procurement would involve each of the islands working together, taking the same approach to delivery. Through joint procurement, Orkney, Shetland and the Western Isles councils would need to agree on common contractual terms to be used with the CPO provider.

Table 7.3 summarises the most relevant advantages and disadvantages of joint procurement.

Table 7.3: Joint Procurement Points to Consider

Advantages	Disadvantages
Joint procurement can facilitate knowledge and resourcing sharing.	Collective agreement on contract terms and infrastructure specifications may become harder to reach as the number of cooperating buyers increases.
Greater coordination in EVCI roll-out means hight priority sites can be developed faster.	Demand currently exceeds the supply of EVCI installation and management services. Therefore, suppliers are at risk of becoming overstretched.
Reduced need for duplicative procurement and contract management activities, saving time and money.	Risk that site specific challenges are not fully considered in the procurement exercise.
Unlock economies of scale benefits.	
Consistent user experience across the network.	

Source: Mott MacDonald

7.6 Transition and Expansion of Current Network

7.6.1 Transition Arrangement and Requirements

For the transition of the existing network of chargers on the islands from the CPS network, a commercial model for existing EVCI needs to be identified to ensure the continued provision of charging infrastructure to island communities. The applicability and extent to which commercial models suit the context of island geographies are important considerations to any approach taken.

Engagement with Transport Scotland established that the process of transition should be as seamless as possible, and the following should be considered:

- **Small-scale transition has seen issues, but eventually managed**: changing one technology to another back office has highlighted some issues, and some chargepoint operators prefer to manage their own hardware. However, on a small scale, these issues have been managed to facilitate transition.
- **Avoid 'rip and replace':** unless there are reliability issues, or EVCI is reaching end-of-life, like-for-like swaps for functional equipment should be avoided. There should be engagement with chargepoint operators as to ability to migrate existing assets.
- **Requirements in transition to be clarified:** removal of devices from the Chargeplace network should be staggered / scheduled with CPS to ensure adequate resourcing from their end.
- **Process of migration shouldn't be a huge activity:** the migration of assets shouldn't be too much of a burdensome activity but tests such as for compatibility will be required.

These findings are necessary for consideration is determining the chosen approach to transition both from an operational and commercial perspective.

7.6.2 Transition and Expansion under Own-and-Operate Model

The own-and-operate model would ensure the continued provision of EVCI across the Three Island Authorities, regardless of commercial viability and private sector interest. The model provides an increased level of control and could mimic the current arrangement with CPS. This would require procurement of operation and maintenance services from the private sector

(taking the role of CPS), ensuring the provision of a new back-office system and the necessary management expertise for existing devices.

For the expansion of the network under the own-and-operate model, the Three Island Authorities would have to fully fund EVCI and, again, procure support in operation and maintenance from the private sector. There could be opportunity to procure such support at scale through bundling existing infrastructure with new infrastructure increasing the ability to benefit from economies of scale and generating value for money.

7.6.3 Transition and Expansion under Concession Model

Under the concession model, the concession contract will define risk apportionment. Legacy devices can be included in this contract. The concessionaire will expect to understand the asset condition of existing assets, confirmation that there are no restrictions on their transferability, and technical information about interoperability. Where possible, existing warranties should be transferred to the concessionaire.

The inclusion of existing assets, with established demand profiles, may help to improve the viability of the concession contract.

7.6.4 Transition and Expansion under Alternate Investment Partner Model

Similar issues to those described under the concession model would exist in these arrangements. One further consideration will be in relation to who gets ownership of the existing assets (which under the concession model revert to the grantor upon concession expiry).

7.7 Feedback from Commercial Workshop Sessions

An introductory commercial workshop was held with HITRANS and representatives from the three island authorities on 30th August 2023. The basis for the three commercial models was presented and their strengths and weaknesses discussed.

A follow-up commercial workshop will be conducted in September 2023 to discuss commercial model preferences in more detail.

7.8 Commercial Model Assessment

To assess the suitability of each of the identified commercial delivery models, strengths, weaknesses, opportunities and threats have been identified in the context of both transition and expansion of EVCI networks in the island settings. A full SWOT analysis can be found in Appendix C.

At this Strategy and Expansion Plan stage, the commercial assessment addressed a range of commercial model options under consideration for the island's authorities; however, it is not possible to draw conclusions on a preference for the EVCI expansion strategy.

An informed decision on the preferred commercial model will be based on further market engagement with CPOs and island fleet operators (e.g. NHS, fire and police service), assessment of non-conventional models as alternate investment partner model, and internal council discussions and assessment. These discussions and assessments will take time, and given the outcome of financial assessments in Section 8, it may be identified that the best scenario for the islands would be to pursue an investor and alternate commercial model in the future, when the commercial viability of investment increases.

The additional information gathered as part of future engagement will provide a better understanding of both CPO and alternate investment partners appetite for EVCI expansion.

Regardless of the preferred commercial option being chosen, application for EVIF will progress as the main funding option for EVCI expansion.

8 Financial Case

The objective of the Financial Case is to identify the financial requirement to bring about the wider benefits outlined in the Strategic and Economic Cases. Whilst non-monetisable benefits are included in the Economic Case to offset costs to produce a Net Present Value, the actual costs of delivery need to be accounted for with options for funding and financing identified. The draft vision for the Public Electric Vehicle Charging Network in Scotland states that further investment from the private sector is required to meet the scale and pace of EVCI expansion within Scotland. For this reason, the Financial Case uses the SFT Feasibility Model to appraise a concession contract option only.

8.1 Funding Sources

Regardless of the preferred commercial option (as discussed in the Commercial Case), there are principally three sources of potential funding used to mobilise the construction phase of the EVCI;

- Grant funding from the Scottish Government
- Local Authority contributions
- Operator investment from a private sector operator, alternative investor or a local authority

It is desirable to structure this investment opportunity in a way that is attractive to private investors, ensuring that there is a suitable return on the investment that mitigates risks in an emerging market. However, it is acknowledged this can be challenging in the island environment.

The quantities and profile of spending by funding source are all set out in 8.2 of this Financial Case.

8.2 Capital Cost Requirement

All figures and charts have been calculated using the 'SFT EVI Feasibility Model v4.1', referenced henceforth as the 'SFT Feasibility Model', spreadsheet model provided[40]. All inputs have been discussed with colleagues at SFT and are deemed appropriate for this analysis, and consistent with the approach they expect to see in all model applications.

The results of the SFT Feasibility Model are largely driven by two kinds of key input; the technical inputs, which comprises of the charger requirements, the cost of installing and maintaining the chargers and electricity provided to form an income stream, and the financial inputs, which are made up of local, regional, and national figures, optimised to provide the best reflection of the circumstances of each scenario. The total Capital Cost requirement indicates the full value required to deliver the number of chargers in this business case and is the key figure in the financial case. Table 8.1 shows a breakdown of the Capital Cost requirement.

Table 8.1: Capital Cost Breakdown

Cost Item	Value £, 2023 prices
Existing Asset replace and update	£2,400,000
Capital Enabling Costs	£400,000
Capital EVI + Installation Costs	£2,700,000

[40] SFT Feasibility Model provided by Scottish Futures Trust (SFT) for use on all Pathfinder projects.

Cost Item	Value £, 2023 prices
Standard DNO Costs	£400,000
Total Capital Cost requirement	**£5,900,000**

Source: Mott MacDonald

As previously noted, there are three funding sources outlined for delivering this scheme; operator or alternative investor investment, central government grant funding, and Local Authority contributions.

8.3 Financial Viability of Service

A core feasibility test has been undertaken for the combination of local authorities as part of the SFT feasibility assessment.

For all local authority business cases a particular set of assumptions is used as standard to assess the affordability and feasibility of the scheme put forward. These are:

- A private sector Charge Point Operator (CPO) would invest a capital amount such that they would make a return of 15% on that initial investment.
- All revenue would be received by, and costs borne by the CPO.
- Transport Scotland, through the EVIF will award a minimum grant of £300k for any Local Authority that applies with a business case that aligns with the Transport Scotland and SFT strategy. Any further grant above this minimum will be assessed following the initial stages of the procurement phase when the true value of the private sector investment is known. It is assumed that the three island authorities will be granted £900k.
- The Remaining capital amount required to deliver the scheme would need to be assessed and funded through other measures, including further private sector investment, local authority contribution or grant funding.

It is key to note that these assumptions, particularly the desired return on investment from the CPO, are indicative only. They are intended to produce a set of results that are comparable across all local authorities. It is expected that the contributions from bidding CPOs will be different, and therefore the remaining capital amount will be different in all cases.

The utilisation figures used in the modelling set out below come from the baseline average observed utilisation. These figures are lower than the SFT minimum recommended figures for utilisation but are deemed appropriate in this analysis due to the exceptional circumstances in the Northern and Western Isles, as set out in section 3.

Table 8.2 below summarises indicative results of the SFT feasibility model under these specific assumptions.

Table 8.2: SFT Feasibility Model Results

Funding Source	Value £, 2023 prices
Indicative Private investment	£100,000
‘Minimum’ Transport Scotland Grant	£900,000
Remaining capital amount	£4,900,000
Total Funding/Capital Cost requirement	**£5,900,000**

Source: Mott MacDonald

These results show that there is almost no contribution from an investing CPO, as the margins are too small for them to make any significant return on their investment. This result is not unexpected as utilisation on the islands is likely to be low, coupled with higher-than-average

costs due to inaccessibility. It is therefore likely that for this particular commercial model to progress, operational subsidy will be required.

A sensitivity test has been run to show the impact on the results should an operational subsidy of 20p/kWh by given to the CPO. The results are illustrated in Table 8.3.

Table 8.3: Sensitivity Test

Funding Source	Value £, 2023 prices
Indicative Private investment	£2,000,000
'Minimum' Transport Scotland Grant	£900,000
Remaining capital amount	£3,000,000
Total Funding/Capital Cost requirement	**£5,900,000**

Source: Mott MacDonald

This returns a much stronger case for investment with the CPO able to invest £2m and still see a return on investment of 15%. The social and strategic benefits outlined earlier in this report, coupled with a strong financial return make a strong case to take the strategy forward and identify possible sources for operational subsidy.

To improve commercial viability, a number of options could be considered by island authorities. These have not been modelled in detail at this stage. Examples of potential options include:

Joint procurement, either between the islands or with a mainland authority, in order to improve cost efficiency and to create scale sufficient to attract private sector interest.

Offtake agreements to de-risk the contract for potential investors, such as from a fleet provider (e.g. NHS Scotland), whereby they commit to purchase a volume of power over an agreed period.

However, it is noted that the three island authorities are concerned that mainland collaboration may result in their bespoke needs not being met. In addition, NHS and blue lights are currently very focused on fleet with discussions on staff and visitor needs at very early stages. Ongoing discussions will involve multiple NHS boards and take significant time.

8.4 SFT Planning Data Values

To apply consistency across funding applications SFT have provided a list of recommended values to use in the SFT Feasibility Model. Whilst these values represent a benchmark, they are high level, and non-geography specific.

Table 8.4 below has each of the SFT planning data values alongside the chosen modelled value for this case. Model values vary based on UR8 classification for urban and rural locations. These assumptions are applied to each authority individually.

Table 8.4: Model Input Values

Cost Heading	SFT Value	Modelled Value	Background Information
Tariffs (including VAT)	AC 47p/kWh DC 62p/kWh (including VAT)	AC: £0.47/kWh DC: £0.62/kWh	TS objective – Tariffs which are fair, sustainable and are set at a rate which enables the private sector to invest across the country in the long term. The planning assumption rate is solely for the purpose of adopting a common approach for allocating grant funding and is not intended to be a recommended or required tariff. LAs may propose alternative tariffs which are aligned with the above principle where it is either

Cost Heading	SFT Value	Modelled Value	Background Information
			necessary to ensure financial viability or which could offer better value for money. The electricity Year 1 rate is assumed to be 25p/kWh. It is intended that tariffs will flex up and down as this rate changes over time. Notes: • The UK market average for CPO pay as you go AC tariffs as of January 2023 is around 56p/kWh ranging between 29p and 79p. • The UK market average for CPO pay as you go 50kW DC tariffs as of January 2023 is around 70p/kWh ranging from 55p to 79p. • SFT analysis indicates that the breakeven point for EV charging for petrol cars is 44p/kWh and diesel cars is up to 58p/kWh as of March 2023. • Future tenders are expected to encourage bidders to propose flexible tariff structures.
Contract Length	Project Specific	20 Years	Concession/service type contracts are expected to be in the range of 15 to 20 years.
Electricity Utilisation Year 1	AC Range From: 5,620 kWh To: 26,977 kWh DC Range From: 18,110 kWh To: 54,329 kWh	AC Range From: 3,263 kWh To: 6,807 kWh DC Range From: 12,045 kWh To: 13,603 kWh	It is recognised that utilisation can vary significantly based on a number of factors, especially between local authority areas. However, SFT expects that forecast utilisation be within the outlined range, which has been derived based on external analysis . Any deviation from this range must be justified, with evidence where possible. The proposed range is to ensure data is not inflated/deflated which would negatively impact the outputs.
Electricity Utilisation Growth	5%	5%	Average growth across the whole portfolio. This may vary based on Y1 forecast utilisation, 3rd party supply of infrastructure nearby and tariffs – but will need to be justified.
Electricity Rate Year 1	2023/24 – 25p/kWh 2024/25+ - 29p/kWh	2023/24 – 25p/kWh 2024/25+ - 29p/kWh	The current local authority estimate from electricity Price Risk Guidance.
Electricity Rate Real Price Inflation	Flat lined	Flat lined	Assumes changes in electric rate are passed on to the consumer in future contracts
EVCP Transaction Costs	7kWh - £146/yr 22kWh - £146/yr	7kWh - £146/yr 22kWh - £146/yr	Transaction costs associated with charging sessions. Examples include back-office costs, merchant fees etc. Transaction costs are expected to flex with utilisation – i.e. a higher number of sessions would attract greater transaction costs.

Cost Heading	SFT Value	Modelled Value	Background Information
	50kWh - £365/yr	50kWh - £365/yr	
EVCP Planned Maintenance Costs	7kWh - £146/yr 22kWh - £146/yr 50kWh - £1,800/yr	7kWh - £600/yr 22kWh - £600/yr 50kWh - £2,600/yr	This includes service visits, bay cleaning, wear and tear.
EVCP Annual DNO Capacity Charges	Project specific	£25,000	To be include in row 76 of the "Fin Input" of the feasibility model along with other ad-hoc annual costs. Authorities to provide a breakdown of what costs they are including in row 76 of the "Fin Input" tab.
EVCP Capital Enabling Costs (ex VAT)	7kWh AC – £2,200 22kWh AC - £2,200 50kWh DC - £4,000	7kWh AC – £4,000 22kWh AC - £4,000 50kWh DC - £7,100	Assumed to include costs with acquiring and preparing the site such as forming new car parking bays and landscaping.
EVCP Capital EVI + Installation Costs (ex VAT)	7kWh AC – £5,650 22kWh AC - £6,000 50kWh DC - £33,400	7kWh AC - £10,000 22kWh AC - £10,700 50kWh DC - £59,500	The costs relating to the purchase, installation, and commissioning of EV infrastructure. Source, EST Draft Electric Vehicle. Infrastructure Guide (EVIG) plus c.7.5% for inflation.
EVCP "standard" DNO costs (ex VAT)	7kWh AC – £2,000 22kWh AC - £2,000 50kWh DC - £4,000	7kWh AC – £3,600 22kWh AC - £3,600 50kWh DC - £7,200	Non-material "standard" DNO connection costs, such as civil engineering, feeder pillar, indicative traffic management, etc to connect the charge point to the local grid.
Material DNO Costs	Project Specific	Project Specific	To be itemised separately in the feasibility model. Ensure there is no double count with Capital Cost Contingency allowances.
Capital Cost Contingency	Project Specific	25%	On the assumption that no one-off cost allowances have been added to account risk, suggest applying a contingency of 15%. Where quotes are available and the scope of works well defined this could be reduced.
Exiting Asset Transfer Costs	Project Specific	£20,000	Where existing assets are transferred into a concession, assume a reasonable capital cost allowance for refreshing such assets to enable a similar level of functionality of the new assets to be provided.
EVCP Useful Asset Life	8-10 years, with mid-concession replacement	10 years	A range of 8 to 10 years depending on technology adopted. Assumed to be replaced mid-way through the concession period. Locally sourced data shows that useful asset life of existing chargers in circa seven years. It is assumed that

Cost Heading	SFT Value	Modelled Value	Background Information
			technological advances will increase this lifespan in line with chargers on the mainland.
EVCP Replacement Costs	100%	100%	Assume that cost of replacing the EVI at its end-of-life mid-way through the concession is equal to the initial installation costs. The feasibility model will index such costs to the year in which they are incurred.
Corporation Tax Rate	25%	25%	This an assumed rate for the feasibility model. How actual projects are structured and therefore appropriate tax assumptions will vary for project to project.
Inflation – OPEX	2.5%	2.5%	Whilst current rates of inflation are considerably higher, the assumption is that general inflation over the course of the concession period will on average be in line with Government targets. This is applied to capital and operating costs.
Target Equity IRR	15%	15%	This an assumed rate for assessing the level of capital subsidy. How actual projects are financed, and the cost of finance will vary for project to project.

Source: Mott MacDonald

8.5 Summary

The results indicate that the programme is unlikely to be feasible without significant public sector funding, and additional operating subsidy. Further steps should be identified to engage with potential partners and private CPOs to determine options to encourage private sector investment in the EVCI networks of the islands. At that stage, the true remaining capital amount will be known, and a full in-depth assessment of the funding options should be completed for each local authority.

Financial considerations for future attention include:

- Once all EVIF applications have been received, SFT and Transport Scotland will consider the mechanisms through which they might allocate funding. This will inform the approach to procurement with two possible options set out below:
  - Market led procurement, with no initial subsidy: whereby CPOs are committed to deliver all sites within an authority. They are to submit an amount they would be willing to invest and therefore also an amount they would require as subsidy in a competitive process. The competition element would drive investment amount to be higher, and therefore minimise public contribution.
  - Capped grant: a maximum subsidy is agreed between Transport Scotland and the authority following a review of all submitted business cases. CPOs can bid against what they believe is affordable with the stated level of subsidy. Where a CPO plans to deliver all of the infrastructure, they have the ability to ‘bid back’ against the subsidy amount. The competition element would drive CPOs to use as little of the subsidy as possible and therefore minimise the public contribution.
- SFT and Transport Scotland are currently in the process of determining their preferred approach to procurement. Once this has been established, they will communicate this to all Local Authorities and suggest the way forward.

9 Management Case

The Management Case sets out options for how the three island authorities can manage the delivery of the EVCI network including governance, suggested stages for programme delivery, required resources, programme of next steps, risk and mitigation.

9.1 Introduction

The EVCI included within this business case takes the existing publicly-funded and managed EVCI across the three island authorities and combines it with a plan for additional EVCI investment which is predicted to be required to cover increasing future demand and to ensure a just transition with equitable coverage. During this period, the existing EVCI will require maintenance and upgrading when required; the new EVCI will additionally require procurement, installation, followed by maintenance and upgrading when necessary.

Successful delivery requires good governance, strong programme management, and collaborative working. At the time of writing, the three island authorities have signed a collaboration agreement which enables HITRANS to provide a central resource but have not yet confirmed their preferred commercial model. The following section discusses options for how the local authorities could work together to govern and manage the delivery of EVCI provision, including suggested next steps.

9.2 Governance and Management

9.2.1 Organisation and Team

The EVIF programme is designed to achieve benefits through collaboration and it recommends that local authorities work together to agree a form of collaborative governance and management. As outlined above the three island authorities have already signed up to a collaborative agreement with financial commitments, joint aims (to be confirmed) and high-level joint procurement considerations. However, the exact form of the ongoing agreement will be influenced by the commercial model adopted.

Three options have been considered for project/programme management of the future EVCI roll-out:

4. **Option 1:** Setting up a delivery team which is given the terms of reference and governance structure to allow them to operate as an arms-length delivery organisation on behalf of all three local authorities. Such a team would be delegated funding, and would manage development, delivery, and operation of the new EVCI network and the CPO partner(s).
5. **Option 2:** Each council would operate separately from a financial and management perspective with the allocated funding used to pay for the EVCI planned for their own area in this business case. While the financing and management issues (e.g. responding to local people and monitoring maintenance requirements) would be divided, a steering group or programme board would still provide coordination between the councils and ensure economies of scale are exploited and the same standards maintained. Procurement could still be joint, and the same CPO partner(s) could deliver across all three Council areas but be paid through the organisations.
6. **Option 3:** A mix of Option 1 and 2 whereby some of the island authorities form a combined delivery team and some local authorities operate independently.

Option 1 would:

- Ensure more consistency
- Provide greater efficiencies and economies of scale
- Consolidate skills

However, it would also:

- Require revenue-sharing and payment-sharing to be organised, which could be complex
- Require provision for liabilities to be correctly apportioned
- Be affected by differences in approach, politics, and governance between authorities

Option 2 is more complex in the long run, however it is easier to set up and mobilise in the short-term. Given the rapid timescales required to deliver the EVCI set out in this business case, Option 2 may be more attractive.

As the preferred commercial model becomes clearer, it is recommended that the three island authorities set up an Inter-Entity Agreement (IEA) as a precursor to a formal Memorandum of Understanding (MoU). The IEA will:

- Provide more detail on the governance processes to allow local authorities to work together to procure, manage and deliver the EVCI programme described in this business case
- Confirm which authorities will act as Lead Authority or Authorities
- A template IEA is available from SFT as a pro forma that can be used by local authorities and other organisations entering into mutual delivery of EVCI Pathfinder projects.

9.2.2 Programme delivery

To ensure efficient and effective management, it is recommended that the three island authorities divide delivery of the EVCI programme into the following stages:

- **Stage 1 – Business case (almost complete)**: development of SFT Business Case document; overseen by HITRANS and the three island authorities
- **Stage 2 – Agreement on preferred commercial delivery options.**: further discussion and agreement on preferred commercial delivery option(s), informed by more detailed financial analysis (as required), and re-confirmation of collaborative working arrangements as required
- **Stage 3 – Approval process**: approval of proposed delivery model and working arrangements by individual local authority executive teams and cabinets
- **Stage 4 – Procurement and development**: further development of this business case and the procurement strategy, including identification of a CPO partner (or partners), soft market testing, official procurement process and developing the governance required to achieve the required council approvals. Senior management, procurement, legal and financial representatives will also be involved as required
- **Stage 5 – Monitoring and delivery of the capital works and commercial operation:** overseeing contract awards and monitoring contractual delivery, including ensuring CPO partners deliver to time and budget, dealing with problems and issues and reporting on progress.

9.2.3 Required Resources

The proposed governance and management require technical, procurement, legal, management and administrative support. Existing resources and specialist capability varies across the local authorities within the Northern and Western Isles region. External Consultants may be required to assist the teams in the local authorities to develop, deliver, or operate the EVCI roll-out.

At the time of writing, it is not possible to provide an estimate of costs as final costs will depend on the commercial model adopted, procurement routes used and the need for any external consultancy support. However, Transport Scotland has allocated £80,000 funding per local authority in the 2023/2024 financial year (in addition to any funding rolled over from 2022/2023) to progress next stages and procurement.

9.2.4 Approvals

Each of the three local authorities have their own internal approvals process to approve this business case and then agree the proposed commercial delivery model, procurement approach and sign-off of any funding and financing plans. This includes the need to present papers for approval to committees and Cabinets. In addition, HITRANS will also progress this business case through their own Cabinet, although this approval will be subject to approval of the three island authorities to maintain local democratic oversight.

9.3 Timetable

The timescales for this EVCI programme may vary between local authorities but are estimated to be as outlined in Table 9.1.

Table 9.1: Next Steps

Month/Year	Key tasks
September 2023	Submission of draft Strategy and Expansion Plan document to SFT for comment
Q4 2023	Further discussions and engagement on commercial delivery model Further engagement with SSEN to confirm any grid capacity constraints
Q4 2023	Incorporate comments from SFT on Strategy and Expansion Plan
Q1 2024	Confirm preferred commercial delivery model and procurement approach
Q1 2024	Re-confirm collaborative working arrangements based on the preferred model and agree and establish Inter-Entity Agreement IEA(s) as required Finalisation of Strategy and Expansion Plan and internal approval process Submission of finalised Strategy and Expansion Plan to SFT Soft market testing
Q2 2024	Development of procurement/tender documentation Commencement of procurement process
Q3 2024	Partner in place Commencement of capital works for new EVCI
Q4 2024	Commencement of service delivery
2025	EVCI programme in place, with installation and service delivery of new EVCI ongoing

9.4 Risk Management and Mitigation

At this early stage of development, a register of high-level risks has been developed, including plans for their mitigation. This risk register should become a live document, and an agenda item on Steering Group (and later Delivery Group) meetings to review, adjust and add to. As more detail is possible a Quantified Risk Register is likely to be appropriate. The risk register is shown in Table 9.2.

Table 9.2: Risk Register

No.	Category	Name	Description	Likelihood	Probability	Impacts	Proposed Mitigation
1	Programme	Decision on commercial delivery model delayed	Difficulties agreeing preferred commercial delivery model due to time required for discussions with partners	HIgh	60%	Delayed or incomplete delivery of the EVCI programme resulting in the network remaining static or putting the three island authorities at risk of missing the funding conditions.	Consider ongoing HITRANS (or other lead organisation) involvement to maintain momentum. Identify programme of activity for Stage 2 including facilitated discussions with partners, Chief Executives Group and relevant officers.
2	Programme	Failed procurement	Difficulty finding a delivery partner or receipt of inadequate bids resulting in failed procurement. Particularly as many authorities in Scotland will be seeking this service at the same time.	Medium	30%	Delayed delivery of the EVCI programme and costs associated with additional procurement exercises. As above	Further consideration of commercial delivery options. Once confirmed, development of a procurement strategy including soft market testing, PIN and ensuring engagement on technical specification and contract terms mitigation works for this risk but delays schedule with associated risk on left
3	Funding & financing	Incorrect cost estimation	Underestimated costs for the EVCI required, potentially due to inflation and/or global delivery issues	Medium	60%	Insufficient funds to deliver EVCI, requiring either a reduction in EVCI commissioned, or additional funding from Council (or other) budgets	Flexible specifications to enable potential delivery partners to adapt to cost changes
4	Funding & financing	Insufficient funds available for procurement process	Available funding from Transport Scotland is insufficient to cover procurement costs	Medium	50%	Additional funding required from Council (or other) budgets	Collaborative working enables economies of scale and better use of individual local authority funding allocations
5	Stakeholders/ consultation/ third parties	Selected locations objected to by the public or land owners	To install the EVCI, consultation may be required. Land owners or local people may object in some locations	Low	20%	Reduction in amount of EVCI that can be delivered, or requirement to find alternative sites which could lead to delays or cost increases, lower demand sites being selected or compromise equitable distribution objective	Use of council-owned land where possible to host EVCI; socialisation of community to the plan and its benefits; early engagement with the public or land owners where possible.

No.	Category	Name	Description	Likelihood	Probability	Impacts	Proposed Mitigation
6	Stakeholders/ consultation/ third parties	Power connections and capacity	Selected locations compromised by difficulties in power connections or capacity	Medium	40%	Compromise in locations resulting in not meeting objectives or increased costs	Early engagement with SSEN on potential sites, flexible procurement approach on site locations and alternative power options
7	Land, planning & environmental	Below-ground or ground conditions constraints	Presence of utilities or similar, or unstable ground mean a site cannot be used for a charger to be installed	Medium	30%	In most cases it should be possible to adjust the site of a charger to accommodate, but in some cases the same impacts as risk 5 may apply	Surveys where required; inclusion of financial? risk allowance; procurement process enables alternative sites to be considered
8	Funding & financing	Market conditions change	Increase in electricity costs and/or flooding of market with demand relative to operators able to enter contracts	Medium	40%	Unattractive market proposition leading to inability to install and operate numbers of EVCI required and funded; conversely, increase in electricity costs could reduce demand for EVs and thus EVIs	Early market engagement at next stage of project delivery; re-running of demand model if required; intel from SFT on market
9	Funding and financing	Market failure	EVCI Market failure	Medium	30%	Council or partner has to fund loss. Stranded assets. Poor maintenance/upkeep by partner. Network coverage (and just transition) removed. Loss of public confidence. Bad publicity	More detailed analysis on commercial delivery models and risks.

A. Maps

1. Population Density Orkney
2. Population Density Shetland
3. Population Density Western Isles
4. Scottish Indices of Multiple Deprivation (Orkney)
5. Scottish Indices of Multiple Deprivation (Shetland)
6. Scottish Indices of Multiple Deprivation (Western Isles)
7. Dwellings per hectare Orkney
8. Dwellings per hectare Shetland
9. Dwellings per hectare Western Isles
10. Key Employment Centres Orkney
11. Key Employment Centres Shetland
12. Key Employment Centres Western Isles
13. Existing Council-Owned EVCI Locations – Orkney
14. Existing Council-Owned EVCI Locations – Shetland
15. Existing Council-Owned EVCI Locations – Western Isles
16. Proposed Orkney Council Public Charging Network by 2025/26
17. Proposed Shetland Council Public Charging Network by 2025/26
18. Proposed Western Isles Council Public Charging Network by 2025/26
19. Orkney Council Active Travel and Public Transport Alignment with Proposals
20. Shetland Council Active Travel and Public Transport Alignment with Proposals
21. Western Isles Active Travel and Public Transport Alignment with Proposals
22. Orkney Council Rural Proofing Analysis of the Proposals
23. Shetland Council Rural Proofing Analysis of the Proposals
24. Western Isles Rural Proofing Analysis of the Proposals
25. Orkney Council Index of Multiple Deprivation Analysis of the Proposals
26. Shetland Council Index of Multiple Deprivation Analysis of the Proposals
27. Western Isles Index of Multiple Deprivation Analysis of the Proposals

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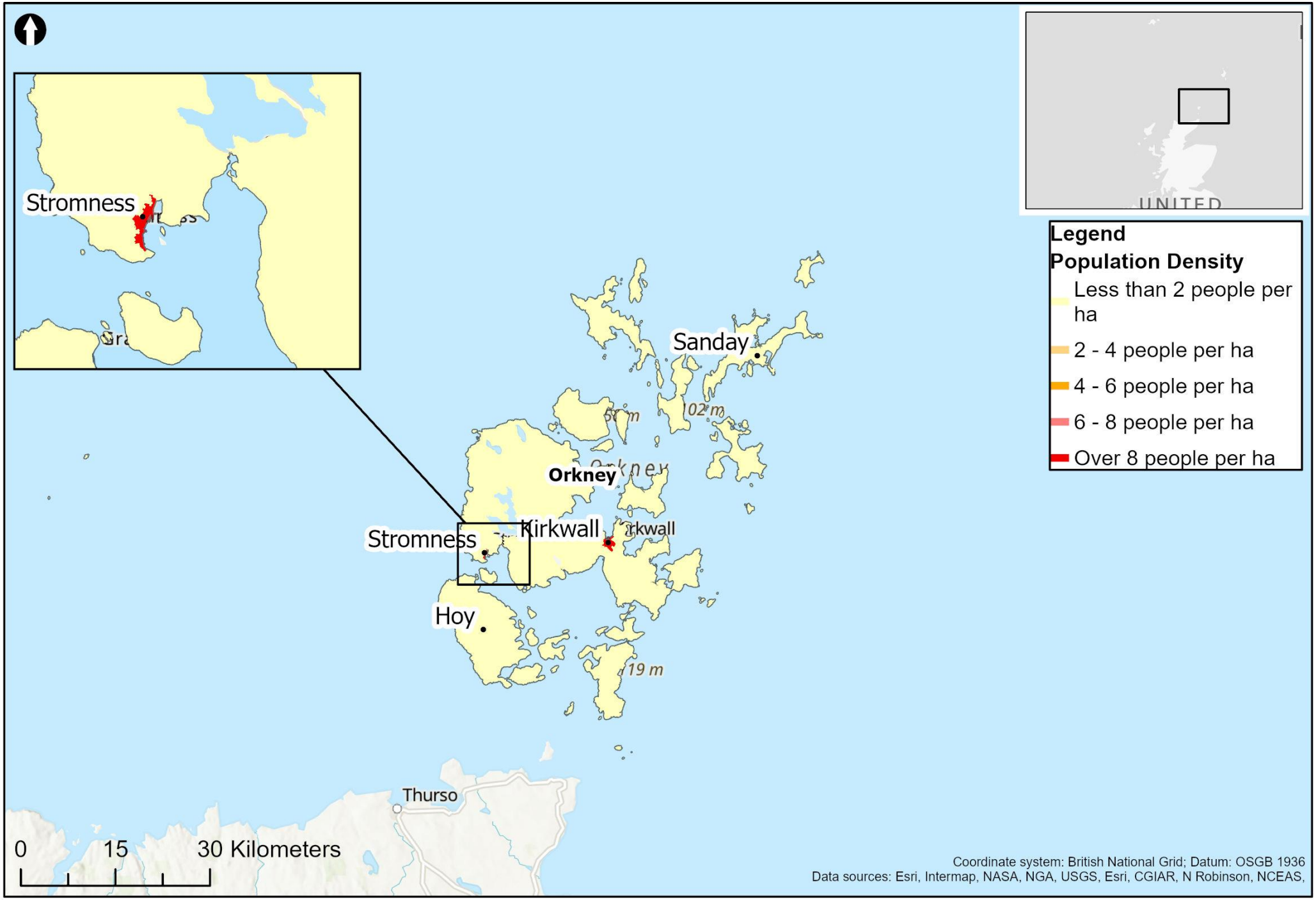
Stromness
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Population Density
Less than 2 people per ha
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4 - 6 people per ha
6 - 8 people per ha
Over 8 people per ha
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Data sources: Esri, Intermap, NASA, NGA, USGS, Esri, CGIAR, N Robinson, NCEAS,

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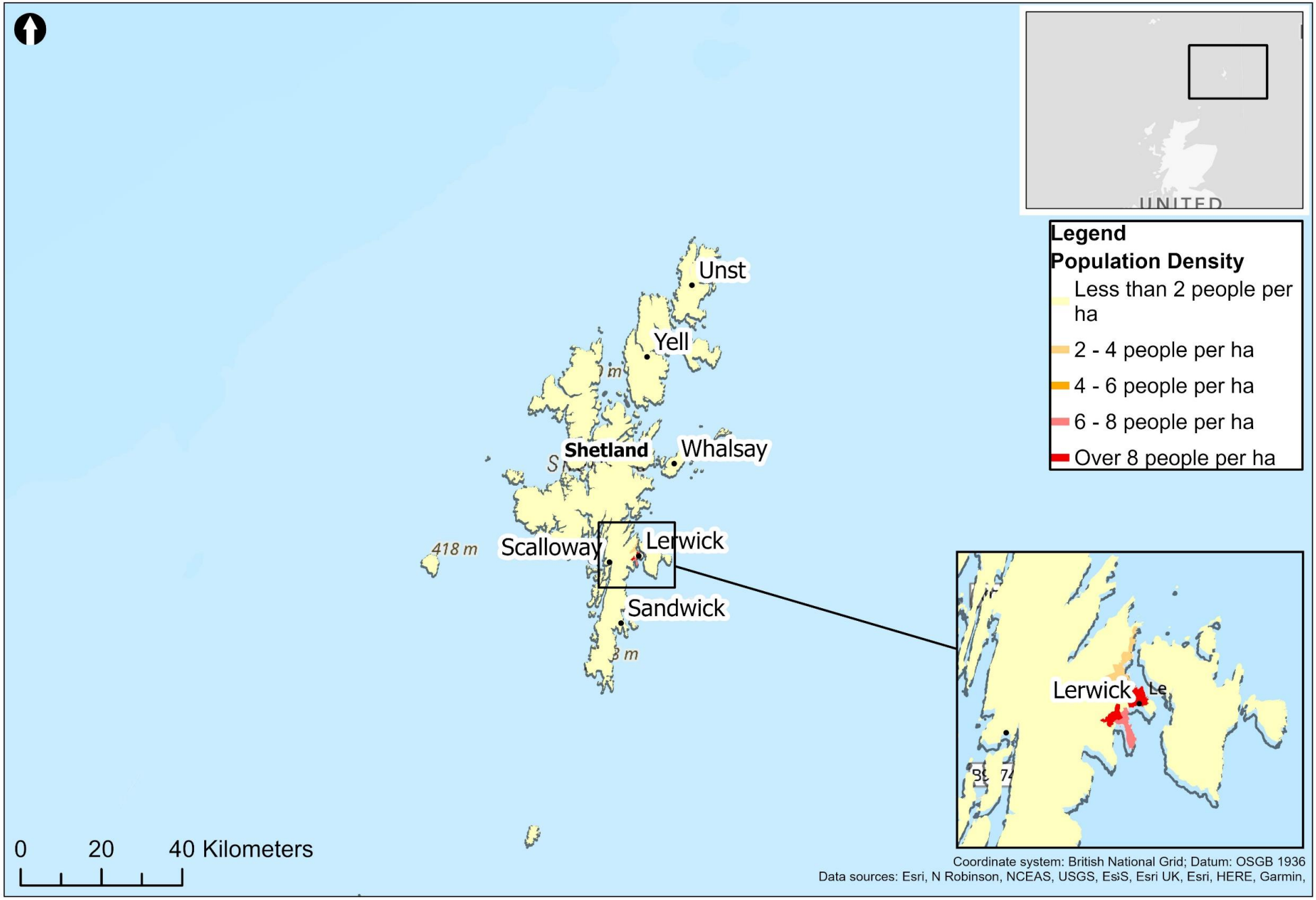
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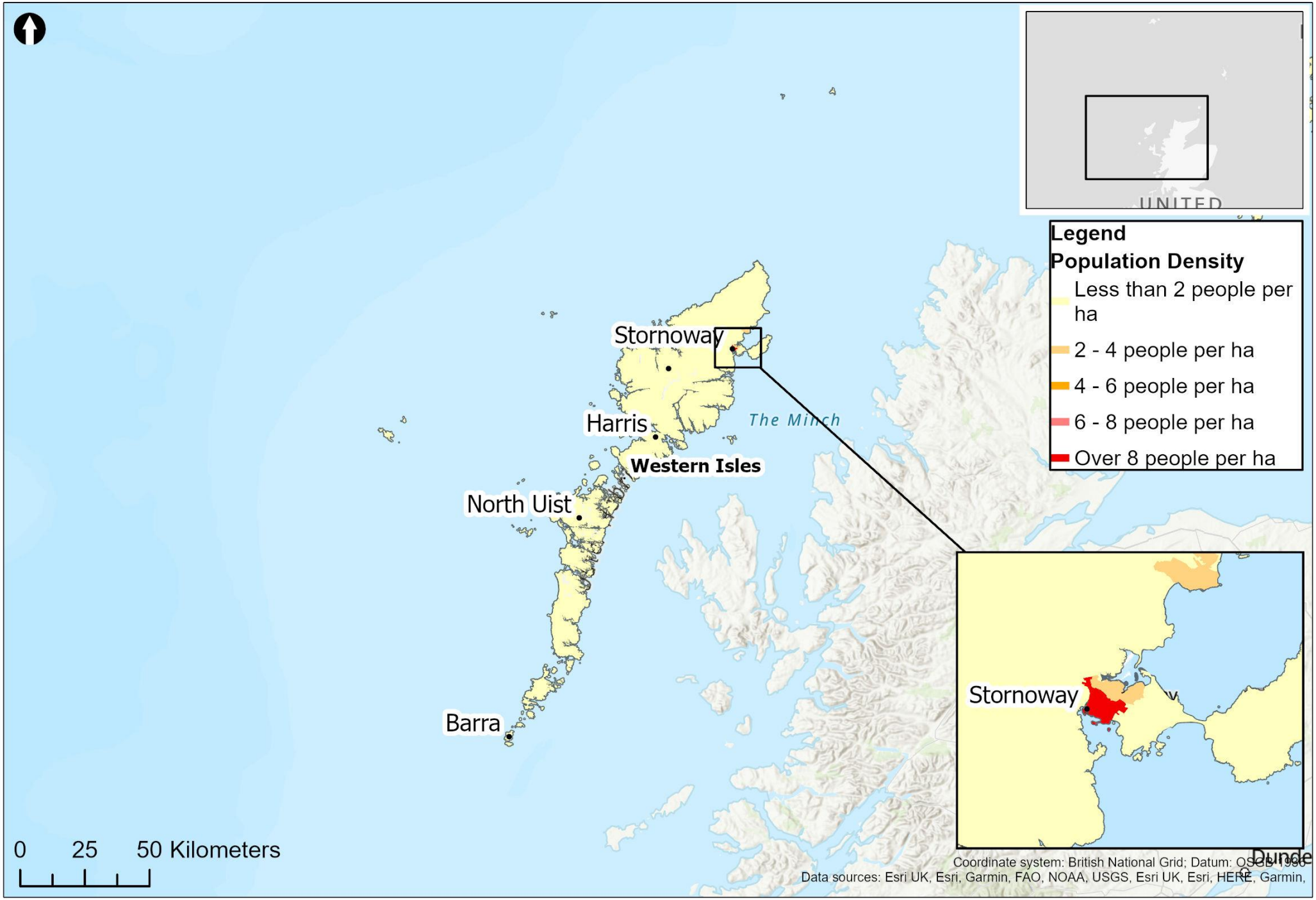
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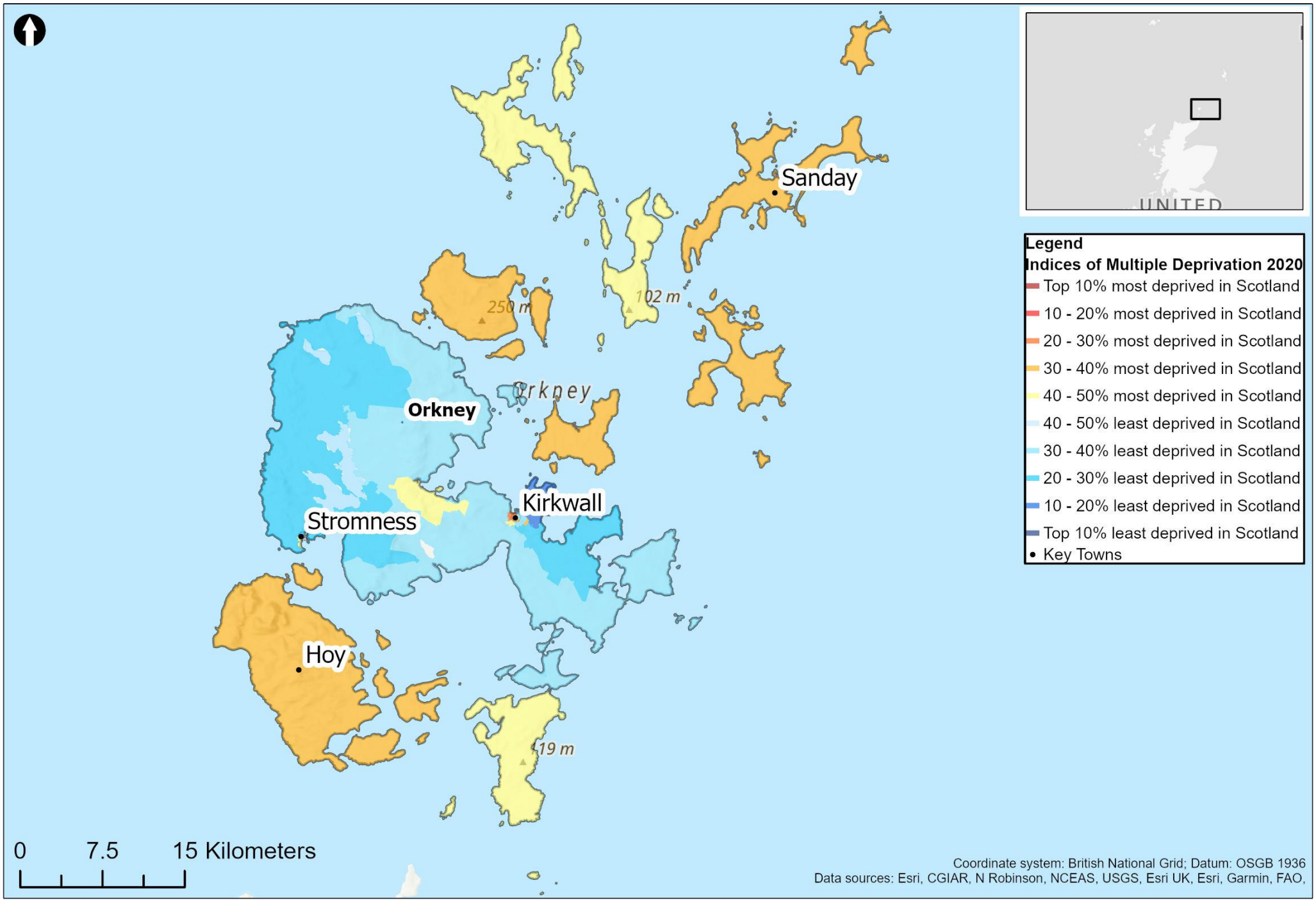
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Indices of Multiple Deprivation 2020
Top 10% most deprived in Scotland
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20 - 30% most deprived in Scotland
30 - 40% most deprived in Scotland
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Top 10% least deprived in Scotland
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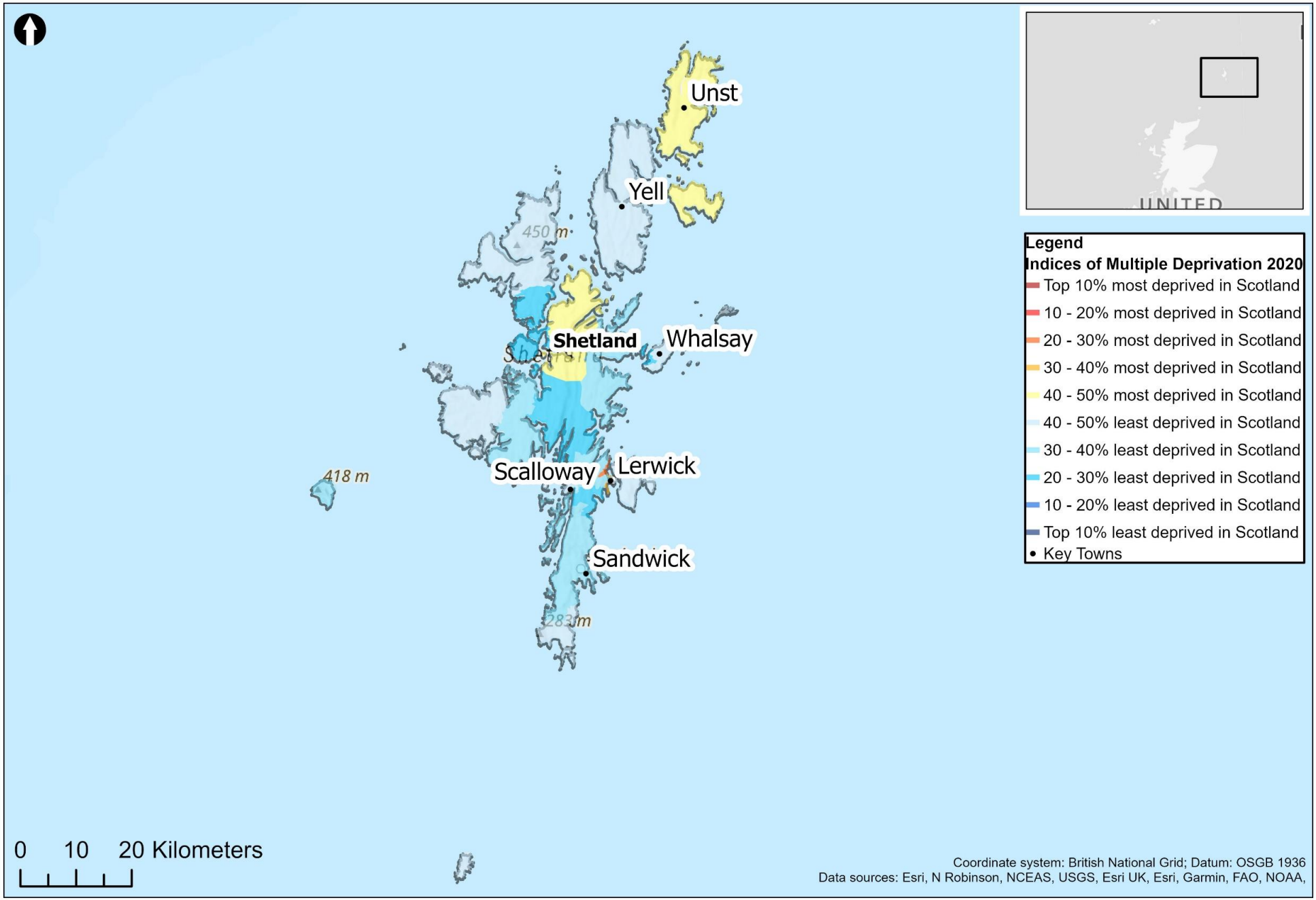
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Top 10% least deprived in Scotland
Key Towns
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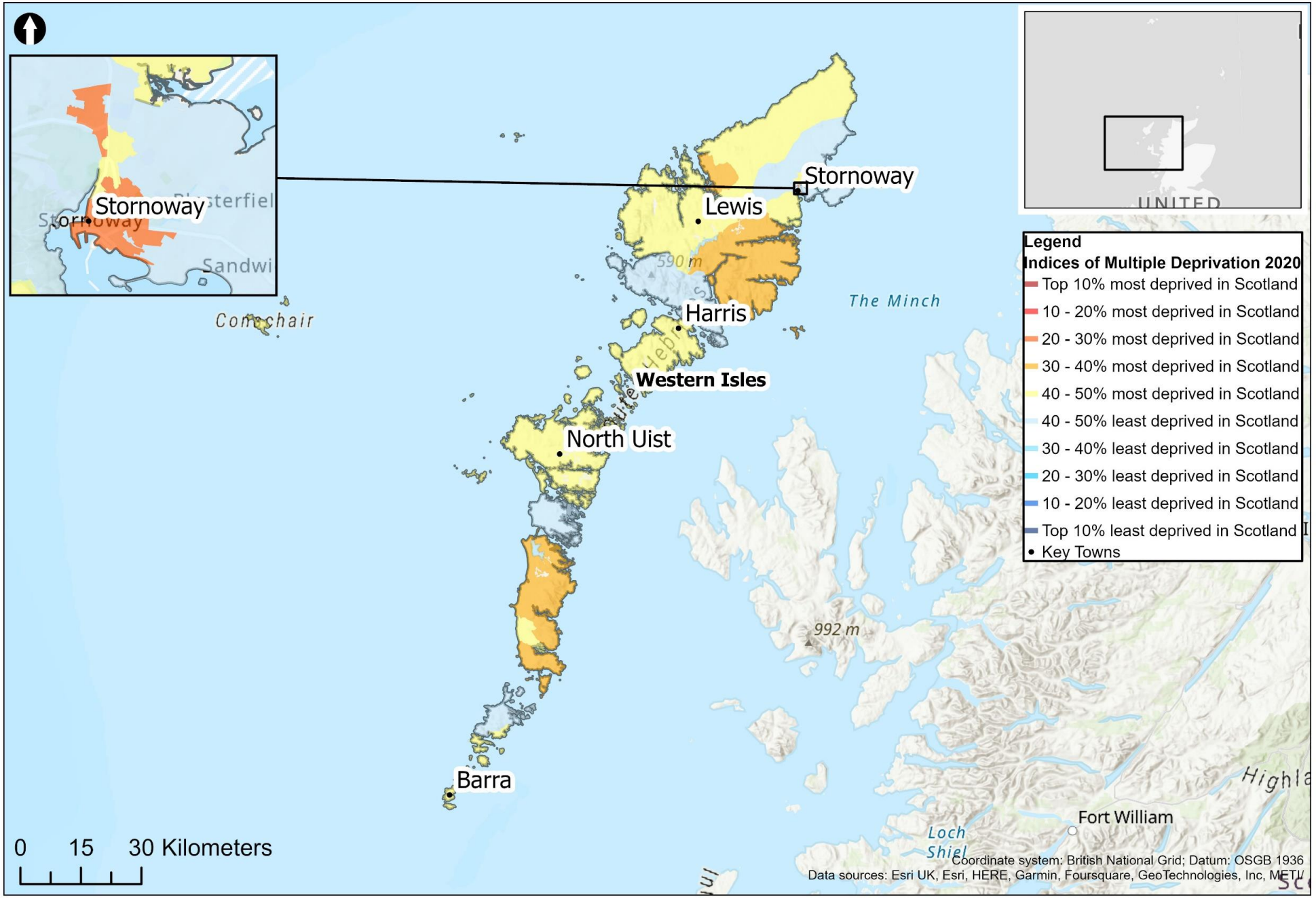
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Top 10% most deprived in Scotland
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Top 10% least deprived in Scotland
Key Towns
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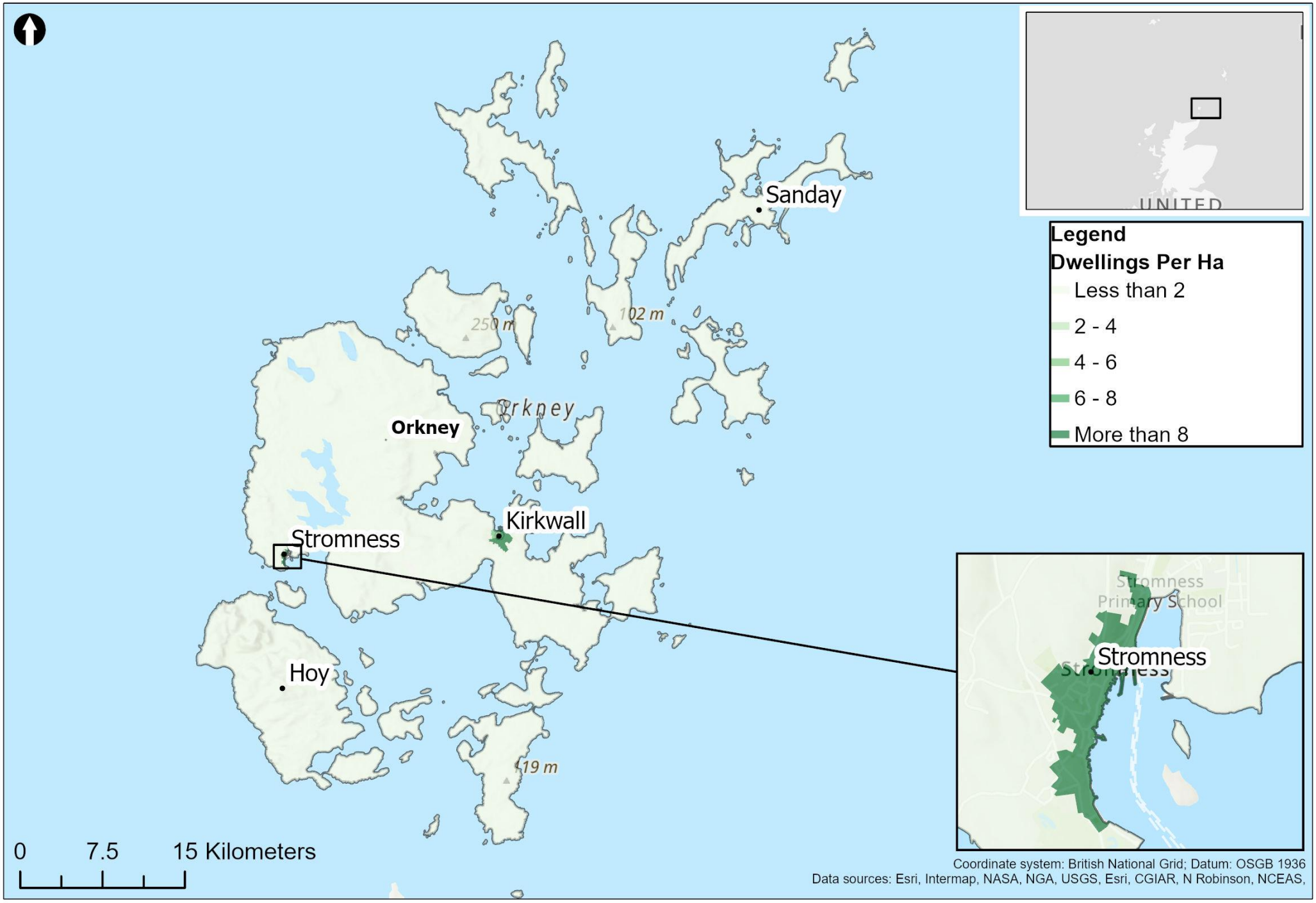
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Dwellings Per Ha
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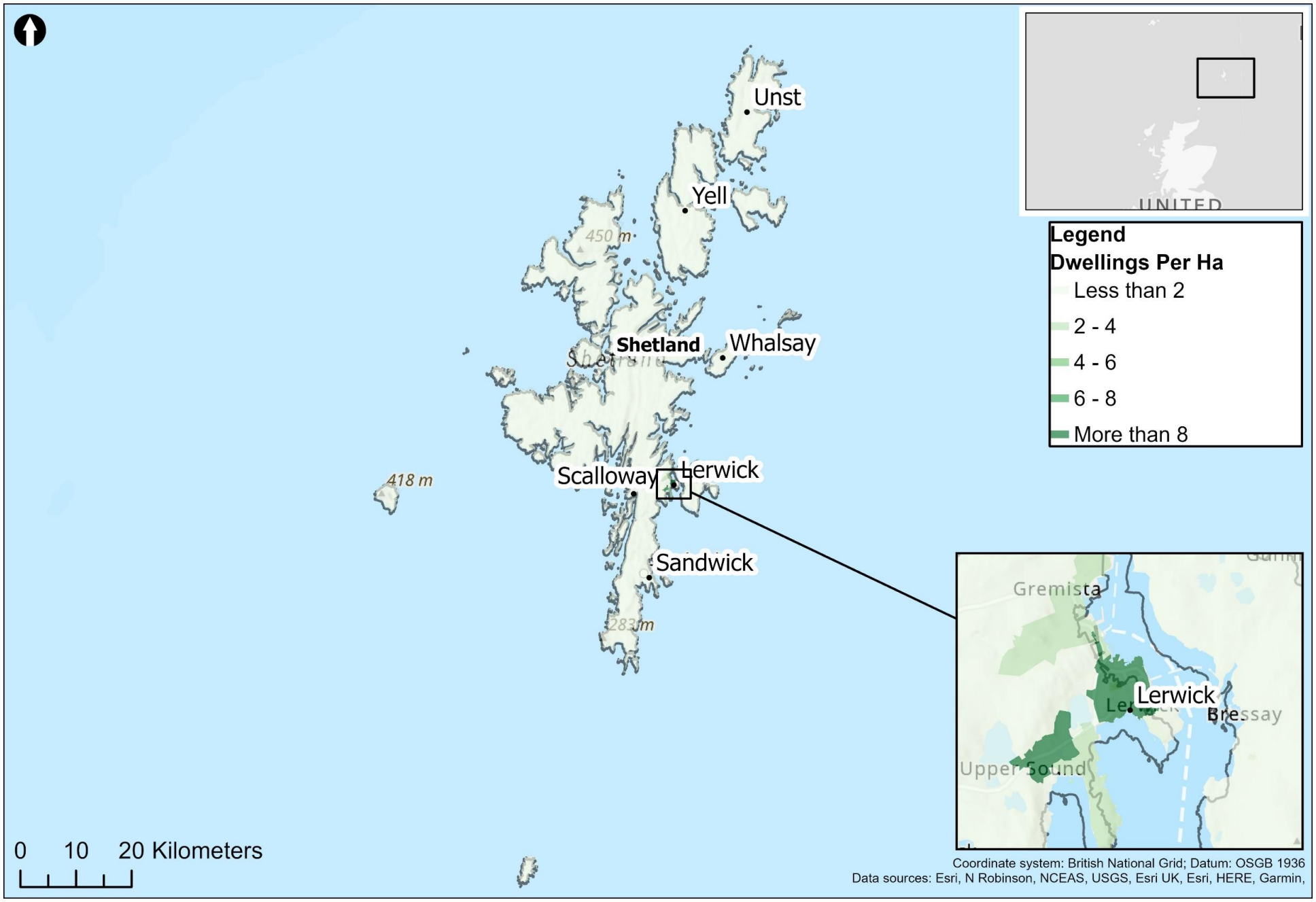
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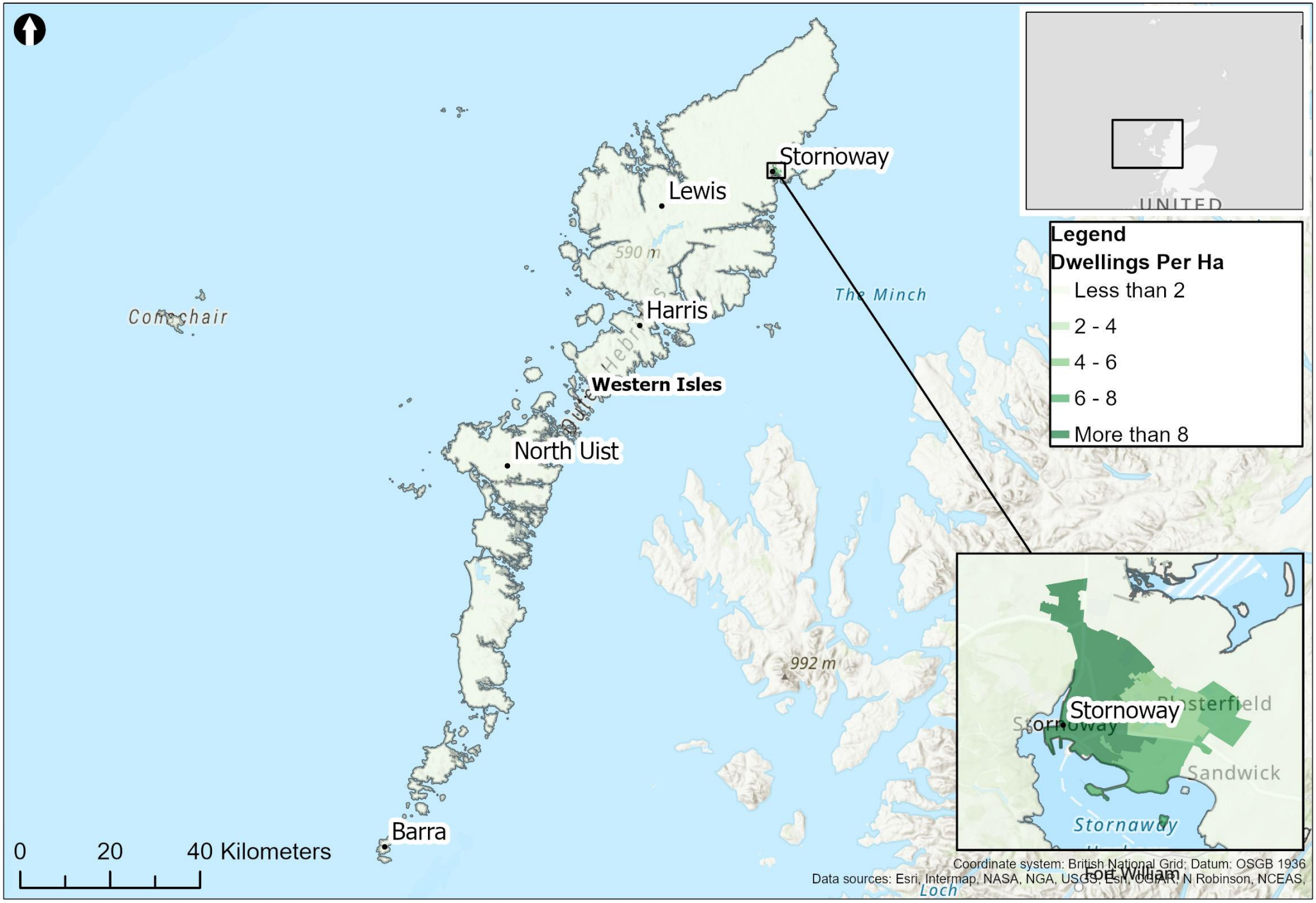
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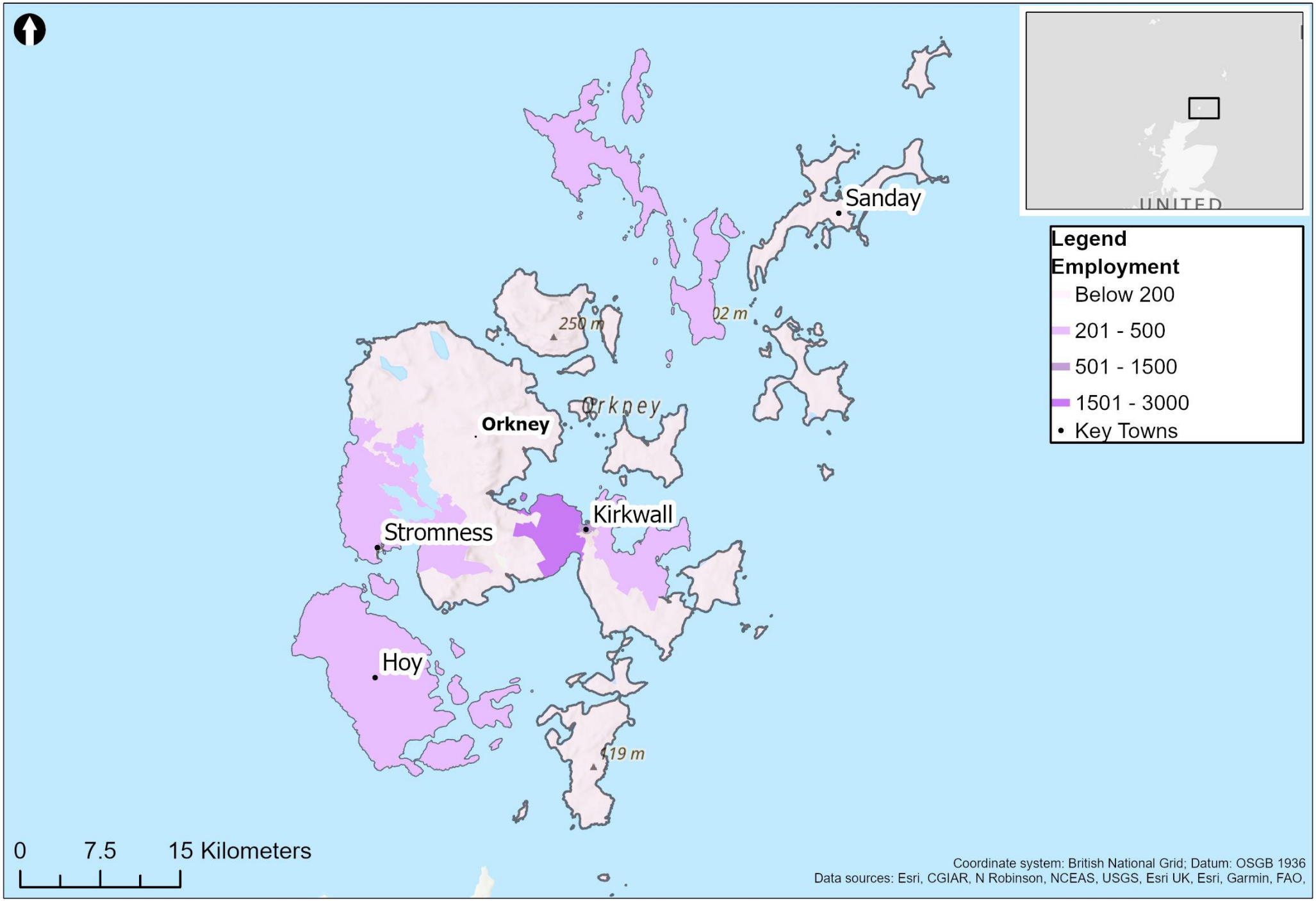
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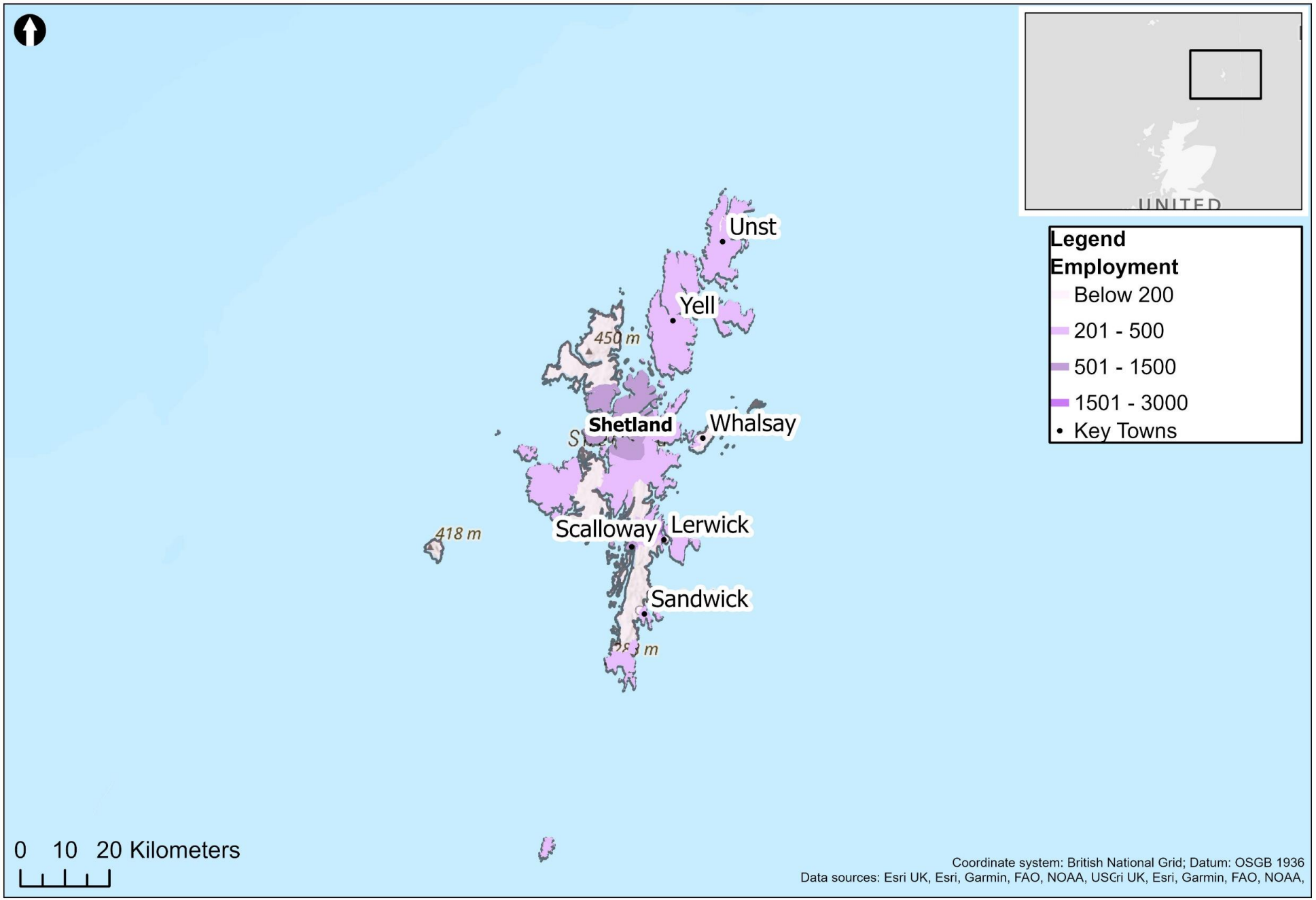
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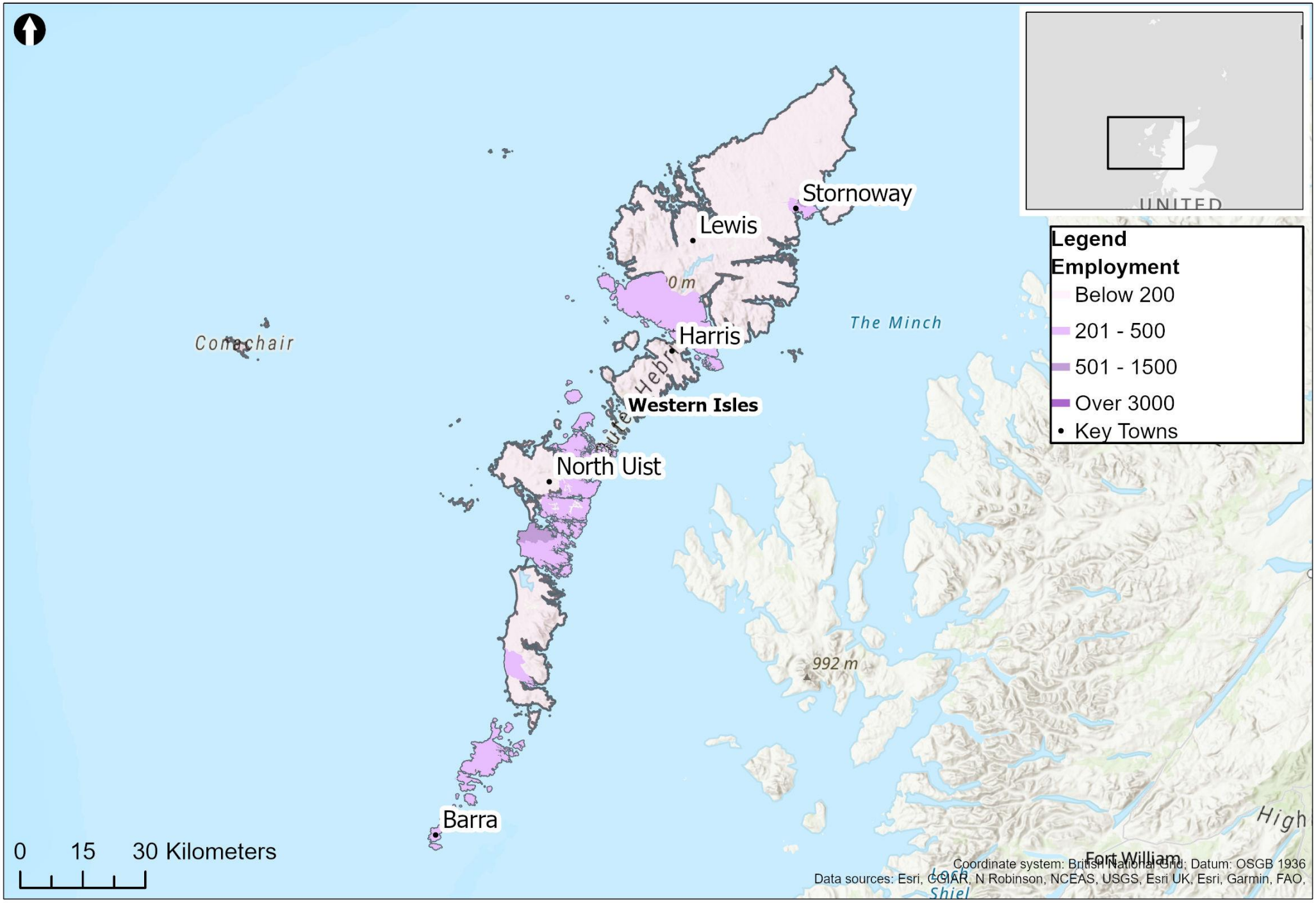
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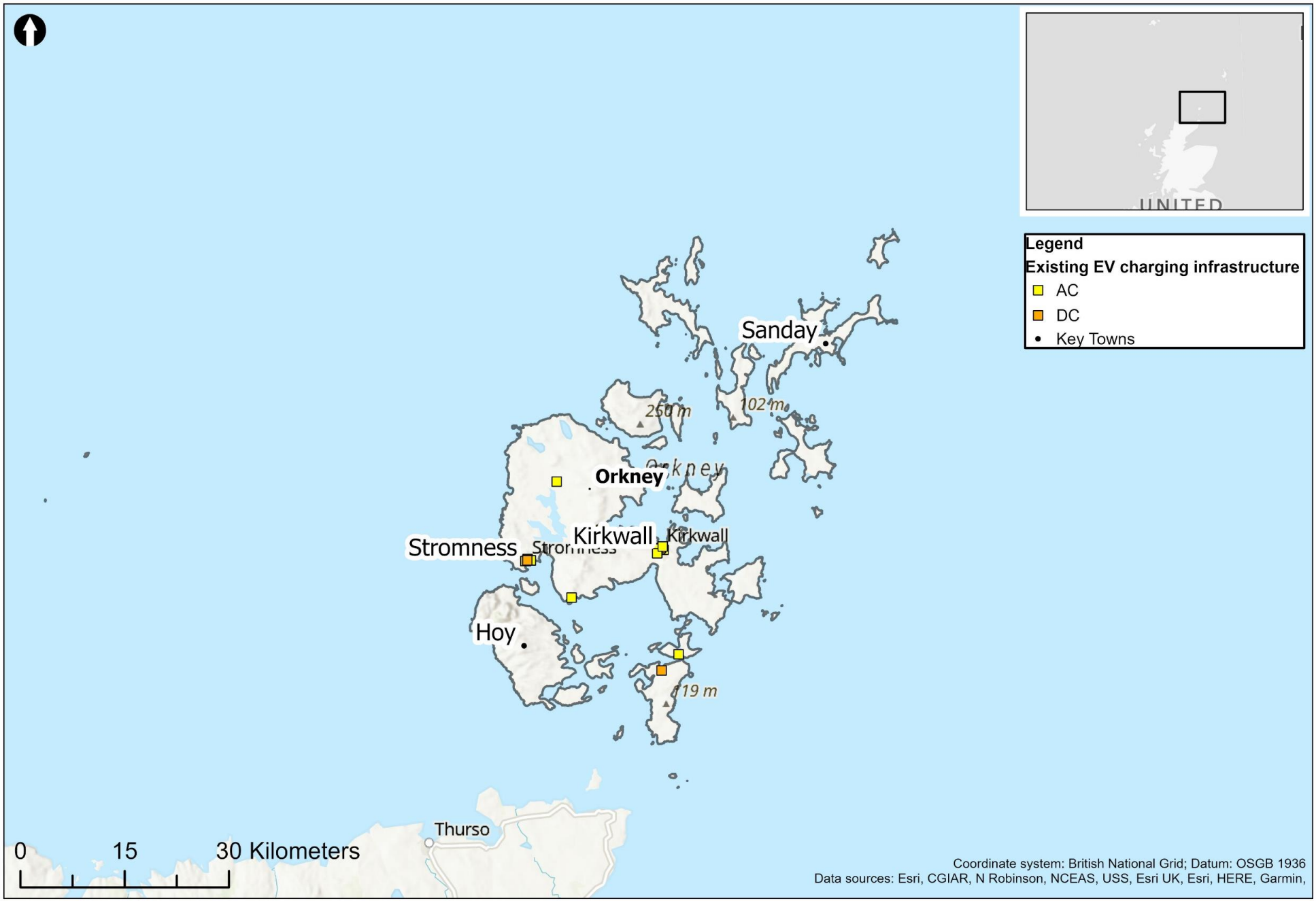
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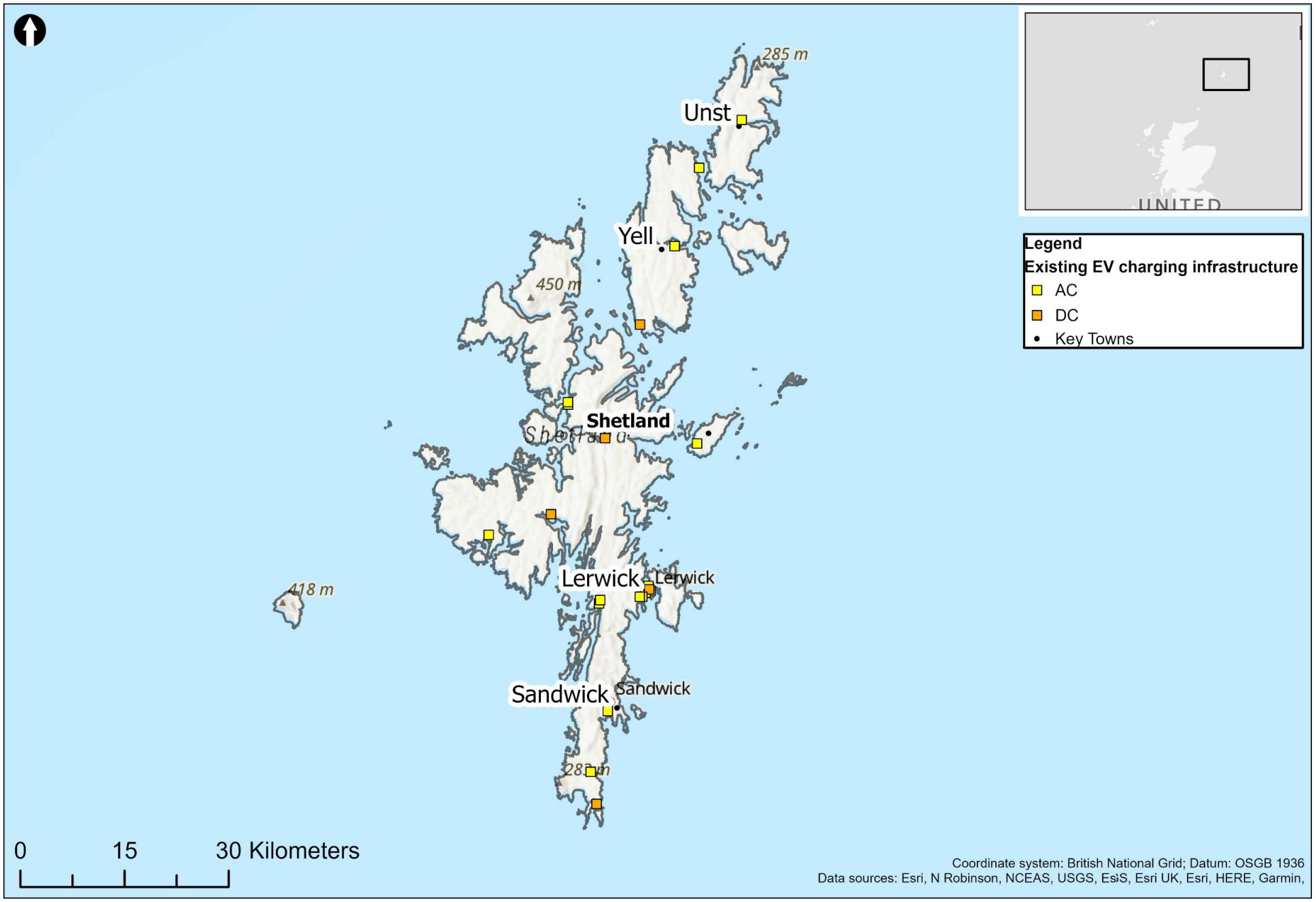
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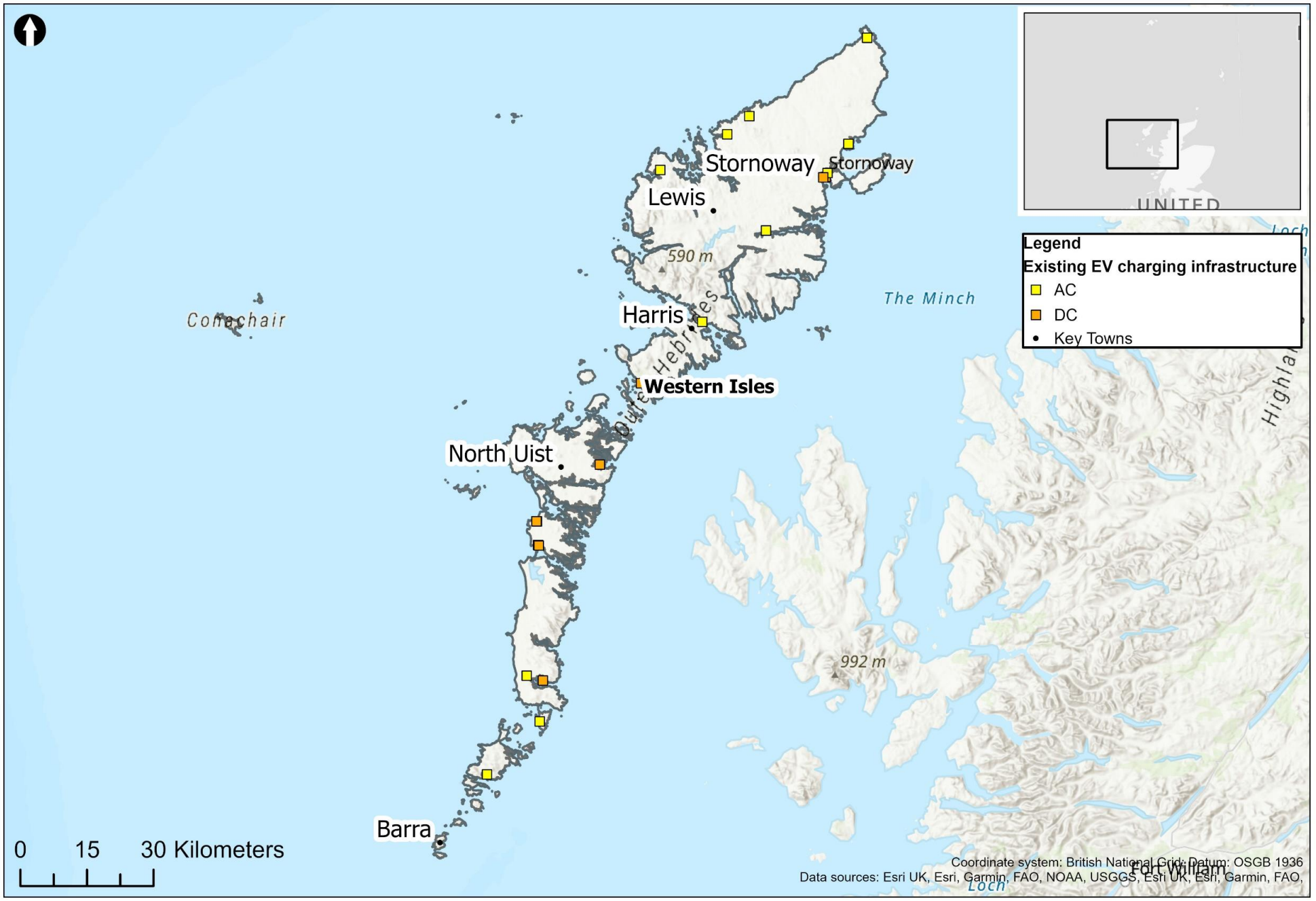
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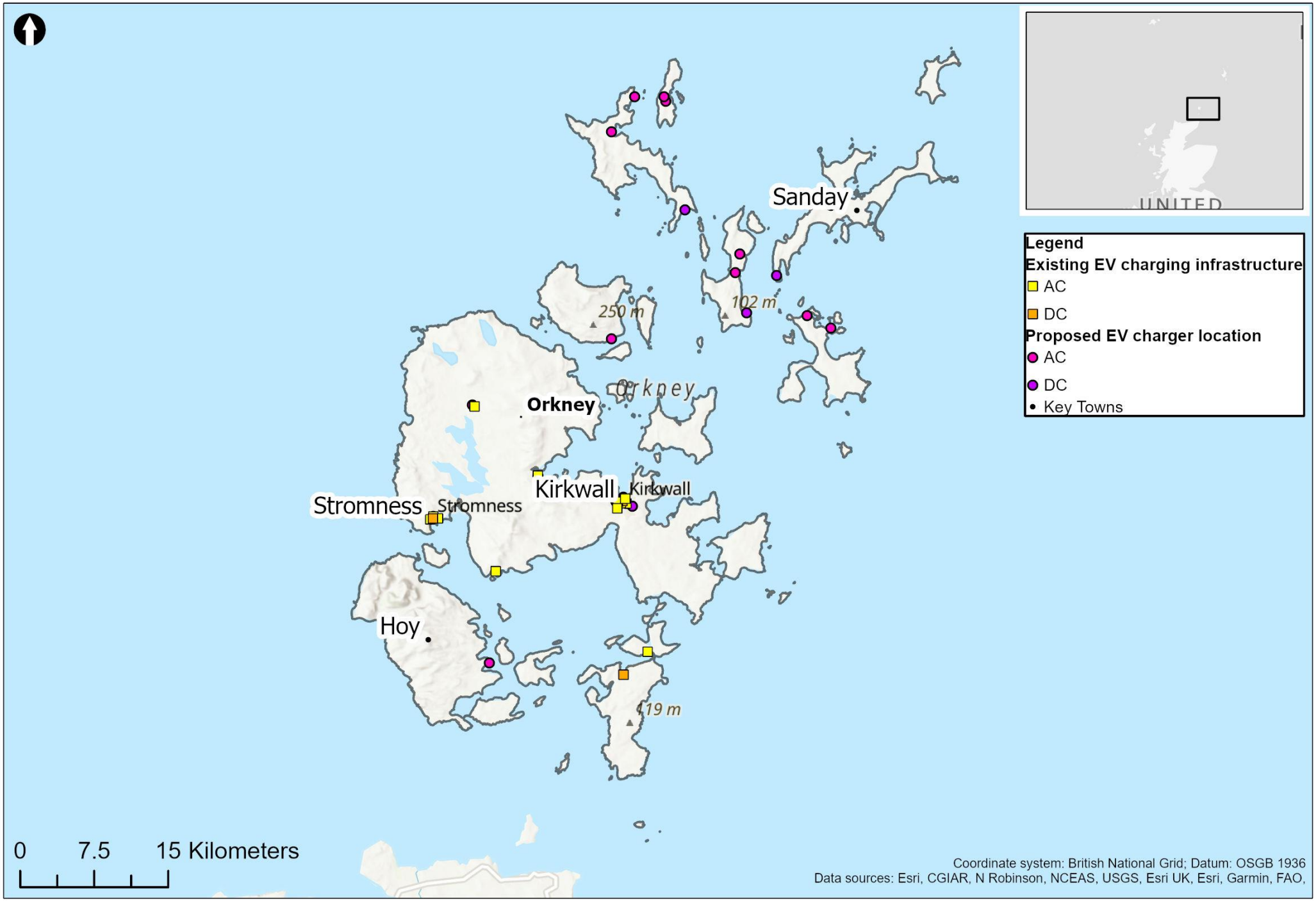
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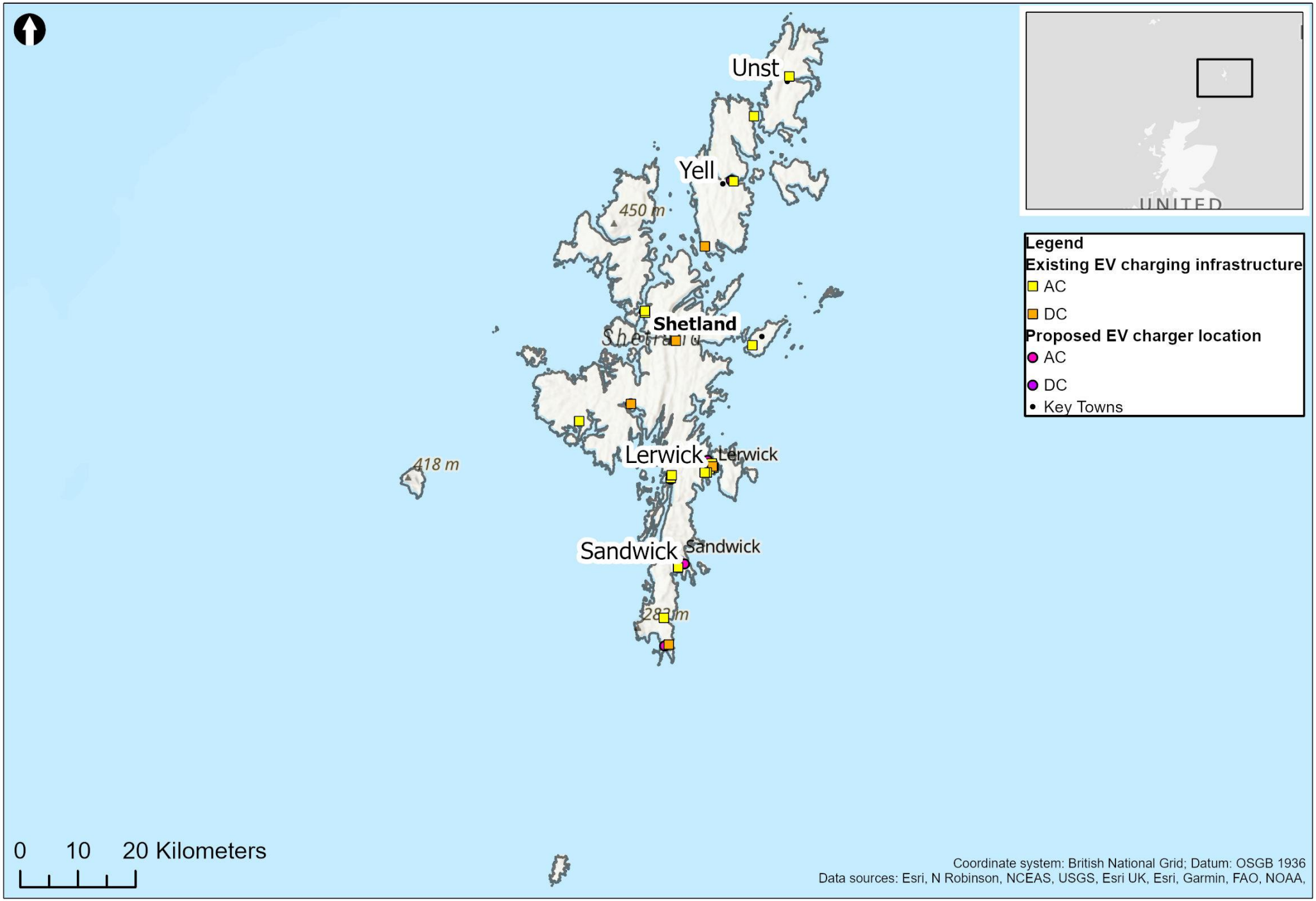
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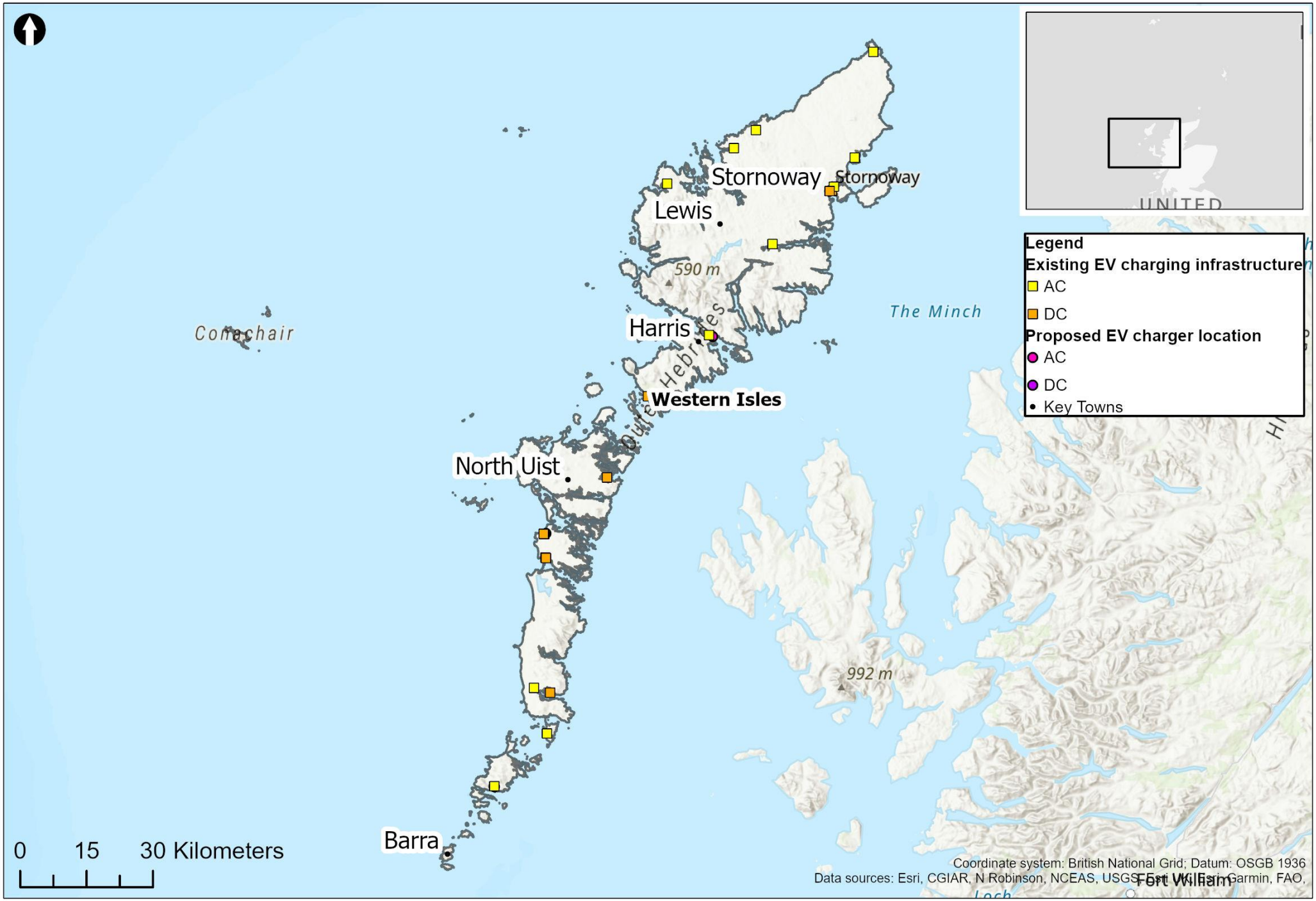
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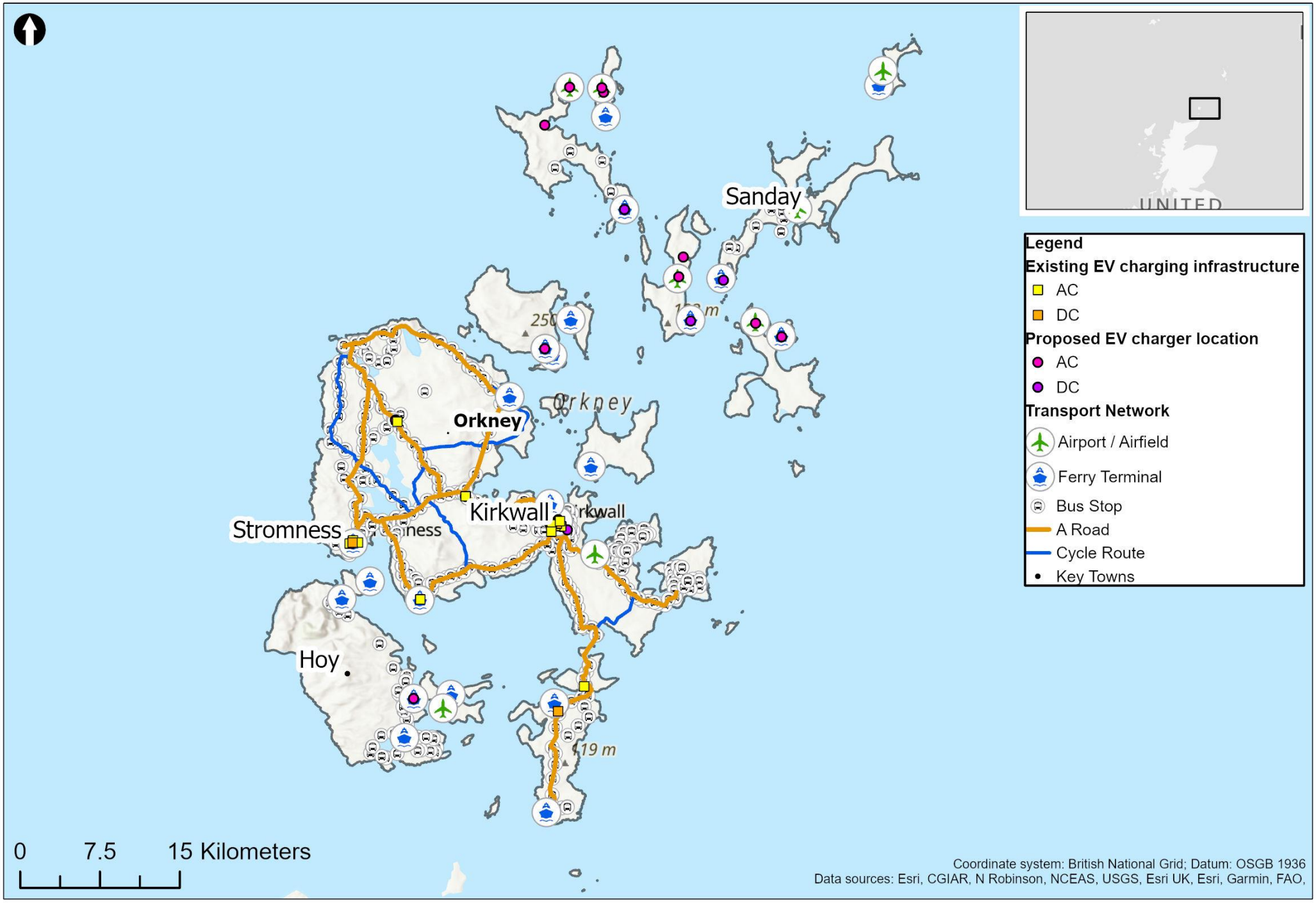
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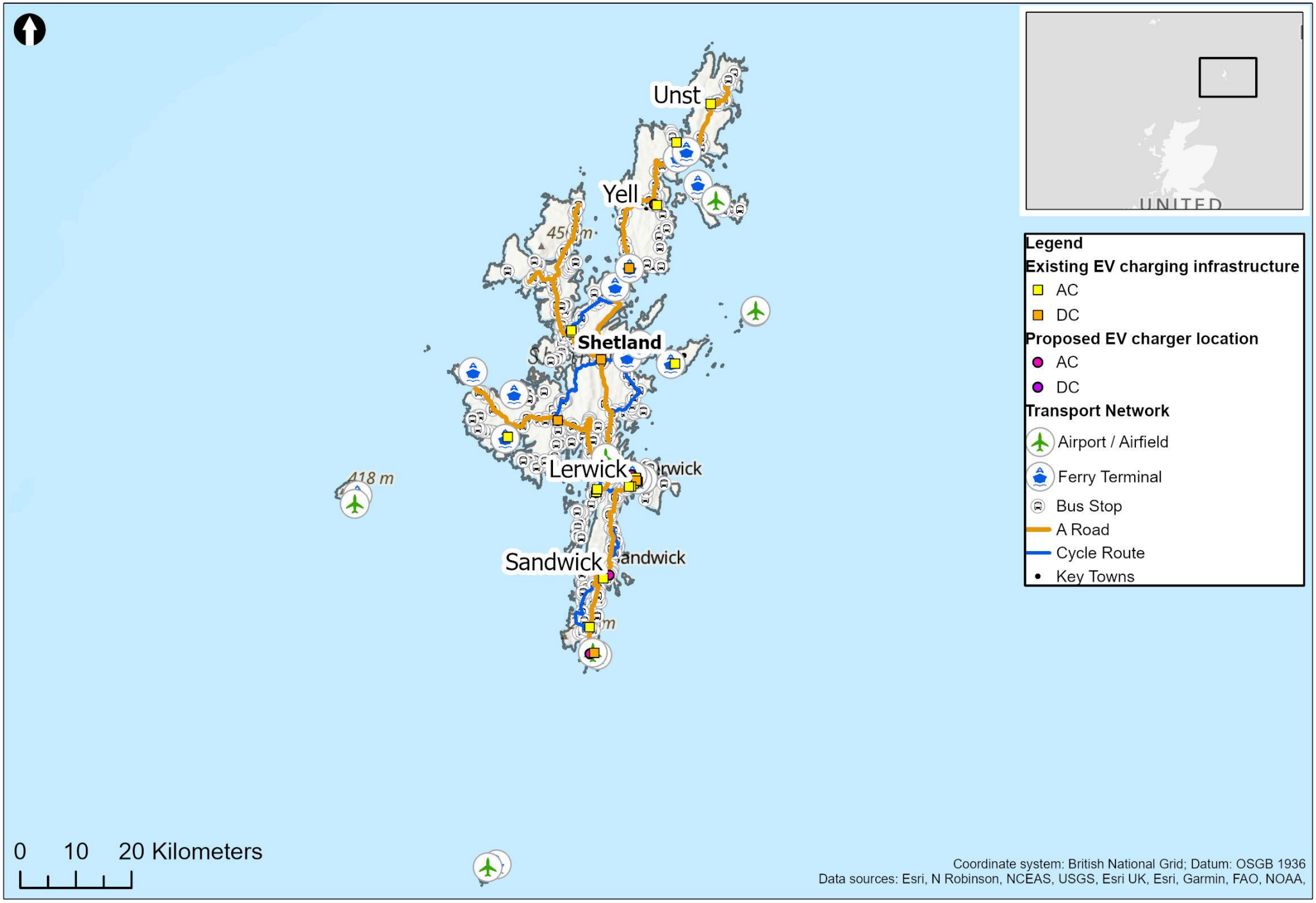
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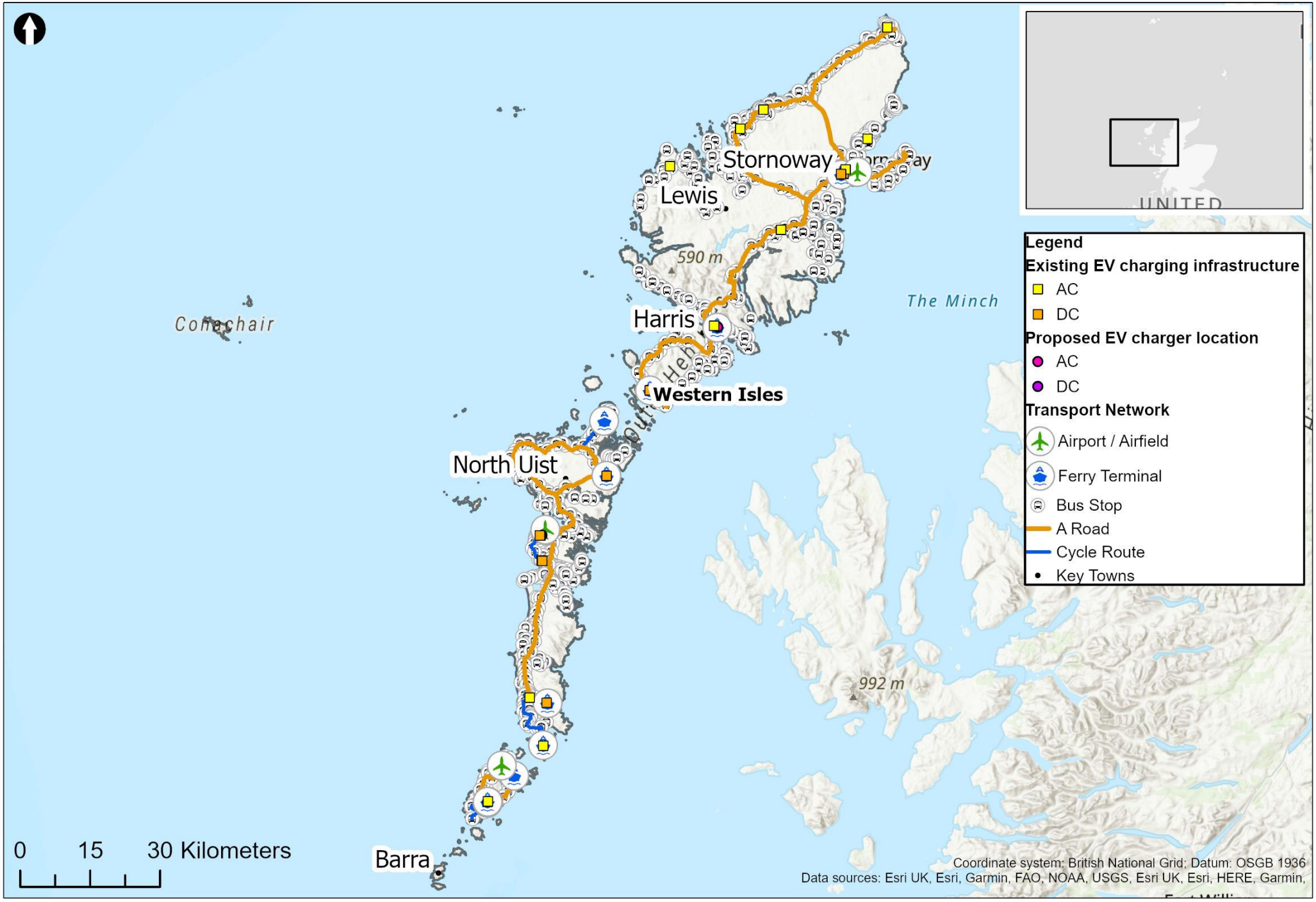
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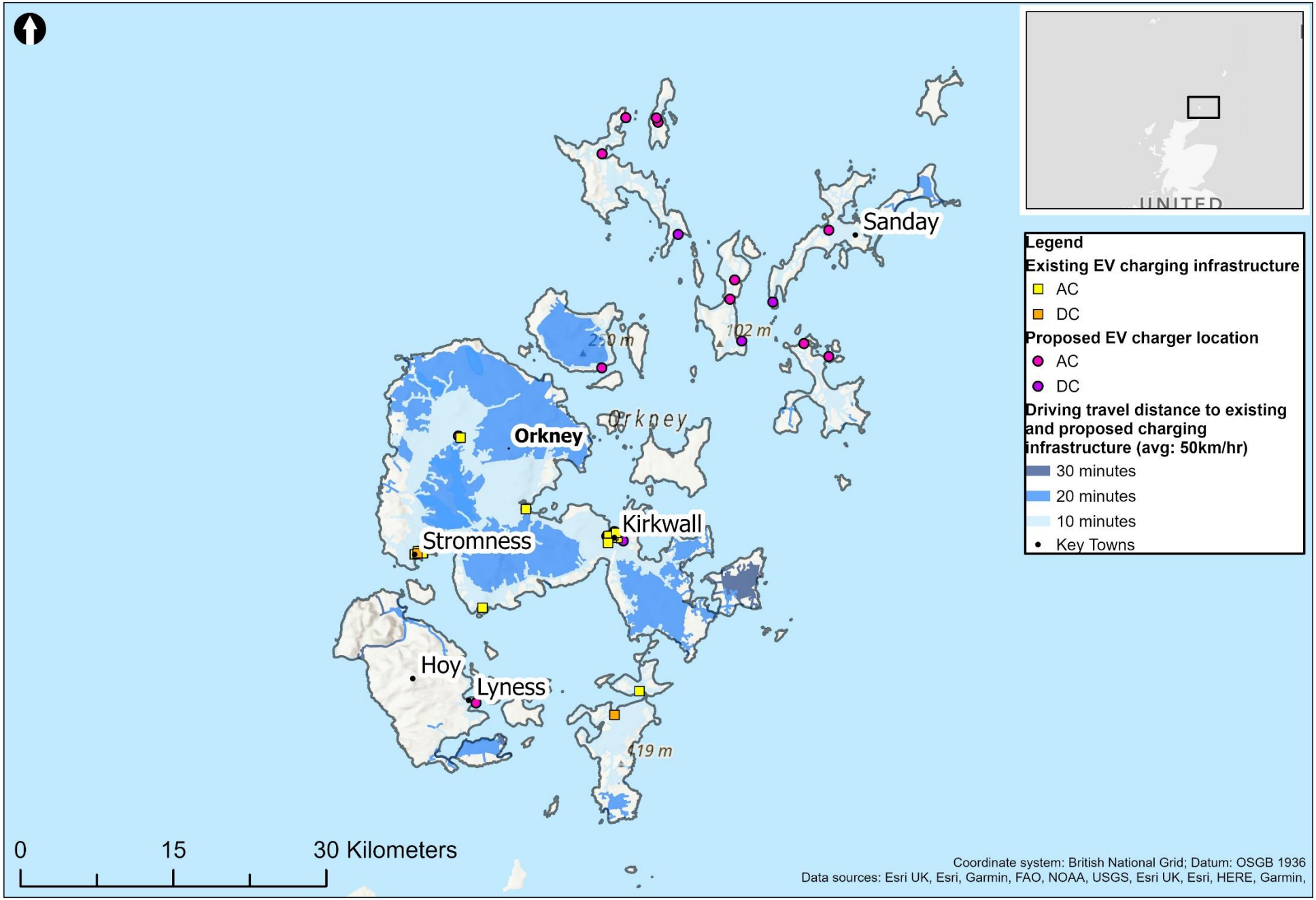
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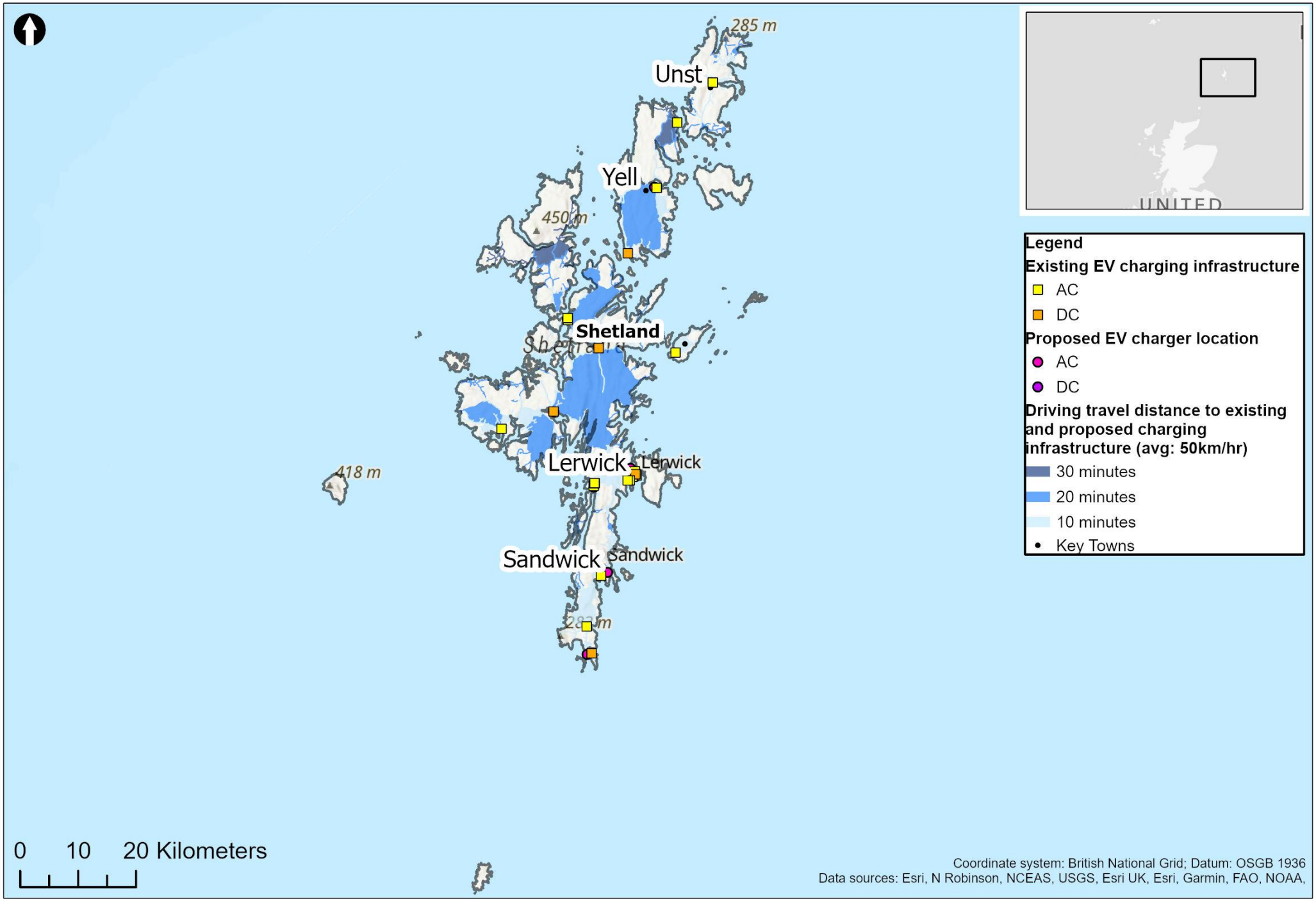
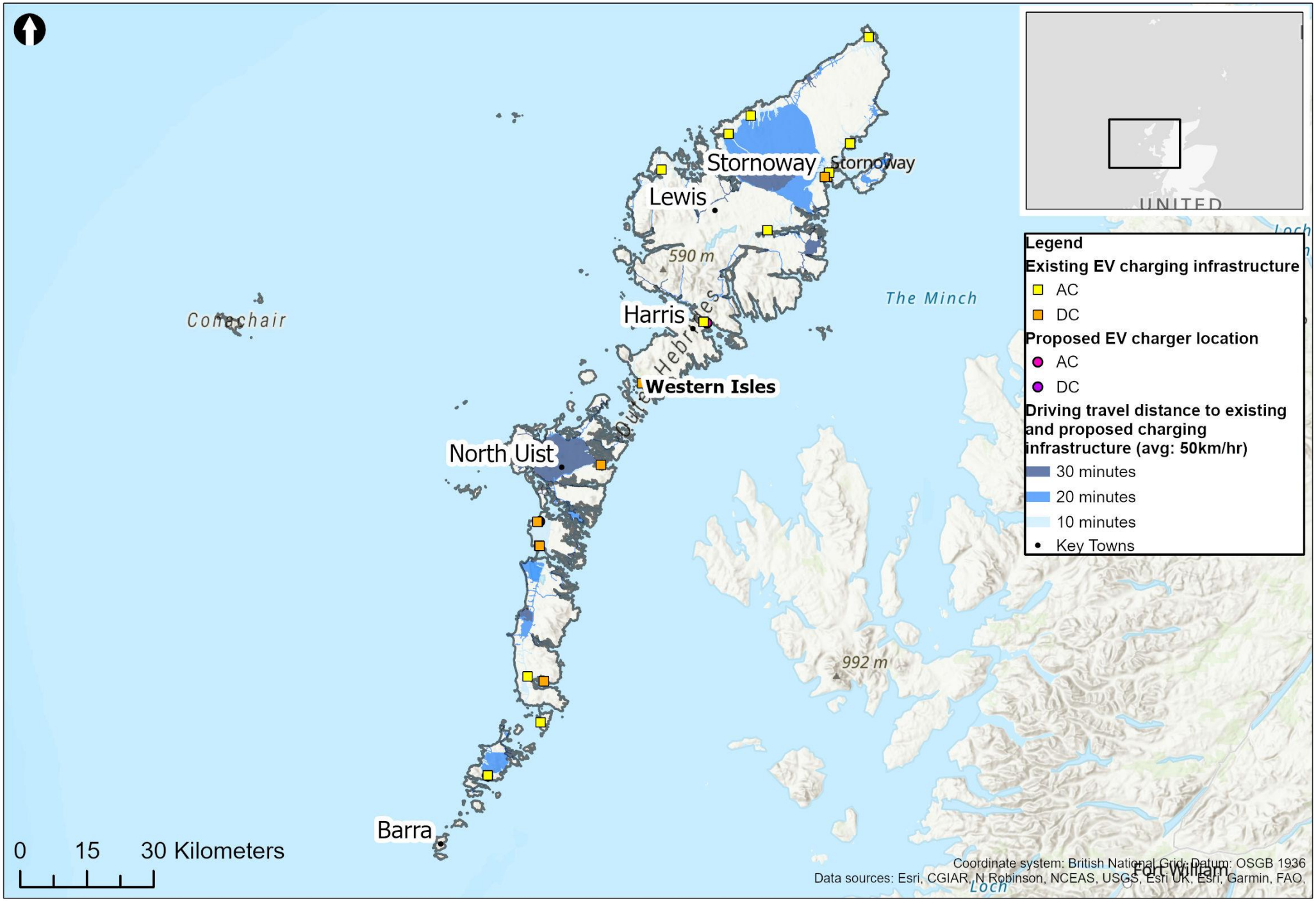
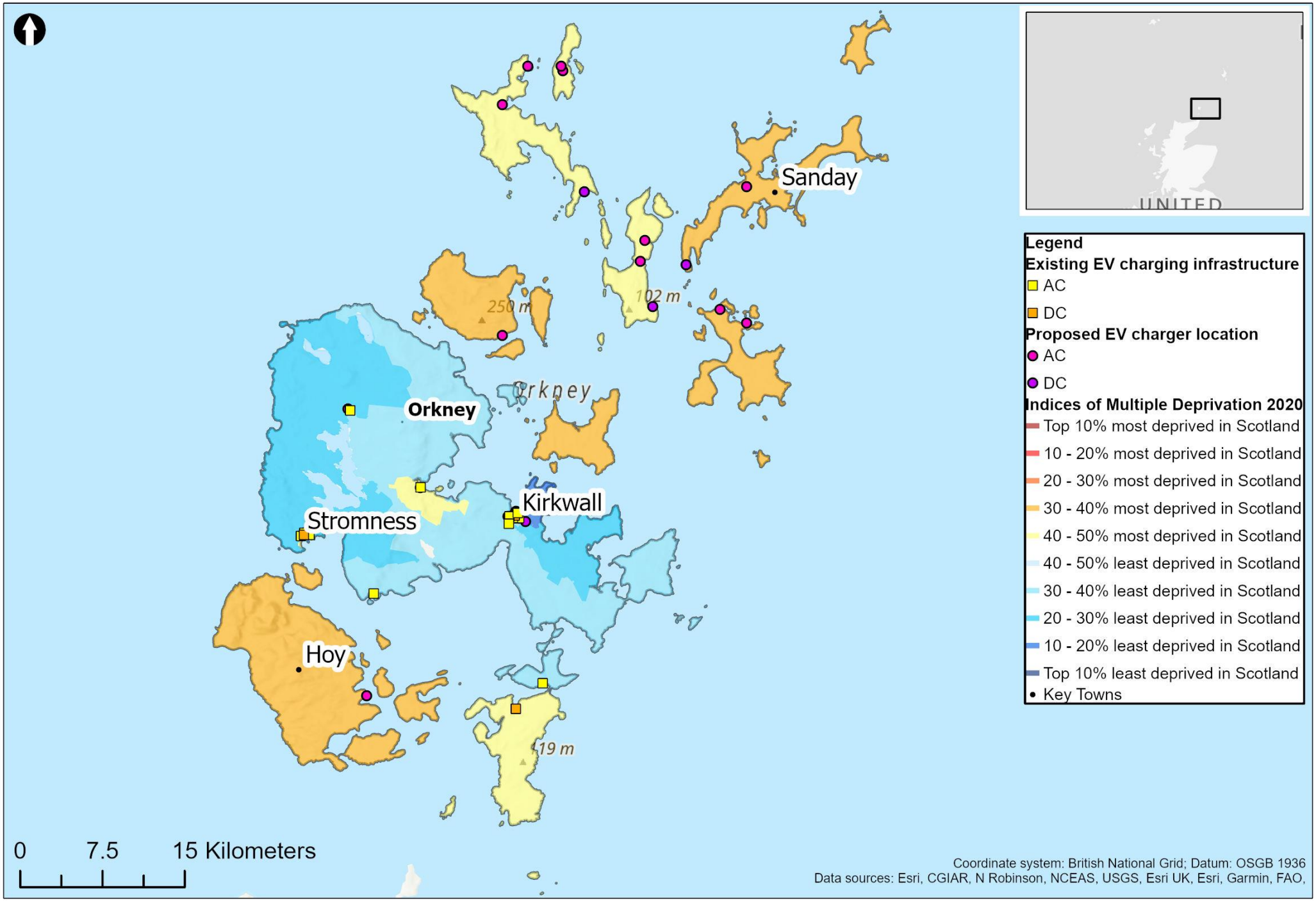
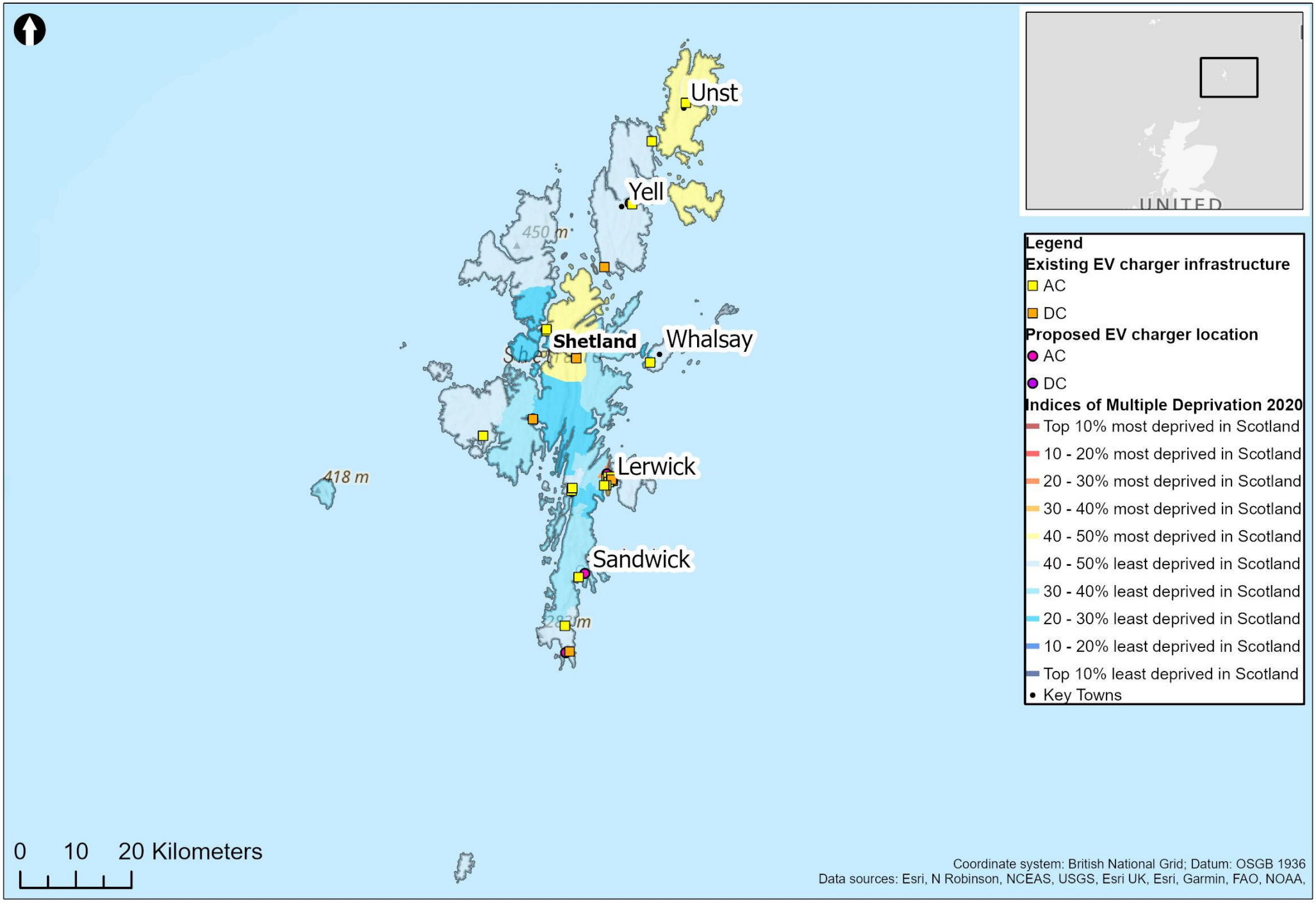
219 m
0
15
30 Kilometers
Legend
Existing EV charging infrastructure
AC
DC
Proposed EV charger location
AC
DC
Driving travel distance to existing and proposed charging infrastructure (avg: 50km/hr)
30 minutes
20 minutes
10 minutes
Key Towns
Coordinate system: British National Grid; Datum: OSGB 1936
Data sources: Esri UK, Esri, Garmin, FAO, NOAA, USGS, Esri UK, Esri, HERE, Garmin,


285 m
Unst
Yell
450 m
Shetland
Lerwick
Lerwick
418 m
Sandwich
Sandwich
UNITED
Legend
Existing EV charging infrastructure
AC
DC
Proposed EV charger location
AC
DC
Driving travel distance to existing and proposed charging infrastructure (avg: 50km/hr)
30 minutes
20 minutes
10 minutes
Key Towns
0 10 20 Kilometers
Coordinate system: British National Grid; Datum: OSGB 1936
Data sources: Esri, N Robinson, NCEAS, USGS, Esri UK, Esri, Garmin, FAO, NOAA,


Stornoway
Stornoway
Lewis
590 m
The Minch
Harris
Western Isles
North Uist
Barra
992 m
Fort William
Legend
Existing EV charging infrastructure
AC
DC
Proposed EV charger location
AC
DC
Driving travel distance to existing and proposed charging infrastructure (avg: 50km/hr)
30 minutes
20 minutes
10 minutes
Key Towns
0 15 30 Kilometers
Coordinate system: British National Grid; Datum: OSGB 1936
Data sources: Esri, CGIAR, N Robinson, NCEAS, USGS, Esri UK, Esri, Garmin, FAO,


Sanday
Orkney
Orkney
Kirkwall
Stromness
Hoy
250 m
102 m
19 m
UNITED
Legend
Existing EV charging infrastructure
AC
DC
Proposed EV charger location
AC
DC
Indices of Multiple Deprivation 2020
Top 10% most deprived in Scotland
10 - 20% most deprived in Scotland
20 - 30% most deprived in Scotland
30 - 40% most deprived in Scotland
40 - 50% most deprived in Scotland
40 - 50% least deprived in Scotland
30 - 40% least deprived in Scotland
20 - 30% least deprived in Scotland
10 - 20% least deprived in Scotland
Top 10% least deprived in Scotland
Key Towns
0
7.5
15 Kilometers
Coordinate system: British National Grid; Datum: OSGB 1936
Data sources: Esri, CGIAR, N Robinson, NCEAS, USGS, Esri UK, Esri, Garmin, FAO,


Unst
Yell
450 m
Shetland
Whalsay
418 m
Lerwick
Sandwick
0 10 20 Kilometers
Legend
Existing EV charger infrastructure
AC
DC
Proposed EV charger location
AC
DC
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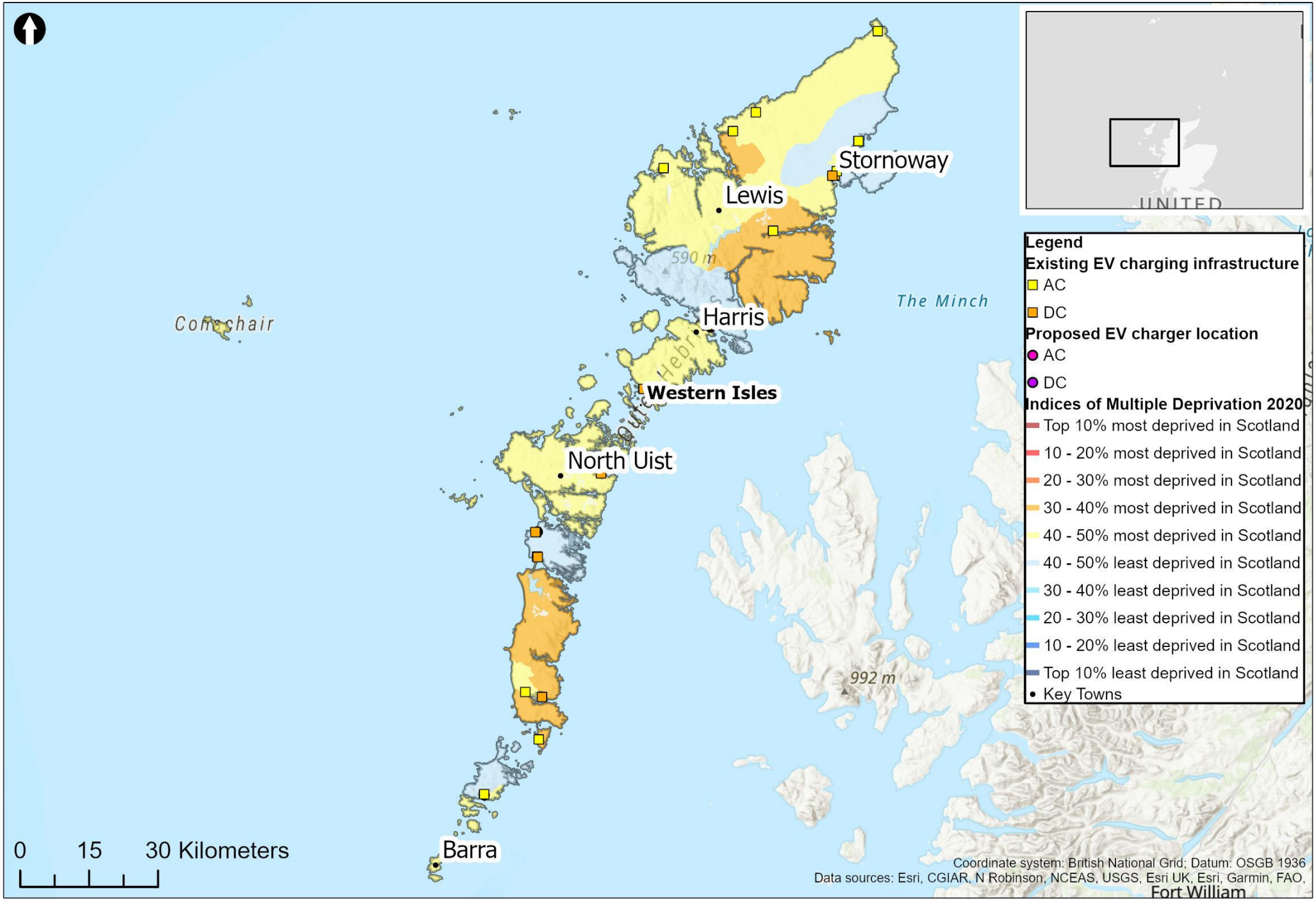
20 - 30% least deprived in Scotland
10 - 20% least deprived in Scotland
Top 10% least deprived in Scotland
Key Towns
Coordinate system: British National Grid; Datum: OSGB 1936
Data sources: Esri, N Robinson, NCEAS, USGS, Esri UK, Esri, Garmin, FAO, NOAA,


Stornoway
Lewis
590 m
Harris
The Minch
Western Isles
North Uist
992 m
Barra
Fort William
0 15 30 Kilometers
Legend
Existing EV charging infrastructure
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DC
Proposed EV charger location
AC
DC
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40 - 50% most deprived in Scotland
40 - 50% least deprived in Scotland
30 - 40% least deprived in Scotland
20 - 30% least deprived in Scotland
10 - 20% least deprived in Scotland
Top 10% least deprived in Scotland
Key Towns
Coordinate system: British National Grid; Datum: OSGB 1936
Data sources: Esri, CGIAR, N Robinson, NCEAS, USGS, Esri UK, Esri, Garmin, FAO,

B. Stakeholder Engagement Plan

No.	Stakeholder		Classification	Purpose of Discussion
0	Scottish Futures Trust		Core part of S&EP	Facilitate delivery of S&EPs
1	Councils (collectively engaged)	Orkney Islands	Core part of S&EP	Understand EV/sustainable transport requirements for the study area
		Shetland Islands	Core part of S&EP	
		Western Isles	Core part of S&EP	
2	Transport Scotland		Major Stakeholder	Future of CPS, commercial models, EV policy/strategy
3	University of Highlands and Islands		Major stakeholder	Understand fleet and public charging requirements. Joint working opportunities?
4	NHS & emergency services Shetland/Orkney/Western Isles		Major stakeholder (to be collectively engaged)	Understand fleet and public charging requirements. Joint working opportunities?
5	Energy organisations: - ReFLEX Orkney - Orion Project Shetland		Major stakeholder (to be collectively engaged)	Understand opportunities and constraints on the islands, particularly around renewables and charging. Any collaboration opportunities
6	SSEN		Major stakeholder	To discuss connections for proposed network
7	Royal Mail		Minor stakeholder	Large fleet operator, mostly vans
8	Stornoway Car Hire		Minor stakeholder	Large fleet operator, mostly cars
9	Orkney Car Hire		Minor stakeholder	Large fleet operator, mostly cars
10	Bolts Car Hire, Shetland		Minor stakeholder	Large fleet operator, mostly cars but also taxi fleet

No.	Charge Point Operator	Description
1	Believ	
2	FOREV	(note: showing considerable interest in island portfolio approach, Fuuse back office)
3	Swarco	(note: deployed existing CPS infrastructure)
4	Pod Point	(note: presence in Kirkwall)
5	Zest	(note: presence on South Uist)

C. Commercial Case SWOT Analysis

	Own and Operate	Concession	Alternate Investment Partner
Strengths	• Public sector collects all revenues. • Procurement and delivery of EVCI likely simpler and quicker. • Public sector has flexibility over payment tariffs. • Likely simpler to transition existing CPO assets under this structure.	• Limited capital or revenue risk to local authority • Low local authority resource commitment • Increasingly established commercial model in private sector • Rapid deployment • Efficient operation (and risk transferred to private sector)	• Limited capital or revenue risk to local authority • Low local authority resource commitment • Limited risk of capital misallocation • Rapid deployment, depending on partner.
Weaknesses	• Public sector carries all financial, commercial and management risk. • Public sector takes on all reputational risk, and risk of unexpected costs. • Political risk on the public sector through accountability to taxpayers, and constrained by public sector capital controls.	• Less control by local authority, relative to own and operate model. • Commercial motive by private sector may clash with public policy goals. • Quality of services and maintenance may vary among different operators.	• Least local authority control • Long agreements or exclusion areas. • Commercial motive by private sector may clash with public policy goals. • Quality of services and maintenance may vary among different operators.
Opportunities	• Flexibility over back office means the public sector is not constrained to a single operator (although can affect cost incurred through diseconomies of scale). • The public sector can determine chargepoint locations irrespective of commercial viability.	• Ability to take on charging assets at the end of the term, if desired. • Potential to share revenue upside. • Potential to increase scale and coverage of EVCI at faster rate relative to other models. • Can suit joint procurement approaches across multiple island authorities.	• Potential to respond to changes in EV market trends. • Potential for fixed income stream. • Potential to increase scale and coverage of EVCI at faster rate.

	Own and Operate	Concession	Alternate Investment Partner
		• Potentially better positioned to respond to changes in EV market trends.	
Threats	• Most significant capital burden on the public sector compared with other models. • The level of uptake and demand for EVCI will have direct financial impacts on the public sector. • Continued public sector leadership a barrier to entry to private sector. • At the end of the operating term, the island authority potentially in the ownership of redundant equipment. • Transfer of existing assets may suffer from reluctance of private sector to offer maintenance and operation services given hardware is from an alternate supplier.	• Private operator control over data privacy and security. • Equity concerns, private operator may prioritise areas with higher profit (and may want to limit significant direction from local. authority in locational decisions) • Highly dependent on private sector interest especially in an island setting. • Incorporating existing assets into concession arrangement could affect propensity of private sector investment because of hardware from alternate supplier.	• Issue of low or unknown commercial viability reducing propensity to invest relative to other models. • More challenging to migrate existing assets to structure than under concession or own and operate models. • Unclear genuine appetite by alternative investment partners in these geographies (e.g. of utility sector, given UK regulatory arrangements). • Potential challenges in electricity providers using rollout of EVCI as a mechanism to drive up demand for electricity supply. Could have effect on price of electricity, or commitment of partner should this not work.