

Chapelcross Masterplan Framework

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1.0 Introduction

The future of Chapelcross is centred on clean energy generation, storage, distribution, innovation and research created a strategic multi-use Green Energy Hub with a focus on advance manufacturing, circular economy and renewable hydrogen production

National Strategic Site

Chapelcross is recognised locally, regionally and nationally as a strategic site with the potential to develop as a multi-user Green Energy Hub. Through activities including green hydrogen production, green energy generation, storage & distribution, and a range of energy transition manufacturing, industrial and enterprise activity it can play a significant role in the transition to net zero carbon and deliver significant economic and social place-based benefits.

The Development Framework supports and provides a basis for the Green Energy Hub across a 190ha site including the existing Nuclear Licenced Site, surrounding areas owned by South of Scotland Enterprise (SOSE), and wider Nuclear Decommissioning Authority (NDA) landholdings. The site contains a range infrastructure and place assets with potentially significant opportunities for net-zero focused development and investment focused on manufacturing, circular economy, green hydrogen production and energy distribution.

The Chapelcross Programme Partners (CXP), including Dumfries and Galloway Council (D&GC), have identified the need to prepare a Development Framework to guide a long-term programme of investment and development based on a coordinated masterplan framework that sets out the strategy to deliver investment and fully realise the strategic value of the site.

Key Facts:

Site Area
190ha

Proximity to
A74(M) Jct 20
3.6km

60ha+
Phase 1
Available Land

3km
to the A75

14m
People within
2hr drive of
Borderlands
Region

132kv
On-site
substation

90MW+
Planned solar
energy
development at
Chapelcross

1GW+
Onshore wind
capacity in
D&G. 12% of
Scotland's total

Chapelcross Vision & Objectives

The Strategic Outline Business Case (SOBC) (2020) for Chapelcross has defined the strategic development objectives for the site and wider CX Programme. Its strategic and economic case are strongly aligned to the policy framework and priorities around net-zero, energy transition, sustainable development, and inclusive growth established by UK and Scottish Governments, as well as regional policies set by Dumfries & Galloway Council and South of Scotland Enterprise.

The defined CX Programme strategic objectives are to:

- Support the development of green energy production, storage and distribution solutions.
- Make a significant Dumfries and Galloway Council contribution to the UK and Scottish Government's net zero carbon targets.
- Create a large-scale, strategic mixed-use employment site for the Borderlands area, with substantial wider economic impacts and inclusive growth.
- Maintain 100% beneficial use of the site over the full decommissioning period to 2095 (in line with Energy Act 2004 requirements), and beyond.

Building from the SOBC, the Development Framework forms a long-term plan for site development for the period 2025-2050 and will help inform further Business Case / Investment Planning, Partnership Agreements, and the Delivery Plan over the period.

The Chapelcross Programme has defined five energy-related 'pillars of success' which support the delivery of these objectives and the overall vision. They are:



Green Energy
and Net Zero Industry



Sustainable Agriculture,
Aquaculture and Food



Clean Mobility
& Logistics



Education Skills and
Training for
the Just Transition



Digital Connectivity
& Data Services

Enterprise Campus

Nuclear Decommissioning Site

Energy Campus

Green Industry Campus

Hydrogen Campus

Solar P/V

B722

Creca

Chapelcross Vision

Chapelcross Strategic Context & Need

Dumfries & Galloway and the wider South of Scotland region has experienced considerable growth in the deployment of renewable energy over the last 20 years, primarily in on-shore wind for which it was an early adopter. In total 2GW or more of onshore wind is likely to be constructed in the region by 2030 and it has among the UK's highest proportion of connected renewable generation relative to its demand

The region has been a leader in producing green energy and this will continue to grow through further on-shore wind deployment (incl. re-powering), solar, along with new renewable technologies and emerging sectors linked to the circular economy and wider energy transition.

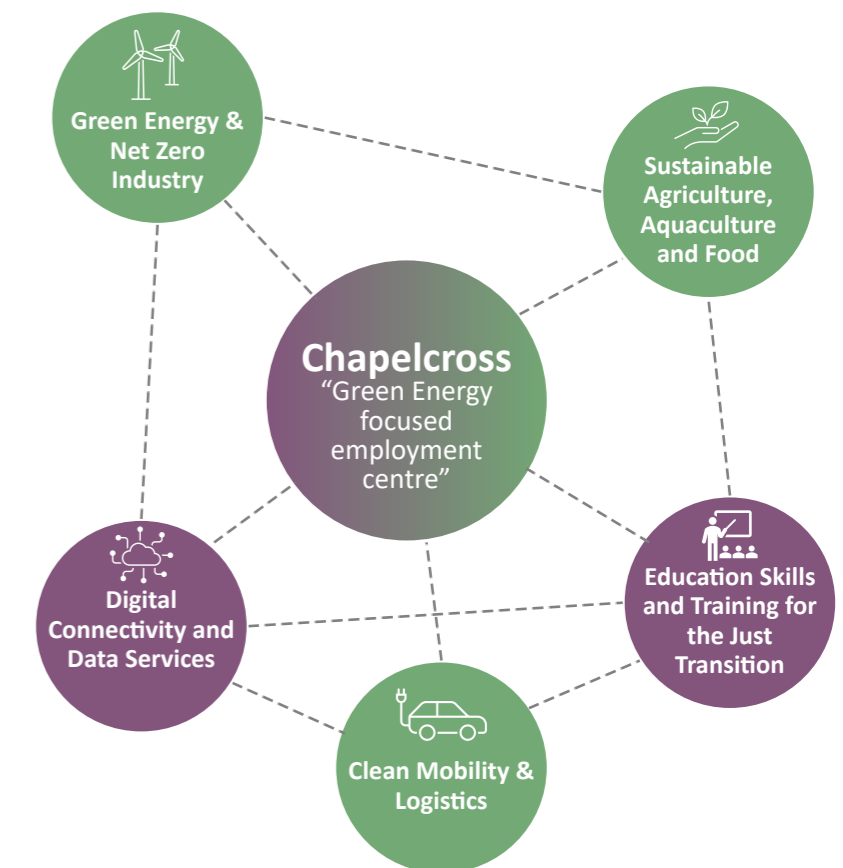
This development continues to make a significant contribution towards achieving net-zero, and there has been considerable community benefit funding delivered at the local level. However, there has been comparatively little 'follow-on' investment and there is a recognised need for the region to capture wider value more effectively from its renewable energy resources.

The scale of renewable energy production in the South of Scotland, which is well in excess of local need, provides a competitive platform for the Region to be take a greater share of the economic opportunities arising from energy transition: This will involve:

- Supporting secondary / tertiary business activities associated with renewable energy and growing a local 'Green Economy' supply chain.
- Job creation, skills & training-based opportunities in the 'Green Economy' especially for young people.
- Attracting inward investment from sectors looking to co-locate and benefit from renewable generation (eg. Energy-Intensive Manufacturing Processes, Data & Digital Processing, Sustainable Agriculture, Life Sciences).
- Embracing innovative 'Power to X' opportunities from surplus renewable energy generation.
- Through hydrogen and wider energy systems innovations supporting and enabling wider decarbonisation of other activities and sectors such as transport, agriculture, domestic heating.

Chapelcross sits at the centre of these energy transition opportunities. It has the potential to be a catalyst for green growth and play a key role in accelerating the transition to net zero carbon, developing new technologies and securing a stronger return from the Region's renewable resources.

The scale of site, legacy infrastructure and grid connections, transport connectivity to A74(M) and A75, along with established investment interest highlights its strength to form a national and regional Green Energy Hub. The available land area provide a capacity to accommodate a mix of Green Energy generators, users, and co-located economic activity including innovation, manufacturing, circular economy, and industrial developments exploiting private-wire, utility networks, and on-site supply of green hydrogen.



Partners
CX Programme Partners

Key Stakeholders
Agencies & Landowners

Investors
Current & Potential Investors

Regulators
Planning & Development Authorities

Utilities
Statutory Utility Providers

Detail of Key Stakeholder Engagement

As part of the early site appraisals process, an Engagement Plan has been developed involving consultation with a range of key site stakeholders. This has included Nuclear Decommissioning Authority (NDA), Nuclear Restoration Services (NRS), South of Scotland Enterprise (SOSE), officer groups within Dumfries & Galloway Council (D&GC), utility providers and operators, and industry operators with potential interest in the site.

The Engagement Plan has sought to ensure that these key interests in the future of the site have been able to provide early input to the development of the Framework, and that stakeholder requirements, investment plans and priorities are fully understood.

As part of the early appraisal process for the Development Framework a series of engagement meetings have been held. Key meetings to date have included:

- Site visit within Scottish Government Hydrogen Policy Unit (Oct. 2023)
- Client Steering Group Briefing & Review (Monthly 2023/24)
- Development Framework Briefing and Review with SoSE (Nov. 2023)
- Development Framework Briefing and Review with NDA/NRS / Avison Young (Nov 2023)
- Development Framework Briefing and Review with D&GC Officers (November 2023)
 - Development Management / Planning Policy /Regeneration & Economic Development
 - Transportation / Infrastructure / Digital Connectivity
- Jockstown Solar Farm Developer / AGR meeting (Nov. 2023)



Key issues and themes raised by these stakeholders groups are summarised below - reflecting broad feedback around options, delivery, and early stage enabling works that have informed the preparation of the Development Framework:

- Agreement and support for the overall brief, purpose and objectives of the Development Framework. Strong interest in the Framework outcomes and recognition that further technical understanding of site opportunities and constraints is required to plan for future development and advance works.
- Support for Development Framework focus on 'Phase 1' / Non-Licensed land to the north-east of the site, compatible with developing the longer-term view on currently licensed areas and their capacity to contribute to the overall plan.
- Recognition that job-creation target of 2,600 FTE (expressed in SOBC) may be challenging to realise within the early phases given the nature of emerging technologies, and nascent industry profile of potential operators/end-users in the green energy sector.
- There is considerable local and regional interest in the future of the site among communities and wider social and political stakeholders, with a keenness to 'capture the moment' and accelerate investment activity in the short-medium term to build momentum, secure progress and deliver local benefits.
- Importance of capturing maximum 'value' from the site development – beyond immediate economic investment but seeking to secure and embed green energy supply-chain and deliver wider secondary / tertiary benefits to locality and region.
- Build on the considerable interest in the site from a range of investment / development propositions with green energy focus – whilst securing a plan that protects sites strategic value and recognises risks, timescale challenges, market uncertainty / volatility.
- Protect capacity to deliver across a range of investment packages / option and retain flexibility in how development can be phased and configured over time.

Development Framework Vision & Objectives

The Development Framework has been commissioned by D&GC to articulate the CX Programme's Vision and Objectives into a spatial framework for the site. It is prepared to build on the SOBC and plan for a range of potential energy-focused end-users within a defined site masterplan and with strong basis for investment in site preparation and enabling works. The Framework is being developed in parallel with market assessments and response to ongoing investment inquiries around solar, battery storage, commercial / enterprise space, and wider energy transition sectors.

In short, the framework is to provide a clear 'Plan' for Chapelcross that expresses the scale of opportunity at the site and positively guides future investment and development in a coherent, phased manner that will deliver a long-term and sustainable legacy of national and regional importance. This means considering together land use, transport planning, environmental and site servicing requirements along with layout and phasing required to create a robust forward-facing plan and ensure the best use of resources to realise the CX Programme objectives.

The Project Brief set out a series of specific objectives of the Development Framework. Following early site appraisal and in dialogue with stakeholders and CX Programme partners these were amended and extended to set the Development Framework objectives:

- The Framework must be premised on stakeholder collaboration and effectively balance key site interests (NDA, NRS, SoSE, D&GC, future users, nearby communities) to build a broad consensus around the principles of development.
- The Framework should review and seek to further define the 'best fit' of renewable energy and linked energy-focused development in the context of the Chapelcross site – with regard to investment / technical / environmental requirements both for potential end uses and to create a sustainable place to live, work, visit across the Region.

- The Framework must allow for flexibility and optionality across the site and how land is developed over time – planning for land and infrastructure with recognition that green energy technologies, practices, and business / investment models will continue to evolve and introduce variable and changing requirements over time.
- The Framework must seek to enhance and maximise site strengths and existing assets (including landscape and environmental capital) that can build on the distinctive qualities of place creating a strong and sustainable investment environment
- The Framework should ensure Growth Deal funded infrastructure enabling works maximise the potential for early investment and boost the competitiveness and appeal of the site as an investment location for green energy users and associated employment activities.
- The Framework should facilitate and support future participation and engagement with the local community and wider stakeholders, with a joined-up approach to 'Place' that recognises inter-connections between land, development, environment, inclusive growth, health & wellbeing, and wider socio-economic outcomes.
- The Framework should set out the enabling infrastructure (roads/ services/utilities/site preparation & platforming) to ensure the site/ areas of the site are able to respond to market interest and are 'market -ready'.
- The Framework must align to and positively respond to current policy priorities as expressed in LDP2, NPF4 and wider energy / economic development strategies, as well as seeking shape and drive future policy-making for the site such as D&GC's LDP3.

Structure of the Report

The Development Framework Report is structured over six sections – setting out place-based context, framework strategy & principles, enabling infrastructure framework, and the masterplanning of individual development 'Campuses' within the site.

Illustrative graphics and visualisations have been developed to demonstrate spatial planning and masterplanning outcomes: expressing site configuration and the range of development plots, integration and enhancement of existing assets, and landscape framework across the site.

Technical assessments, reporting, plans and other contextual assessments are provided in the appendices.

2.0 Place Context

The Development Framework seeks to adopt and promote a place-based approach – building from a comprehensive review of existing site context, character and assets and how these intersect both now and into the future. This has been informed by initial stakeholder engagement to add further qualitative understanding of the site. The Framework looks to positively shape place quality at the site through future development as well as contributing to and stimulating place-based benefits within wider local (Creca, Annan, Eastriggs, Kirkpatrick Fleming, Ecclefechan) and regional (Dumfries & Galloway / Borderlands) contexts.



A Strategic Site identified within Scotland's National Hydrogen Action Plan and Borderlands Investment Plan.



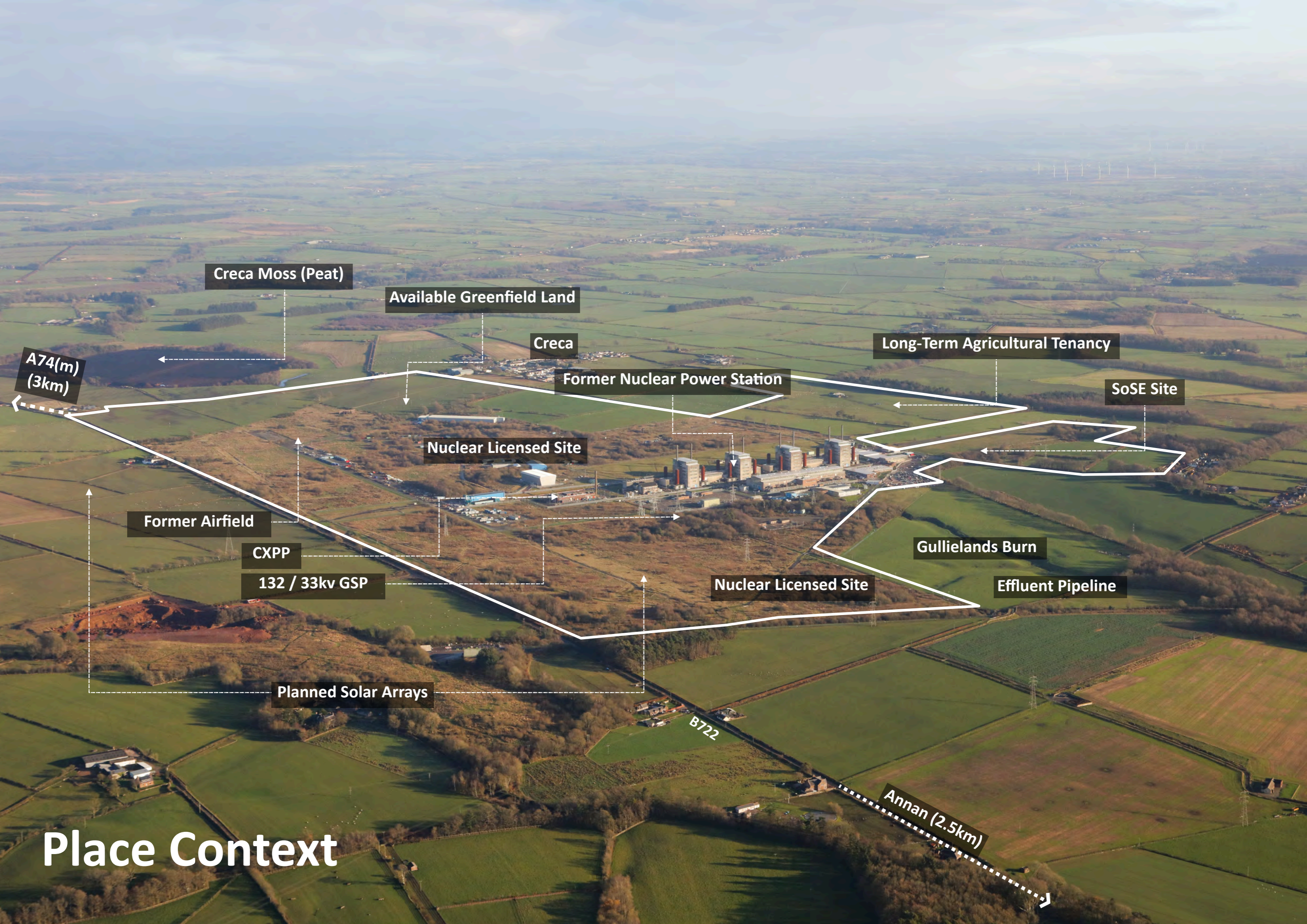


Site & Study Area

The study area for the Development Framework comprises the full extent of the 190 ha+ former Chapelcross Nuclear Power Station Site. The site is currently owned by the NDA and the site decommissioning plan is being delivered by NRS (formerly known as 'Magnox') who operate and manage the site. Land to the south (formerly 'Zone 3') has recently been disposed to SOSE who are bringing forward development proposals and this land is retained within the study area as well.

The site is positioned in an area of low-lying, open countryside approximately 3km north-east of the town of Annan, in the Dumfries & Galloway Council Area. It is situated 6 km from the coast of the Solway Firth and 13 km from the land border with England. The site is also close to the River Annan, from which it previously drew cooling water supplies during its operation as a Nuclear Power Station. The small hamlet of Creca is to the immediate east of the site and is a dispersed village settlement with approximately 25 homes.

Importantly, the site is close to the A74(M) Motorway which is situated 3km to the north-east and connected via the B7022, a local access road adopted by Dumfries & Galloway Council. The A75 Trunk Road which runs east-west through Dumfries & Galloway and connects to Cairnryan Port is 3km south of the site.



Creca Moss (Peat)

Available Greenfield Land

Creca

Long-Term Agricultural Tenancy

SoSE Site

A74(m)
(3km)

Former Nuclear Power Station

Nuclear Licensed Site

Nuclear Licensed Site

Gullielands Burn

Effluent Pipeline

Former Airfield

CXPP

132 / 33kv GSP

Planned Solar Arrays

B722

Annan (2.5km)

Place Context



Site History & Legacy

The site has a varied and rich history – and was originally built and commissioned as Annan Airfield, an RAF base used for training fighter pilots. Its two runways were built at right angles to each other, one northeast to southwest, 1,476 m long, and the other northwest to southeast, 1,454 m long. The airfield and associated development occupied an area of almost 155 hectares. Though closed in 1944, remnants of the runways remain and are visible on the site. They were substantially absorbed by the construction of Chapelcross Nuclear Power Station which occurred over the period from 1955 to 1959, becoming the first Nuclear Power Station in Scotland

The primary purpose of the nuclear activity at Chapelcross was to produce plutonium for the UK's weapons programme, with electricity production for the national grid considered to be a by-product. The site ceased generation in 2004 after 45 years of operation. Decommissioning of the site has been ongoing since then, with demolition of cooling towers completed in 2007 and defueling completed ahead of schedule in 2013.

In the present day, the site area can be broadly divided into three zones:

- **Nuclear Power Station Site** – the site of the former Nuclear Power Station site and its core associated infrastructures and facilities. This includes the CXPP facility to the north formerly used for the processing of Tritium. It is the focus of decommissioning activity and will not be available for alternative use / development until the latter stages of decommissioning in the long-term (c. 2095). This comprises approximately 15.5 ha.
- **Nuclear Licensed Site** - the wider area of land that has been licensed for Nuclear activity but outside the core area of energy generation and distribution. It comprises a mix of former airfield, open scrubland, and storage and warehousing associated with decommissioning activity. Subject to de-licensing and the operational requirements of NRS, this land is potentially available in the medium term as part of future development. In total it comprises approximately 95 ha (including the 15.5 ha Power Station Site noted above).
- **Unlicensed NDA Landholding** – this land is owned by NDA but is outside of Nuclear Licensed area and therefore potentially available for development in the short-medium term. It comprises a mix of brownfield land (former airfield) and greenfield land to the north, south and east of the former Power Station which is currently in low intensity agricultural use (grazing). In total it comprises approximately 60 ha.
- **SOSE Landholding** – this land to the south-east of the former Power Station was acquired by SOSE (from the NDA) In November 2023. It comprises part of the former airfield with the end of the north-west to south-east runway crossing the site, along with mixed grassland and scrub. In total it comprises approximately 6.5 ha.

Key features of the site and its close environs as noted on the plan below include:

- Former Nuclear Power Station
- Large brownfield land areas comprising the former runways and associated airfield infrastructures
- Grid Infrastructure including 132/33kv Grid Supply Point and overhead pylons crossing the site to the north, west and south.
- Gullielands Burn which is culverted underneath the Nuclear Power Station and flows west-ward towards the River Annan.
- Large areas of greenfield land at the east of the site.
- Effluent pipeline connecting to the Solway Firth

While considering the site and NDA landholding as a whole, the focus of the Development is primarily towards the Unlicensed areas of land to the east of the site (known as 'Phase 1' land). These areas are readily available for development in the short-medium term and will require advance enabling and infrastructure works in order to shape a market ready investment proposition that can attract green energy focused uses and provide a catalyst to wider development of the site over the long term.

Decommissioning

The systematic process of decommissioning the site and its infrastructures began in 2004, following closure of the Nuclear Power Station. The decommissioning process involves staged demolition, removal, treatment of plant and buildings associated with nuclear activity and electricity generation at the site.

Given the nature and sensitivity of former Nuclear Power generation and associated infrastructures, decommissioning is a complex, carefully managed, and highly regulated process led by NRS in



coordination with the NDA as well as statutory agencies Scottish Environmental Protection Agency (SEPA), Health & Safety Executive (HSE) and Office for Nuclear Regeneration (ONR). This will require further coordination with future development and site users, particularly in the event of hydrogen, battery storage, and other uses with health & safety / risk management implications.

The current plan to complete the decommissioning project at Chapelcross is divided into three phases: Care & Maintenance Preparations, Care & Maintenance, and Final Site Clearance. These key stages and relevant milestones in the process of decommissioning are summarised below:

Nuclear Power Station closure	October 2004
<p>Care & Maintenance Preparation In this phase reactors have been de-fuelled, and Intermediate Level Waste (ILW) is being retrieved, packaged and stored in a new ILW Interim Storage Facility (ISF). The site will be reduced to a condition that includes four safe stored reactor buildings and associated blower houses, with heat exchangers stored horizontally, an ILW ISF and the Chapelcross Processing Plant, all other significant buildings will be decontaminated and demolished.</p>	<p>2004-2040 (ONGOING) Demolition of Cooling Towers – 2007 De-Fuelling of Nuclear Reactors – 2013</p> <p>Site currently in semi-quiescent state with much reduced maintenance schedule. In preparations for entry into Care & Maintenance Phase.</p>
<p>Care & Maintenance A mainly quiescent period during which the site will continue to be managed, monitored and maintained but human intervention will be minimised.</p>	<p>Scheduled 2040-2089</p>
<p>Final Site Clearance This will involve the dismantling of all the remaining structures on the site, including the reactors, the clearance of any residual radioactivity and de-licensing of the site to make it available for alternative use.</p>	<p>Scheduled 2089-2095</p>
<p><i>*Subject to review / confirmation NRS</i></p>	



Policy Context

Net-Zero & Decarbonisation

The Scottish Government has established a nationwide target of reaching net zero emissions by 2045, among the most ambitious carbon reduction programmes in the world. Meeting ambitious net zero targets will require a rapid transformation across all sectors of the economy and society, coupled with large-scale development and deployment of renewable energy technologies. Recognising the scale of transformation and change that will be involved, the Scottish Government have prioritised ‘Just Transition’ to ensure that the journey to net zero is fair for everyone, with opportunities for people to participate in and benefit from the investment, development and innovation that will drive energy transition.

As part of the transition to net zero, the Scottish Government recognise that Scotland has vast renewable energy sources with a surplus supply that could support the creation of low cost renewable hydrogen. This has the potential to unlock new economic opportunities for Scotland to become a leading producer and exporter of renewable hydrogen. The Hydrogen Policy Statement (2020) and Hydrogen Action Plan (2022) confirms the Scottish Government’s commitment to support hydrogen production and set ambitious targets for 5GW of production capacity by 2030 and 25GW by 2045. By 2045 it is estimated that in an export led scenario, up to 300,000 jobs in total could be sustained across the Scottish economy by hydrogen activities (Arup - Hydrogen Assessment Report for Scottish Government).

In particular, the Hydrogen Action Plan outlines the drive towards regional hydrogen energy hubs that seek to co-locate and coordinate the entire hydrogen value chain from production, storage and distribution, to end-use. Dumfries and Galloway was identified as a location for one of Scotland’s thirteen regional hydrogen hubs, with an emerging hydrogen supply chain cluster and with Chapelcross highlighted as the key development site supporting the development of the regional hub.



Planning Policy Context

The development plan for the Chapelcross site consists of the National Planning Framework 4 (NPF4) (2023) and Dumfries and Galloway Local Development Plan 2 (LDP2) (2019).

NPF4

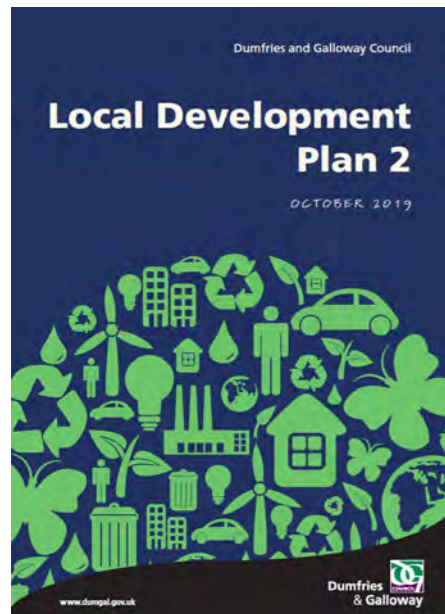
NPF4 presents a framework that will support the planning and delivery of three overarching policy themes:

- Sustainable Places – where we reduce emissions, restore and better connect biodiversity;
- Liveable Places – where we can all live better, healthier lives; and
- Productive Places – where we have a greener, fairer and more inclusive wellbeing economy.

Of direct relevance to Chapelcross, the NPF4 identifies ‘Chapelcross Power Station Redevelopment’ as a National Development (No.17). National Developments are intended to be a focus for delivery, as well as exemplars of the Place Principle, placemaking and a Community Wealth Building approach to economic development. The designation of National Developments means that the principle of development does not need to be agreed in later consenting processes, thus providing more certainty for communities, businesses and investors.

National Development No. 17 states support for the redevelopment of the former nuclear power station and reuse of a significant area of brownfield land at Chapelcross to help deliver a just transition to net zero. Specifically, the NPF4 states support for a development within one or more of the Classes below:

- a) Commercial, industrial, manufacturing, and office related development occurring on the Chapelcross development site;
- b) Generation of electricity from renewables exceeding 50 megawatts capacity;
- c) Infrastructure for the production, storage and transportation of low carbon and renewable hydrogen and related chemicals including ammonia, with carbon capture as necessary; and
- d) Active and sustainable travel connection to the site.



Dumfries and Galloway LDP2

The adopted D&GC LDP2 states support for the development of the wider Chapelcross site, with Policy ED4 (Chapelcross) stating that D&GC will encourage business, industrial and energy generating development proposals, with priority given to the re-use of brownfield land. Parts of the Chapelcross site have been designated in the LDP2 as Business and Industry Sites 1-3 (North, South & West) totalling an area of approximately 60ha. The planning objectives for these sites includes encouraging employment through creation of business expansion, inward investment and energy creation, and supporting the development of a Masterplan/ Simplified Planning Zone for the wider area.

In addition, the D&GC Chapelcross Development Framework (2015) provided planning guidance and a long-term vision for the site, whilst informing the LDP2. This document was intended as a catalyst for initial project development with key actions centred around public engagement, advertising the site and potential future uses, and identifying funding sources.

Subject to further review and dialogue with D&GC Planning Officers, this Development Framework may be adopted as Supplementary Guidance to supersede the previous Framework – ensuring an updated reflection of site development potential and forming a material consideration in future planning application.

Dumfries and Galloway LDP3

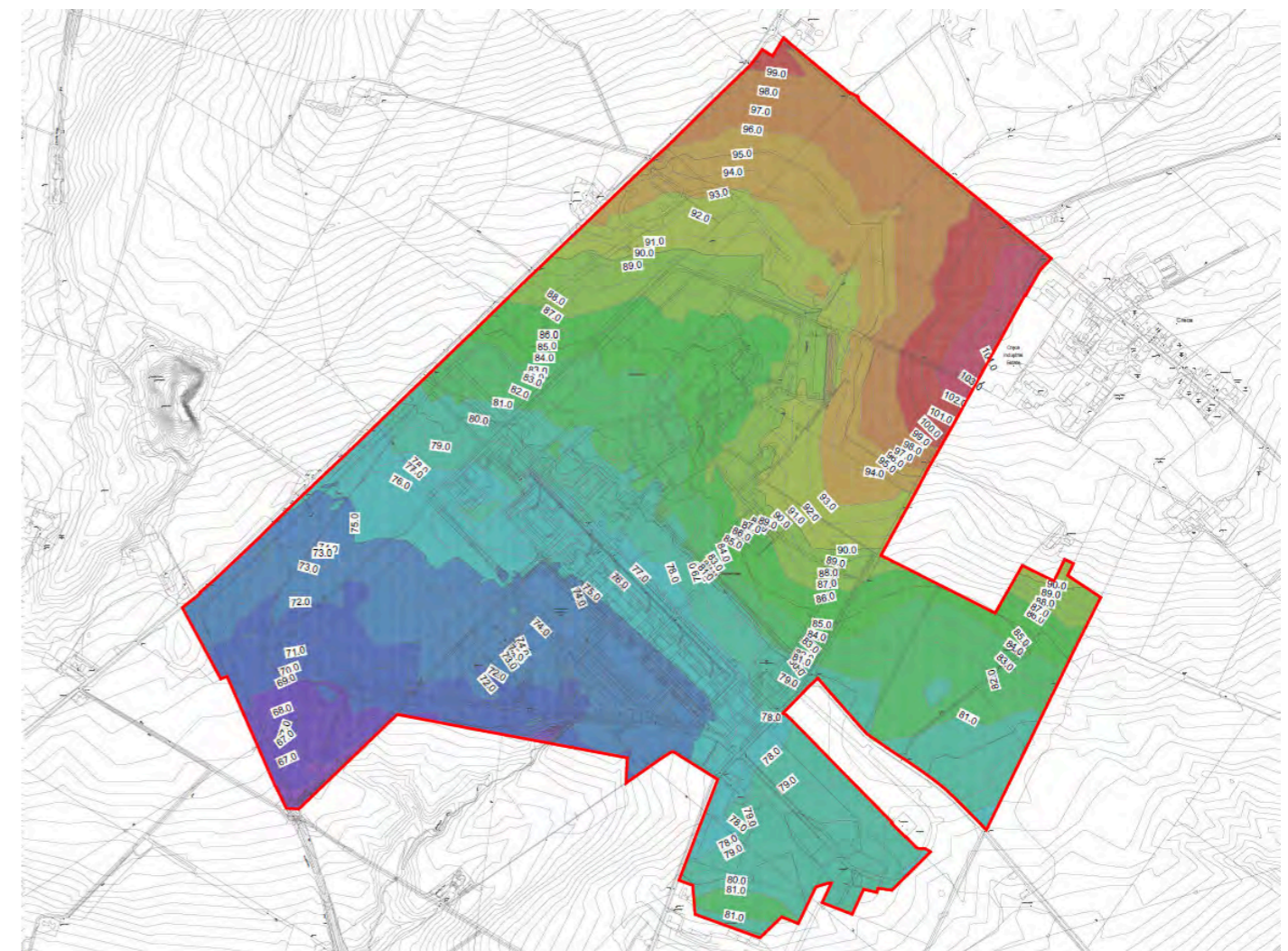
Following adoption of the NPF4, all local authorities are required to prepare new style LDPs. D&GC are in the early stages of preparing the LDP3 and will commence with the 'Evidence Gathering' stage in early 2024. It should be noted that new style LDPs are required to support and enable the NPF4's strategy for National Developments. It is anticipated that the Development Framework will form the basis for a new site allocation in LDP3 supporting energy, industrial and wider energy transition supply chain activity at Chapelcross.

Environment, Biodiversity & Landscape

Topography

As a former airfield, the site is generally flat though there are localised sloping ground and changes in level which may need to be considered in developing the Framework. A Height Band and Slope Analysis has been undertaken for the site and is appended, based on detailed contours derived from OS Mapping.

These demonstrate the gradual changes in level across the, which gradually falls from the north to the south and east. The high point (104m) of the site is at the north-eastern corner of the site adjacent to Creca. From here levels gradually fall to a low point (67m) at the south-western corner.



Height Band Analysis



Ground Conditions

Associated with the historic use of the site as a military airfield and subsequent nuclear power generation, there is a level of ground contamination of the land at the site. A range of previous site investigation studies have been completed across parts of the NDA landholding to assess and interpret the extent of contamination with soils.

The superficial ground conditions at the site are recorded by BGS as 'Gretna Till Formation' – comprising reddish brown, sandy, silty, clayey diamicton with clasts of greywacke, red sandstone, siltstone and grey granodiorite. The uppermost 3m is generally quite variable in lithology and compactness, with lenses of sand, gravel, silt and clay, typically becoming more compact and stony with depth. This is recorded by BGS as generally providing good foundation conditions depending on shear strength, consolidation characteristics and presence of water bearing sands and silt layers / lenses. It is suitable for excavation / digging and generally suitable as general cohesive fill. To the north of the site is a large Peat Bog known as Bonshaw Flow, though this does not extend to the site boundary.

The underlying bedrock is recorded by BGS as 'St Bees Sandstone Member' – comprising Red-brown, very fine- to medium-grained, commonly micaceous sandstones, generally cross bedded, some parallel lamination; mudstone clasts locally common, subordinate thin beds of greenish grey sandstone.

There are a significant number of historic boreholes at the site – mostly completed in 1992. These have not been assessed in full but a selected review of boreholes on the 'Phase 1' land indicates a depth to rock head of between 4mbgl and 7mbgl, varying across the site. The boreholes and trial pits indicate ground conditions consistent with the BGS Record, showing firm boulder clay beneath the surface becoming stiff at depths between 1-2 mbgl.

Site investigations have previously been undertaken at Chapelcross on areas of brownfield land (outwith the Nuclear Licenced Site) following closure of the power station. These have not identified any specific evidence of widespread or significant contamination from former uses. In a limited number of instances, marginally elevated concentrations of potential contaminants have been determined within certain locations. Overall risks to human receptors and risks associated with radiological contamination were assessed as low.

However given the partial nature of previous investigations and time elapsed, it will be necessary for future development to undertake new investigations across now planned development areas to determine detailed nature of ground conditions and confirm absence of contamination.



BGS Geological Records show superficial soils underlying the site as till soils. There is a peat bog to the north-east but outside of the site area.



The site is a mix of greenfield and brownfield (former airfield) areas which have been left largely undisturbed and now support a range of wet, slightly acid grass and scrub lands. Important species include Bee and Lesser Butterfly Orchids, and a range of nesting birds.

Ecology & Biodiversity

Chapelcross Power Station is now in the decommissioning phase with much of the site undisturbed and left for the benefit of biodiversity. Outside of those areas used for agricultural grazing, species rich acid grassland and mixed scrub now dominates the site, with over 90 species recorded in 2011. This habitat supports a range of animal and plant species, with the Chapelcross Biodiversity Action Plan (2017) confirming that species of national importance found on site include: Peregrine Falcon, Pipistrelle Bat, Brown Hare, Barn Owl and Bee Orchid (formerly thought to be extinct in Scotland). Locally important species found on site include: Lesser Butterfly Orchid, Curlew, Woodcock, Song Thrush, Reed Bunting and Dingy Skipper Butterfly. Locally distinctive species found on site include: Oystercatcher, Field Vole and Common, Spotted and Marsh Orchids.

The nearest watercourse to Chapelcross is Gullielands Burn, a tributary of the River Annan. The burn flows into the Chapelcross site on its north east boundary and is culverted beneath the site, before re-appearing on the south western boundary.

Chapelcross does not lie within any designated landscape area. The nearest designated site is the Solway Coast Area of Outstanding Natural Beauty (AONB) 10km to the south east. Approximately 7km from Chapelcross to the south across the Solway Firth lies Hadrian's Wall which is a Scheduled Ancient Monument (SAM) and World Heritage Site.

The following designated sites of nature conservation interest are located within 10km of Chapelcross:

- Upper Solway Flats and Marshes Site of Special Scientific Interest (SSSI)
- Upper Solway Flats and Marshes Special Protection Area (SPA)
- Upper Solway Flats and Marshes Ramsar site
- The Solway Firth Special Area of Conservation (SAC)
- Raeburn Flow SSSI
- Raeburn Flow SAC
- Royal Ordnance Powfoot SSSI

While no designated sites of nature conservation interest are located within 2km of Chapelcross, the effluent pipeline discharges into the Upper Solway Flats and Marshes SSSI/SPA/Ramsar site and the Solway Firth SAC. The Upper Solway supports one of the largest continuous areas of intertidal habitat in Britain and the site is of international importance for a range of coastal habitats and for the passage and wintering of waterfowl supported by them. The Upper Solway is also noted for supporting two species of lamprey, natter jack toads (*Bufo calamita*), great-crested newts (*Triturus cristatus*) and high densities of marine/estuarine invertebrates.

Preliminary discussions with D&GC Planning confirmed relatively low sensitivity for the site and surrounding area in landscape and visual terms, though this will be subject to further detailed assessment and consideration in the context of future proposals.



Site Access & Connectivity

The site is in a rural location with a number local 'B' and 'C' minor roads surrounding the site and providing access. The A74(M) (Motorway) and A75 (Trunk Road) are both less than 3km from the site and provide strategic regional and national accessibility. From the site, Glasgow is approximately 1h20m drive (via the A74(M)), and Carlisle is an approximately 30m drive (via the A75 and M6).

The A75 is an important cross-regional transport corridor connecting to Stranraer and Cairnryan Port – the only sea crossing from Scotland to Ireland. The UK Government has recently confirmed an £8m funding support to improve the capacity of the A75, including exploration of bypassing the villages of Springholm and Crocketford.

The full extent of the NDA landholding is bounded by local roads to the north, south and west, providing a number of access points to the site. The current primary vehicular access is through the 'Main Gate' at the south of the site, providing access to NRS parking and operational site office facilities. The 'West Gate' is at the opposite end of the site, at the approximate mid-point of the site's western boundary onto the B722. It appears to be in less frequent use. Associated with the former airfield use of the site and providing agricultural access, other minor access points to the site are available from the B722 and another at the eastern-edge of the site adjacent to Creca.



Breaconbeds bend between the site and the A74(M) may require improvement to address issues of visibility and road safety for HGVs.

These are historic and now defunct site accesses / junctions which do not meet current road standards and appear to be out of use, but could be considered as part of future site access strategy.

It is likely that future users of the Chapelcross site whether in energy, industrial or wider sectors will require HGV access in order to meet their logistics and servicing requirements. They may also bring specialist / abnormal requirements around emergency vehicle access as part of their operational management of health & safety. The road infrastructure surrounding the site and connecting it to the strategic road network (A74(M) / A75) is therefore a key consideration for the future development of the site.

The B722 connection to the A74(M) has been identified for some time as a priority for improvement works to better accommodate HGV movements and more frequent usage given its importance in connecting the site to the A74(M) corridor.

Prior review (2017) of local accessibility with Dumfries & Galloway Council has identified preferred HGV movement routes around the site. As well as the B722 connection to the A74(M) noted above, this identified the preferred route to the A75 via the C43a and B6357 roads south of Chapelcross, via the Stapelton Bar Crossroads.

This prior review has acknowledged that existing local roads have not been constructed to accommodate HGV movements and the local network presents several potential constraints in this regard. In particular there is a sharp 90 degree bend on the B722 at Breaconbeds between the site and the A74(M). The 'Creca Bend' at the site's eastern edge is similarly constrained with a sharp bend close to the village. Elsewhere there are several junctions and crossroads with potential visibility issues, and other issues of surfacing, horizontal and vertical alignment. Detailed review of the local access network is set out within the appended Site Access Considerations Report – reviewing current speeds, traffic movements, and physical constraints.

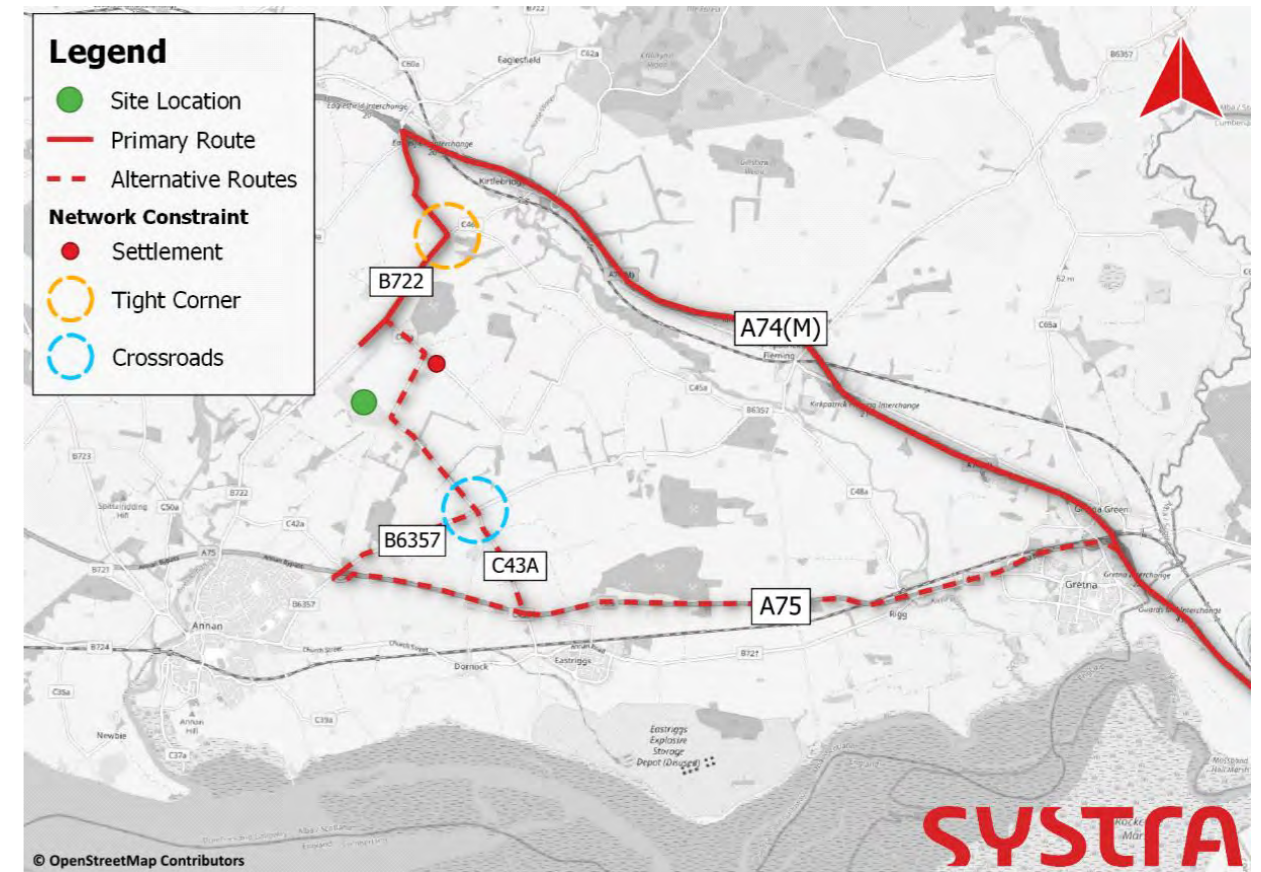
A plan showing the adoption status of local roads is shown below. In summary, all of the local roads surrounding the site are adopted by Dumfries & Galloway Council.

The nearest railway station and rail access is in Annan – c. 3.5km to the south of the site. The historic route of a railway line passes at the western boundary of the site and has been re-purposed for the routing of the Nuclear Power Station's effluent pipeline to the Solway Firth.

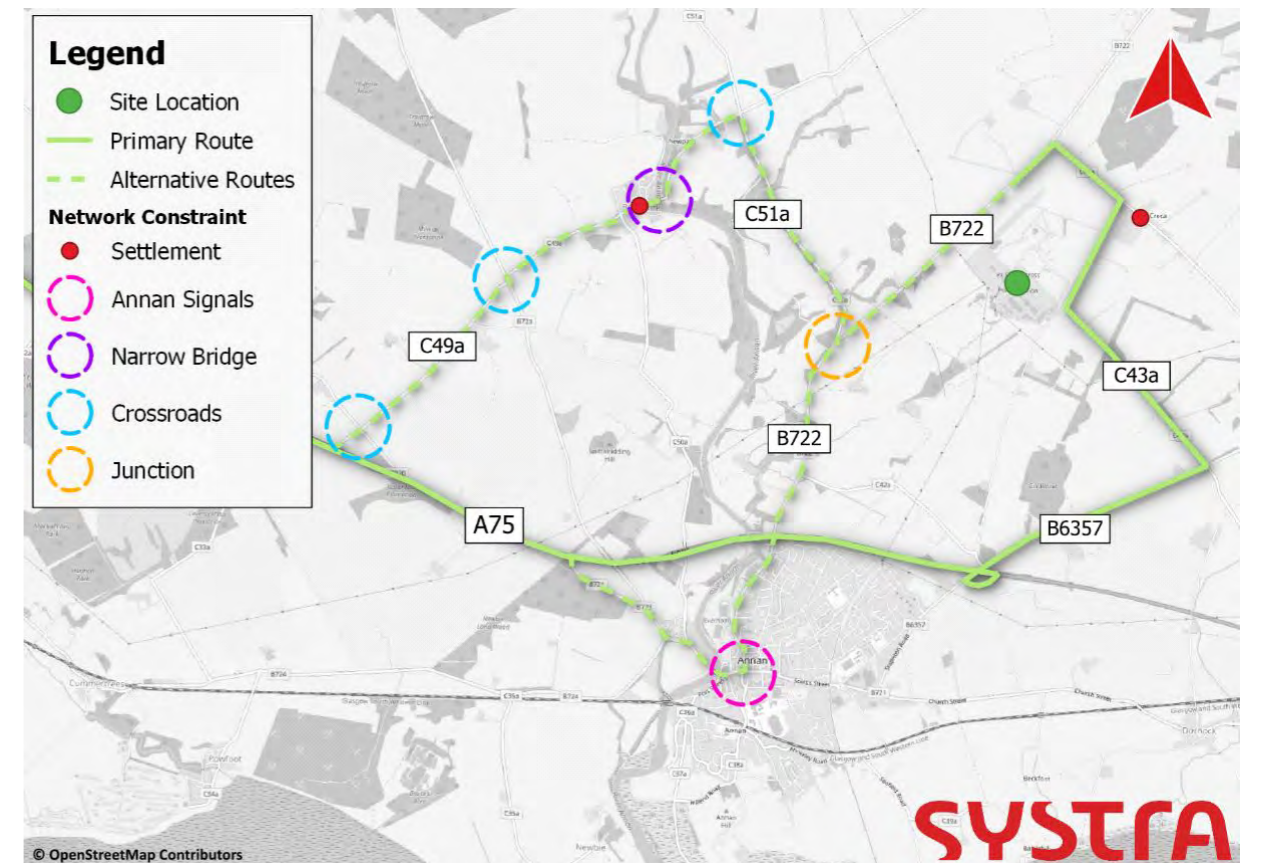
Given its inland nature there is no marine infrastructure in the close vicinity of the site. The port of Cairnryan is c. 115km to the west of the site and would be the nearest likely point of connection to marine import / export of goods, materials, components from the Chapelcross site.



Existing main entrance to the Chapelcross site.



Routing to CX from the East



Routing to CX from the West

Infrastructure & Energy

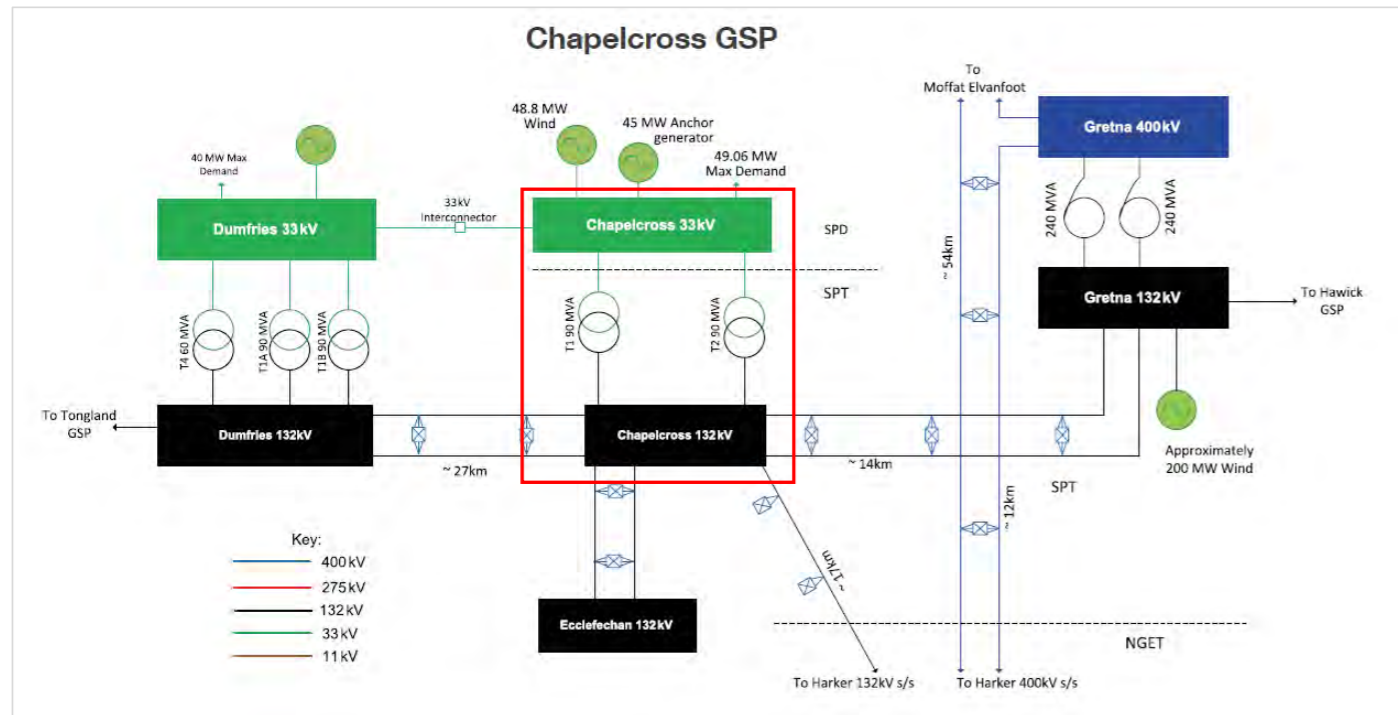
Power & Grid Infrastructure

Owing to its former use as Nuclear Power Station there is considerable grid and utilities infrastructure present on the site, owned and operated by Scottish Power Energy Networks (SPEN).

There is a 132kv 'Transmission' Grid Supply Point at the centre of the site, directly adjacent to the Former Nuclear Power Station and within the Nuclear Designated Site. 130m to the east is the 33kv 'Distribution' Grid Supply Point. There are 2no. 90MVA 132/33kv transformers at the site, which are understood to be 'oversubscribed' with generation and would likely need reinforcement as part of any future energy-led redevelopment involving export to grid.

The 132kv circuits connecting to the Chapelcross 132kv sub-station are Dumfries 1 & 2, Gretna 1 & 2, Harker, and Ecclefechan 1 & 2. These large-scale overhead pylons cross the site, to the west, south and east of the Nuclear Power Station and will require stand-off / exclusion zones. 11kv pylons (wooden poles) cross the north and eastern 'greenfield' areas of the site within the 'Phase 1' land.

Through prior Ironside Farrar reporting, and preliminary stakeholder engagement, it is highlighted that there is considerable grid 'constraint' in the Dumfries & Galloway region. This is due to the considerable growth of renewable energy generation across region exceeding the pace of grid capacity reinforcement to enable transmission. A grid connection for 'export' of electricity from the site is therefore anticipated to be 2032 at the earliest, (subject to further review with SPEN). As a result the potential for 'private wire' generation of renewable energy is under consideration at Chapelcross and a number of other sites in the region to circumvent grid constraint issues.



Grid Supply Schematic

The Kendoon-Tongland 132kv reinforcement project is planned to be delivered later this decade and will partially address grid constraint issues on the Transmission Network, though only meeting capacity for currently planned projects. As future renewable energy projects come forward, including re-powering of existing capacity, it is likely that grid constraint on the distribution and transmission networks will continue to require active management by DNOs, with considerable lead times and potential costs for 'export' connection.

By contrast, grid connection for 'import' of electricity from the grid is understood to be available to levels of up to 50MW with potential for further capacity subject to future review with SPEN.

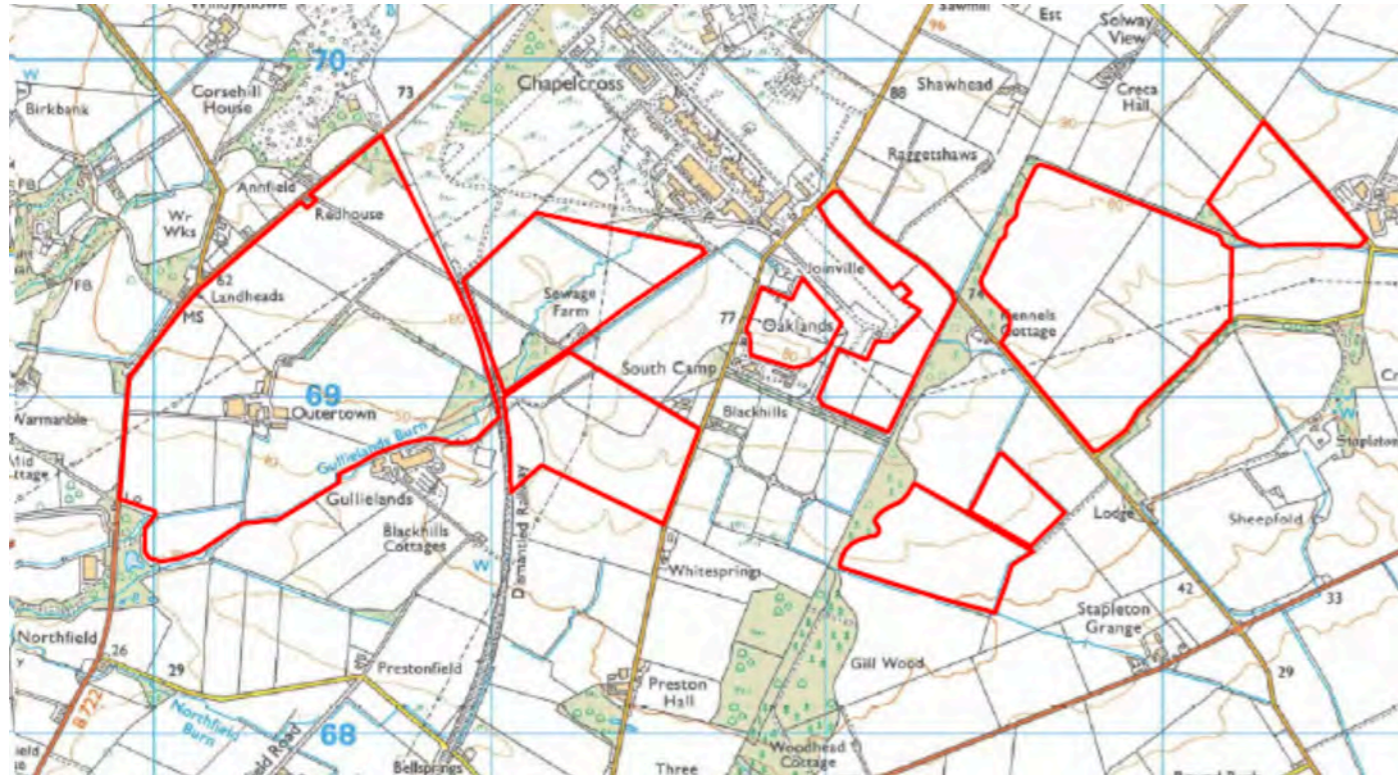
Utilities

Aside from grid infrastructure there a number of other utilities and services at the site to be considered in future development planning.

- Scottish Water Distribution Mains runs parallel to the existing roads at the west (B722), north and south-east of the site, and there is existing mains water supply to the Former Nuclear Power Station site. It is understood (through prior Scottish Water engagement) that during operation of the Power Station daily mains consumption was between 200m³ and 300m³ per day.
- BT Telecoms infrastructure is present across the site, with a range of underground and overground cable runs. These are shown in black on the utilities summary plan below.
- There is no gas distribution infrastructure present on the site. The nearest gas infrastructure is c. 725m west of the site boundary where it an Intermediate Pressure Gas Main runs approximately parallel to the B722 towards Annan where it connects with the Low Pressure Network.

There was water abstraction infrastructure at the River Annan which previously served the site during its operation as a Nuclear Power Station site. The pumping station (owned by Scottish Water) and associated pipework is situated on the banks of the River Annan approximately 2km west of the site. It is now decommissioned and 'sealed' and there is no longer mains power at the pumping station. While the pump infrastructure is no longer functioning, it remains in situ with potential for adaptation and re-investment.

The effluent pipeline from the site to the Solway Firth (c. 6km in length) remains in situ and continues to be utilised by NRS in their decommissioning activity. The pipeline is steel, and has been used to discharge radioactive effluent to the Firth, under license from SEPA. The full extent of the pipelines length, including through Annan, is within the NDA land ownership.



Planned 150MW Solar and Battery Storage Development



Planned 38MW Jockstown Solar Farm

Surrounding Development

Beyond the NDA landholding and immediate environs of the Former Nuclear Power Station, there are a number of local developments and land uses surrounding the site relevant to understanding local context and future opportunity.

- Green Energy International are developing the 38MW 'Jockstown' Solar Farm to the immediate north of the site. The site comprises c. 60 hectares to the north of the B722 and gained planning permission in November 2022. The development will also include battery storage and a direct (underground) grid connection to the 33kv substation within the Chapelcross site. Green Energy International are also bringing forward proposals for a linked solar farm within the areas defined as Zones 2, 11 and 12 of the Nuclear Licensed Site (NE of the Power Station), subject to commercial agreements with NDA and obtaining relevant planning permissions. The development of solar power directly adjacent to the site is a positive enabler and brings a range of potential opportunities for private-wire connections, energy storage, and co-located development.
- Elgin Energy are bringing forward proposals for 150MW Solar & Battery Storage development on 188 ha of land surrounding Chapelcross. A Screening Opinion was submitted to Energy Consents Unit in April 2024 and it is anticipated that a planning application will be submitted later in 2024. The development will have direct grid connection to the sub-station within the Chapelcross site.
- SoSE have recently transacted on the 'Zone 3' land to the south-east of the Nuclear Power Station site. The site comprises c. 6.5 ha of brownfield (former airfield) land. SoSE are currently undertaking development due-diligence including a range of surveys to inform planning and development strategy. Subject to commercial demand, it is anticipated that the site will be developed to provide a range of serviced development plots, suitable for a mix of enterprise, light-industrial and distribution / logistics (Class 4/5/6) users. The SoSE proposals are incorporated into the Development Framework and have the potential to positively complement larger-scale green-energy focused development activity at Chapelcross, and support growth of local supply-chain around the site.
- Further west and on the Banks of the River Annan is Annandale Distillery, a successful local visitor destination. The Distillery have taken innovative steps to decarbonise their energy-intensive industrial processes through installation of a modular thermal energy storage system (Exergy3) capable of storing up to 36MWh excess renewable energy from the National Grid.
- At Newbie (to the south-west of Annan) Cochran Boilers operate a major manufacturing plant – making specialist boilers and associated equipment for a range of commercial applications and sectors. They produce 'H2 Ready' boilers which are already being supplied to distilleries and other sectors seeking to decarbonise through integration of hydrogen.
- Elsewhere in the vicinity of the site are a range of rural, agricultural, and light industrial uses. Within the village of Creca to the east of the site is a small concentration of industrial / builders yards and warehousing. A similar industrial scrap yard (Martin David William & Co) is to the south of the site immediately adjacent to 'Zone 4'. To the west of the site is Annan Household Waste Recycling Centre, a former quarry which has been converted a local landfill and waste disposal centre.

Industry & Employment Land Availability

The Dumfries and Galloway Region property market (D&GC B&I Land Audit 2022) provide up-to-date and accurate information on the supply and availability of business and industrial land in Dumfries and Galloway. The Region faces the challenge of national competition offering competitive prime business & industrial sites with immediate availability in metropolitan and/or multi-modal connected locations.

The Region presents a diverse and growing economic landscape. With a total of 25,033 employees, the region has experienced a notable rise in employment, underpinned by significant growth in various sectors. In particular the region has an increasing role in the transition to net zero and is a significant player in the energy and technical sectors demonstrating an increasingly diverse economic base.

Employment land within Dumfries & Galloway is significantly constrained. The allocated employment land supply is 254.75 ha with only 49.7% of the allocated employment land supply effective (immediately available or could be developed in the next 1-5 years). 48.7% is constrained and prevents land being developed immediately or within 1-5 years.



Table 3: Annual Take up of Business and Industry Land by Housing Market Area

Business and Industry Land Take up by HMA (Ha)	1/1/2012-30/06/2013	1/07/2013-31/03/2014	1/04/2014-31/03/2015	1/04/2015-31/03/2016	1/04/2016-31/03/2017	1/04/2017-31/03/2018	1/04/2018-31/03/2019	1/04/2019-31/03/2020	1/04/2020-31/03/2021	1/04/2021-31/03/2022
Annan	0	0.0	0	0	4.7	0	0	0	0	0
Dumfries	0	5.32	0	0	23.51 (a)	0(0)	0.0(0)	1.8 (a)	0	0.23 (f)
Edinburgh	0	0	0	0	0	0	0	0	0	0
Mid Galloway	0	0	0	0	4.5	0	0	0	0	0
Westward	0	0	0	0	0.02	0	0	0	0	0
Wester Ross	0	0	0	0	0	0	0	0	0	0
TOTAL	0	5.32	0	0	29.83 (a)	0	0.0	1.8	0	0.23

Dumfries' (Dumfries HMA) provides circa 90 hectares of Business/industrial land supply and is largely unconstrained/effective and located within established business and industrial areas at Cargenbridge, Heathhall and Brasswell. Ownership is predominately private, with Cargenbridge in public ownership. Annan (Annan HMA) by comparison has a high % of constrained land including at Chapelcross as a significant share. Annan (Annan HMA) provides circa 135 hectares of business/industrial land supply with only 1ha immediately available, 20ha marketable, and 114ha constrained.

Annan HMA therefore has potential for increased and sustainable supply of employment land, with the Chapelcross site as the key opportunity to boost available and effective land. The Framework seeks to support realisation of this opportunity and the potential to unlock additional development capacity in the Annan HMA area at medium and larger scales.

Within Annan, there has been steady development of the ANN.B&I1 Stapleton Road site, since the site was bought and serviced by Scottish Enterprise and demonstrates a regional level demand for serviced sites and industrial/business uses in the A74 (M) Corridor and Annan HMA.

Community Infrastructure

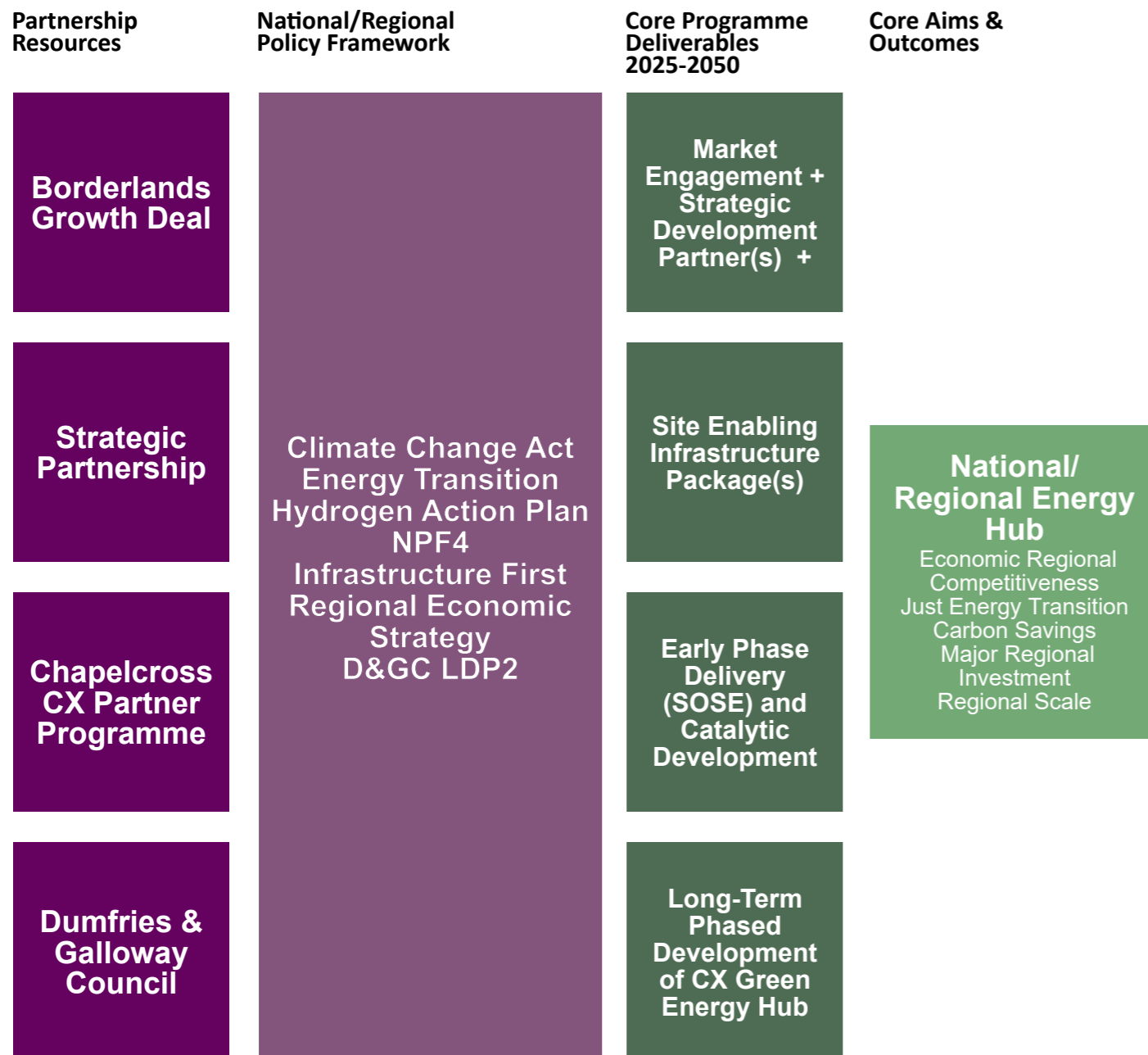
The site is in a rural location – predominantly characterised by scattered farm settlements and farm villages with limited immediate proximity to residential land uses, albeit there are a small number of residences around the site.

The village of Creca is situated at the eastern edge of the site. It is small rural settlement of c. 20 houses and a collection of small light industrial warehouses, garages, and external yardage. Elsewhere in the close vicinity of the site local community infrastructure included the Solway Swim & Leisure Centre c. 500m from the site southern boundary, and at the site's north-western boundary is Annan Household Waste Recycling Centre at the site of a former quarry.

Annan is the nearest District Centre – approximately 2.5km to the south of the site and bounded by the A75. It is a historic market town with a population of c. 8,700 people and providing a range of retail, leisure, community, health & education services serving the wider community in the south-east of Dumfries & Galloway. Key local services and infrastructures include Annan Train Station, Annan Hospital, 4 primary schools and Annan Academy (Secondary), Swimming Pool, Cinema, and a successful high street with a range of national and independent traders.

There is ongoing planning of regeneration and place-based renewal in Annan – including restoration of the historic Harbour, housing expansion sites, high-street improvements, and ongoing development of a Local Place Plan. The long-term development of a Green Energy Hub at Chapelcross is complementary to wider place-based investment in Annan – supporting sustainable regional growth by providing new employment and industrial capacity.

3.0 Framework Strategy & Principles



Chapelcross is a unique and strategically important site. The purpose of the Development Framework is to set out a clear vision and plan to advance the delivery of projects that realise its potential. It seeks to provide a comprehensive site-wide illustrative masterplan and programme of advance infrastructure works that will accelerate and encourage investment.

Delivering on the Chapelcross Programme objectives requires a coherent long-term plan with clear focus. The Framework is a long-term strategic plan (2025-2050) that sets out the vision and recommended actions to guide future investment, development and decision making. It looks to exploit the site's competitive place advantages to support multi-partnered investment that will maximise the site's contribution to net-zero transition, as well as securing job-creation and wider economic and place-based benefits.

The Framework is not prescriptive or definitive but aligns to current best understandings of energy transition market opportunities and requirements, whilst protecting flexibility to adapt to changing needs and investor interests. Successful realisation of the vision expressed in the Framework requires coordinated planning, continuous monitoring, and adaptive management over the long term.

In the short-term, Chapelcross needs to address key barriers to development, instigate and sustain a momentum around energy transition opportunities, and create the conditions for future strategic investment. Positive early steps have already been taken through CX Programme, the securing of Borderlands Growth Deal Funding, and a positive policy framework, but further steps are required to reach delivery and the full realisation of the site's potential.

The core value of the framework is to draw together progress to date, and illustrate a strategic vision and spatial plan that can inform next steps. Accordingly, the Development Framework reporting focusses on:

- Creating a masterplan that is responsive to the CX Programme objectives, stakeholder interests, and responds to key planning policy priorities.
- Developing core enabling infrastructures that respond to market requirements and strengthens 'readiness' of the site. Defining key priorities for early investment in roads, utilities, earthworks, landscape.
- Setting out an Outline Investment Programme for multi-phase delivery of enabling works that can create 'serviced' land supply and facilitate further investment and development.
- Planning for public-private sector investment and ensuring efficient allocation and management of resources.
- Planning for flexibility and adaptability to respond to changing market requirements and demands in fast evolving energy transition sectors.
- Supporting market and wider engagement around a clear investment proposition and building stakeholder confidence through clear and structured planning
- Enabling further development of the Business Case and early commitment to infrastructure investment, partnership arrangement, and delivery planning.



Competitive Place Advantages

Summary of Core Strengths & Opportunities

In fulfilling the CX Programme's stated vision of the site as a "Green Energy focused regional employment centre", the site's core strengths and opportunities that the Development Framework will look to leverage and optimise can be summarised as:

Land & Existing Site Infrastructure

1. It provides very large, level site areas in a single ownership. Up to 60ha of 'Phase 1' land is available in the short-term with an additional 100ha+ available as part of long-term future expansion as decommissioning continues.

The site has a history of energy generation through the Nuclear Power Station and is predominantly brownfield, albeit with significant areas of greenfield land available. There is considerable optionality around future configuration and land use. The site's existing Nuclear License could be re-utilised in the event that nuclear technology (eg. small modular reactors) re-emerge as a part of future energy decarbonisation/net-zero planning.
2. Owing to its rural location and brownfield nature, there are relatively few sensitive receptors or environmental designation constraints in the vicinity of the site.
3. There is a range of existing infrastructures on the site including Water Mains and water Abstraction, Effluent Pipeline, Road Accesses, and Telecoms. Subject to investment and reinforcement these are well positioned to support a range of 'Green Economy' land uses .
4. The SGN Gas Network (Medium Pressure Gas Pipeline) connecting to Annan is located 1.4kms west of the site with capacity for connections and potential for hydrogen blending (subject to future regulatory reform and safety review around blending)
5. The site has a 132/33kv Grid Supply Point operated by Scottish Power – with potential to support Green Energy generation, storage and distribution, and/or provide power supply and resilience to energy intensive users.
6. The site is proximate to the strategic road network at the A74(M) (3.5km) and the A75 (3km) with the potential for regional, national and international distribution and logistics from the site.

'Soft' Infrastructure – Policy, Stakeholders, Skills & Labour, Market

- There is support and 'buy in' to development of the site as a 'Green Economy' hub among all key stakeholders including Dumfries & Galloway Council, NDA, NRS, SoSE, and Scottish Government. The Memorandum of Understanding between these parties was completed in 2017 and they have contributed to the securing of funding through the Borderlands Inclusive Growth Deal (see below).
- The site is designated as a 'National Development' within National Planning Framework 4 – providing clear support for renewable energy and linked economic activity at the site. Scottish Government's Hydrogen Action Plan (2022) has recognised the site's potential as a 'Regional Hydrogen Hub' capable of supporting large-scale hydrogen production and associated distribution, use and wider supply-chain
- Borderlands Growth Deal has committed £15.3m of funding towards the delivery of enabling infrastructure at the site – boosting its readiness for inward investment.
- The Borderlands Region has a population of over 1 million people with the key settlements of Dumfries, Lockerbie and Carlisle all within a 30 minute drive of the site.
- The Scottish Government is investing up to £7 million in developing the South of Scotland Skills and Learning Network, to deliver on strategic priorities identified in the South of Scotland Regional Skills Investment Plan. Local skills and training include the Advancing Innovative Manufacturing in the South of Scotland (AIMS) Project supporting support manufacturing small/medium sized enterprises (SMEs) in Borders and Dumfries & Galloway.



Summary Core Challenges

Notwithstanding those strengths, there remain a number of challenges and hurdles to be overcome in order for the site to fulfil its potential and deliver the net-zero and economic benefits. The core challenges and threats that the Development Framework will look to address and overcome can be summarised as:

Land & Infrastructure

1. The long-term programme of nuclear decommissioning at the site will continue for at least another 70 years – presenting an ongoing process of managing risk and interoperability with future land uses. The ongoing process of decommissioning may be perceived as a risk by some users, and certain land uses such as hydrogen and battery storage will be regulated as COMAH Upper Tier as well as potentially requiring Hazardous Substances Consent, which will require careful coordination with the nuclear decommissioning process.
2. The local road network whilst proximate to the strategic road network (A74(M) / A75), local connections surrounding the site are rural / local roads in need of investment and upgrade in order to enable intensification of land use on the site and likely ‘Green Economy’ users with HGV access requirements. Borderlands Inclusive Growth Deal funding has been allocated to address constraints on the local road network.
3. Grid infrastructure includes a Grid Supply Point on the site however there is considerable Grid Constraint across the region meaning that Grid Connection for export of renewable energy is not possible in the short-medium term. Private-wire connections provide a potential means to overcoming this but rely on direct ‘market-making’ between users with greater risk, uncertainty, and commercial challenges. Planned grid upgrade works including the Kendoon-Tongland 132kv reinforcement works will add capacity to at least partially address regional grid constraint.

‘Soft’ Infrastructure – Policy, Stakeholders, Skills & Labour, Market

- Place perceptions and the rural nature and nuclear history of the site means Chapelcross has relatively weakly developed ‘place profile’ – compared to comparator locations competing for ‘Green Economy’ investment and development in Central Belt, North-East Scotland, and Highlands.
- The skills and workforce catchment within Dumfries & Galloway and wider Borderlands has a comparatively constrained skills-base and also has an ageing, declining population. Chapelcross has the potential to positively contribute to growing the green energy supply chain and skills-base across the region, and early steps with educational partners are ongoing to provide opportunities for young people in the renewable energy trades and supply-chain (Green Skills Academy)
- The regional capacity and profile around innovation & research & development, including for ‘Green Economy’ sectors has historically been limited. However, this is now changing as Higher and Further Education Institutions such as Dumfries & Galloway College launch a Net Zero Skills Centre and Green Transition programme.
- The hydrogen economy is nascent and is still in its early establishment phase. There remains considerable uncertainty around the principal ‘use case’ for hydrogen and how a reliable off-take for large-scale hydrogen production would emerge in the short term within Dumfries & Galloway. The potential for ‘blending’ hydrogen up to 20% into the Gas Distribution Network may change this, and the market is continuing to innovate in partnership with a range of potential end-users of green hydrogen (eg. Agri-chemicals / Distilleries/ HGV & Freight Transport, Chemicals).

Setting a Clear Strategic Proposition - Building on Core Strengths

The focus of the Development Framework for Chapelcross is building on core place-based strengths and competitive advantages, unlocking added value that the site can offer, and creating a proposition that can attract investment and long-term sustainable development.

Building from the site appraisal, emerging energy transition sectors and opportunities were identified and reviewed – considering their requirements and characteristics, potential land use synergies, and overall ‘fit’ with Chapelcross site assets and infrastructures. This included review of green hydrogen, solar, Battery & Energy Storage Systems (BESS), geo-thermal, manufacturing & supply-chain, agri-technologies, data-centres, and low-carbon mobility and logistics.

While variable in their physical requirements, technological readiness, scale of investment, programme for delivery, and suitability for Chapelcross, a clear opportunity exists for a combination of these activities positively co-exist and integrate at the site.

The Framework has therefore sought to further develop and plan for a Green Energy Hub – accommodating a complementary mix of activities that build on the site’s history and existing infrastructure around energy generation and re-position this for a Green Energy future. It seeks to attract and sustain a cluster of energy-related uses that exploit the sites’ location, scale, infrastructure, established partnerships, and skills and resources. The core elements of a Green Energy Hub which emerge are:



- Hydrogen Production** – exploiting core site attributes to establish large scale green hydrogen production as a key catalyst and enabler for secondary / downstream activity. Key attributes include large-scale land areas, constrained renewable energy (grid + local private wire opportunities), water abstraction, and opportunities for blending into gas networks. A Regional Hydrogen Hub forming part of a ‘Whole Systems’ energy concept can support pilots/test and proof-of-concept investments that are scaleable, and support a cluster of supply chain activity.

Downstream activity and co-located users for hydrogen products are difficult to predict at this time. Access to a committed market is one investment driver. Downstream users could include ammonia & fertiliser production, chemicals & synthetic fuels, and wider agri-industry or food & drink sector applications. Wider export to Ireland via the A75 / Cairnryan Port has also been identified as a potential long-term opportunity, subject to technical and commercial feasibility.

There is already carbon sequestration and utilisation expertise and technology in the region (Carbon Capture Scotland’s Crofthead Biogas facility) and future opportunities may emerge for complementary activity around hydrogen production.



- Green Economy Supply Chain & Enterprise** -Linked to the presence of green energy generation, storage and distribution there are a range of industrial, manufacturing, enterprise, and circular economy activities that could be incorporated at Chapelcross. There is potential to attract business investment co-located to hydrogen, renewable energy, and the wider green economy, ensuring Chapelcross captures the full value-chain of these sectors. This can include:

- Fabrication and assembly of technologies, equipment, components;
- Materials recycling and resource management;
- Innovation and technology-based companies;
- Operations & Maintenance activity including monitoring, inspection & repair, logistics and material supply hubs.
- Skills & training based activity associated with energy transition.



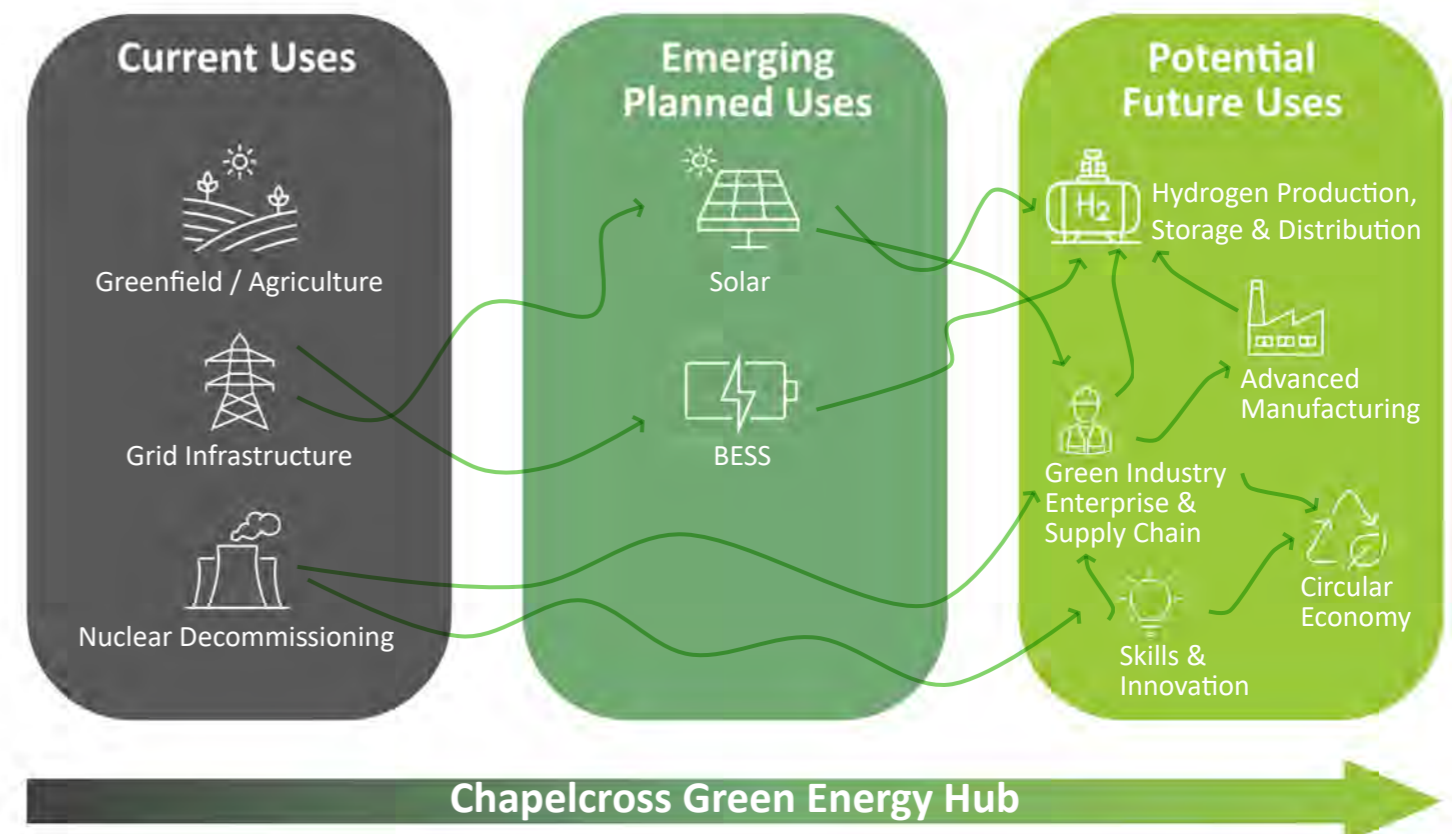
- Energy Sector Investment** - A range of wider investment opportunities in the energy sector will continue to develop at Chapelcross and its surrounds, in parallel to ongoing decommissioning activity and as land becomes available.

The solar energy market has been experiencing significant growth driven by policy (NPF4), technological advancements and investor support. More large-scale solar farms are expected to be developed across region with Chapelcross grid connection and land availability establishing a strong regional cluster. Solar PV may also provide shorter term (25year) land-use opportunity on significant areas of the licensed nuclear site.

While currently not supported in Scotland, nuclear energy has a legacy presence at Chapelcross. If policy and regulatory positions were to evolve over the long-term this could form a future investment opportunity, including nuclear supply-chain activity or emerging new modes of nuclear power.

Manufacturing and services support in the nuclear industry in Scotland is focussed on decommissioning with the industries R&D linked to NMIS(AFRC) /Scottish universities research associated with Small Modular Reactors / Micro Reactors, nuclear fusion (STEP) and re-manufacturing technologies.

The framework seeks to safeguard future opportunity across all non-carbon / renewable energy sectors recognising the inevitable technological and potential for policy changes over the period 2025-2050.



Based upon these core elements and opportunities within a Green Energy Hub, the Development Framework expresses the Chapelcross proposition as 4 connected 'Development Campuses' and a linked package of Enabling Infrastructure.



Enabling Infrastructure – Following 'Infrastructure First' principles a core package of enabling works is defined across road access, utilities, SUDS, earthworks, and landscape to create market-ready development, as well as identifying longer-term infrastructure investment opportunities



Hydrogen Campus – A large-scale Campus for hydrogen production, storage and distribution, supporting this as a core driver and enabler of the site's future as a Green Energy Hub.



Green Industry Campus – Providing industrial, commercial and business space to support a range of energy transition focused manufacturing, supply-chain and circular economy activity at Chapelcross –driving job-creation and supporting regional industrial capacity.



Enterprise Campus – Early phase investment led by SOSE to develop a multi-user Campus providing flexible light industrial and commercial units suitable for a range of potential users looking to locate at Chapelcross as part of a growing cluster



Energy Campus – Longer-term opportunities for green energy investment across wider areas of Chapelcross including current Nuclear Licenced Site –including Solar, BESS, Circular Economy, and future energy supply-chain. Dependent on land availability and compatibility with decommissioning activity.

The Campuses leverage the significant competitive place advantages of the site and provide capacity for multi-phase development with a cluster of complementary uses focused on renewable energy, supply chain & manufacturing, circular economy, and associated innovation and job-creation.

Development Framework Principles

The Development Framework has defined a series of high-level principles to enable sustainable development and place-making across different areas of the site as they come forward. The principles are consistent with local and national planning priorities and respond to key issues and opportunities identified from site analysis, and feedback from key CX Programme stakeholders involved in the development of the Framework.

The Development principles provide guidance and reference to inform the development of detailed implementation of proposals at Chapelcross.

Energy & Sustainability



- Maximise the potential value of existing energy infrastructure on the site to support new development in energy transition sectors and related activities. This should include utilising constrained renewable energy and local sources of renewable energy proximate to the site.
- Seek to deliver a 'whole-systems' approach to energy – delivering a complementary combination of energy generation, storage and utilisation that supports net-zero carbon emissions in power, heat, transport, industry, and other sectors.
- Incorporate principles of sustainable design, taking account of whole-life carbon emissions, energy and resource efficiency, and circular economy.
- Incorporate flexibility in design and function, allowing for adaptive re-use of buildings and materials over their lifetime, and future-proofing for renewable energy technologies.

Place Quality



- Incorporate a high quality of design and landscaping across all development – with contextual understanding that responds to local landscape, ecology, and the wider built environment across the site and wider area.
- Contribute to the delivery of 'Successful Places' – designing for Healthy, Pleasant, Connected, Distinctive, Sustainable, and Adaptable Places as defined in NPF4.
- Development should create a clear sense of place for Chapelcross – with consideration of siting, scale, massing, colour, orientation, footprint and proportions of buildings and other infrastructures to provide a distinctive place quality.
- Incorporate and reflect Just Transition principles, ensuring that local communities are able to influence and shape energy transition development and that benefits and opportunities from development are accessible to local people.

Environment



- Integrate development proposals with local landscape and environmental character – including establishing a new landscape framework of appropriate scale building a green network comprising native species and supporting priority habitats.
- Enhance site biodiversity and ensure no net loss of biodiversity in line with the requirements of NPF4 and restore and enhance biodiversity across the site as well as supporting habitat connectivity across the area.
- Respect local environmental constraints and designations, and identify opportunities to positively integrate existing environmental features, such as daylighting existing culverted, watercourses, integrating woodland/hedgerows and other habitats into future development.
- Effectively avoid, minimise and mitigate the site environmental risk to development from the legacy of the site as a former airfield and nuclear power station.

Land Use Integration

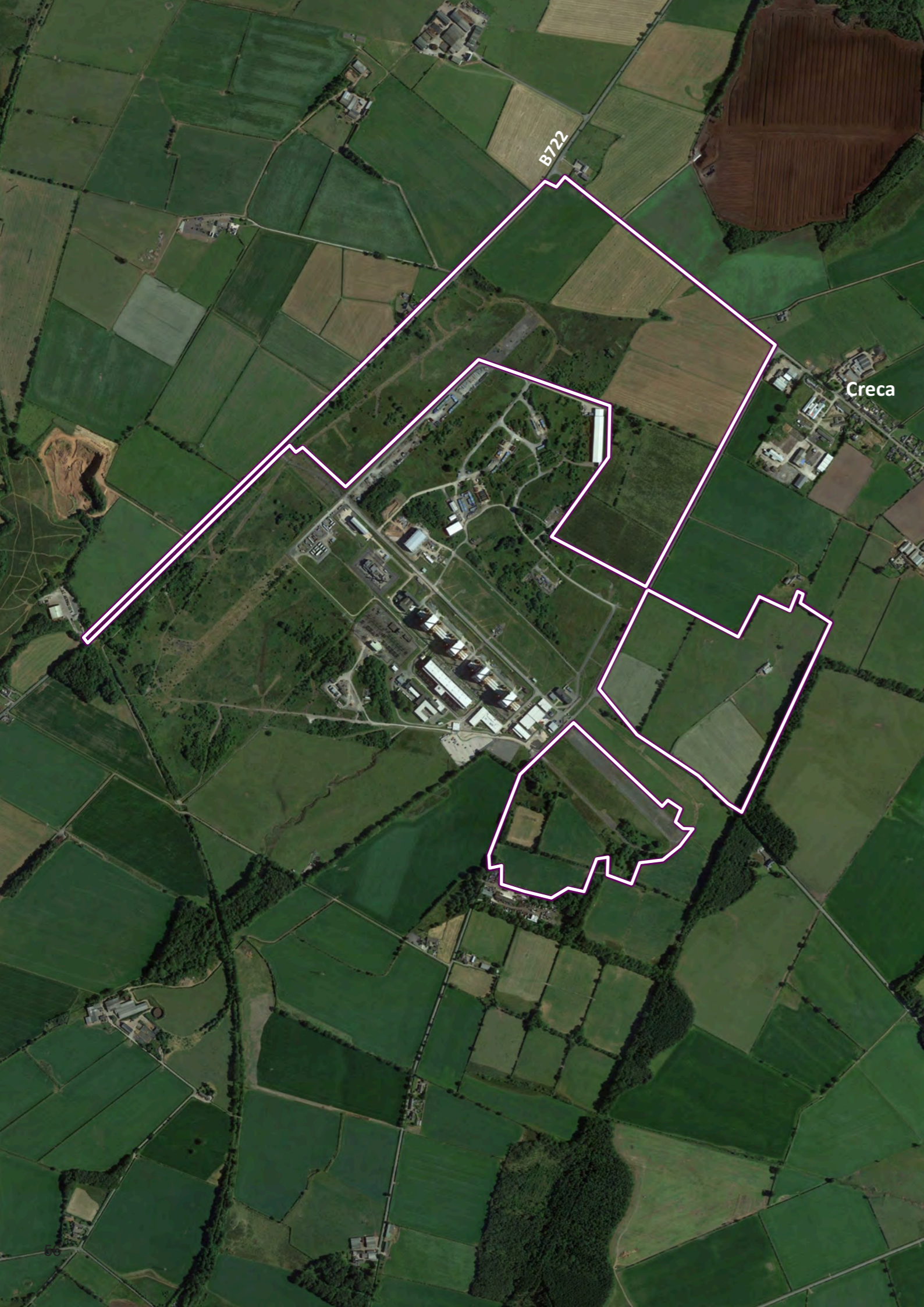


- In accordance with NPF4, enable delivery of a range of complementary land uses across the site within energy, high-value industrial and manufacturing, circular economy sectors, with a priority toward job-creation and 'value-add' activity, as well as wider skills & innovation-based opportunities.
- Plan for long-term flexibility and adaptability in land use across the Site – with ability to respond to changing technological and development requirements of energy transition sectors and related industrial uses.
- Minimise risk and disturbance to ongoing decommissioning activity at the Nuclear Licensed Site. Where possible opportunities should be taken to integrate and/or accommodate complementary activities that benefit from co-location to the Nuclear Licensed Site.
- Maximise opportunities to redevelop brownfield land across the site and avoid development beyond the established site boundaries on areas of Open Countryside and wider Green Network.

Connectivity



- Prioritise the enhancement of key transport and movement corridors to/from the site and the nearby strategic road network (A74(M) / A75) – creating a stronger regional and national connectivity for the site.
- Create a clear access strategy and hierarchy of movement within the site, with flexibility to respond to the different accessibility and logistics requirements of different end-users as these are defined.
- Support and facilitate delivery of active travel connection and wider transport infrastructure to link the site to surrounding communities – supporting local living and strengthening 20 minute neighbourhoods.



4.0 Enabling Infrastructure

The Development Framework promotes an ‘Infrastructure First’ approach that puts infrastructure considerations at the centre of the development strategy. Chapelcross is a large strategic site with existing grid infrastructure but limited existing road access or utility infrastructure for development. The site requires a package of up-front infrastructure investment in roads, utilities & services, and landscape, to create a market-ready development proposition and support long-term productive use.

The central objective of an ‘infrastructure first’ approach is to enhance existing site assets, create a foundation for place-making, and strengthen the capacity of the site for development across a flexible mix of uses and activities. A programme of infrastructure investment is outlined to support the sites competitive place advantages and each phase of development as they come forward.

Core Elements & Infrastructures

Building from the strategic objectives and responding to established policy and funding priorities – three core packages of ‘Enabling Infrastructure’ are contained within the Development Framework. Combined these will provide a foundation and platform for flexible development within the Green Energy Hub concept.

Enabling Infrastructures

Connectivity –

- Roads improvements to A74(M)-B722 connection including signage
- New Chapelcross site access junction
- Local road network improvements

Landscape / Environment /Biodiversity–

- Strategic landscape framework
- Biodiversity and habitat development
- Blue/Green Networks and Gullielands Burn daylighting

Utilities –

- Utility corridors (power / gas / water / digital-fibre-optic)
- Power Utilities
- Water Supply & Drainage
- Telecommunications
- Utility safeguarding, easements and wayleaves

Connectivity & Access Framework

Chapelcross benefits from proximity to the strategic road corridors of the A74(M) and the A75 - providing access to Dumfries, Carlisle and wider national connections to the Central Belt. However, road connections in the immediate environs of the site are constrained and of limited capacity. A programme of upgrade is required in order to facilitate development and unlock the potential of the site as a Green Energy Hub and location for strategic economic development.

The site is linked to the strategic road network (A74(M) / A75) by the B722 / B6357/ C43a and other unnamed local Roads. Across this local network there are a number of geometric constraints, most particularly at Burnhead Cottages and Breaconbeds on the route from the site to A74(M). Elsewhere in the local network there are junctions and crossroads with limited visibility (Stapleton Bar) and/or roads of narrow width and condition potentially unsuited to HGV traffic. The potential for upgrades to signals within Annan Town Centre has also been identified through previous studies. These issues with the local network are set out within the appended Transport Review.

The Connectivity & Access Framework recognises that advance investment is required to address the potential scale of future development and improve local road capacity. It sets out masterplan level recommendations for investment in the local road network that will improve site readiness for development, as well contributing to wider regional economic growth, social inclusion, and environmental sustainability. Road infrastructure investment forms part of a wider site-wide package of publicly funded enabling works, and therefore prioritises those interventions which directly address key geometric constraints and with greatest impact in positioning the site for development.

Subject to future phased delivery of the site and detailed modelling of transport impacts in response to development proposals, it may be appropriate for further intervention to address wider network issues in coordination with Dumfries & Galloway Council. As identified in the Road Network Review, this could include measures to improve visibility and safety at junctions and crossroads on the local road network around the site, or signals within Annan Town Centre. In all cases this would be subject to future detailed assessment of emerging proposals and their demand on the network.

The current priorities for investment that would facilitate strategic access to the site and enable development are a phased upgrading of the B722 to provide enhanced strategic connectivity between the site and key national road corridor of the A74(M). A package of upgrades are detailed in the appended Access Review and would include:

- Phase 1 works comprising an upgrade at Breaconbeds to provide a curved bend (360m) to replace current 90 degree bend and widening of the road to 6.75m with 1m hardstrips. Phase 1 works would also include creation of a new purpose-designed site access junction from the B722 – comprising a 38m ICD roundabout and with tie-in to existing road (incorporating deflection), and a minor upgrade to widen the current 90 degree bend at the eastern edge of the site on the local Creca road – improving visibility and strengthening access to the eastern and southern parts of the Site, including Enterprise Campus being delivered by SOSE.
- Additional works encompassing improvements to the double bend adjacent to Burnhead Cottages including re-alignment based on 360m radii curves and road widening to 6.75m with 1m hardstrips.
- Later phase works comprising widening of the remainder of the B722 along its full length to 6.75m with 1m hardstrips.

- Associated provision of signage and road markings to the local road network as part of upgrades.
- Promoting investment in Active Travel (walking/cycling) and recreational connections between Chapelcross and Annan along the former branch railway as part of the 'Village Links' active travel network.

The existing local road network has 60mph speed limits and no changes are recommended – though the detailed design of road upgrades would seek to address localised speeding, as well account for increased vehicle movements and the effect this may have on typical speeds.

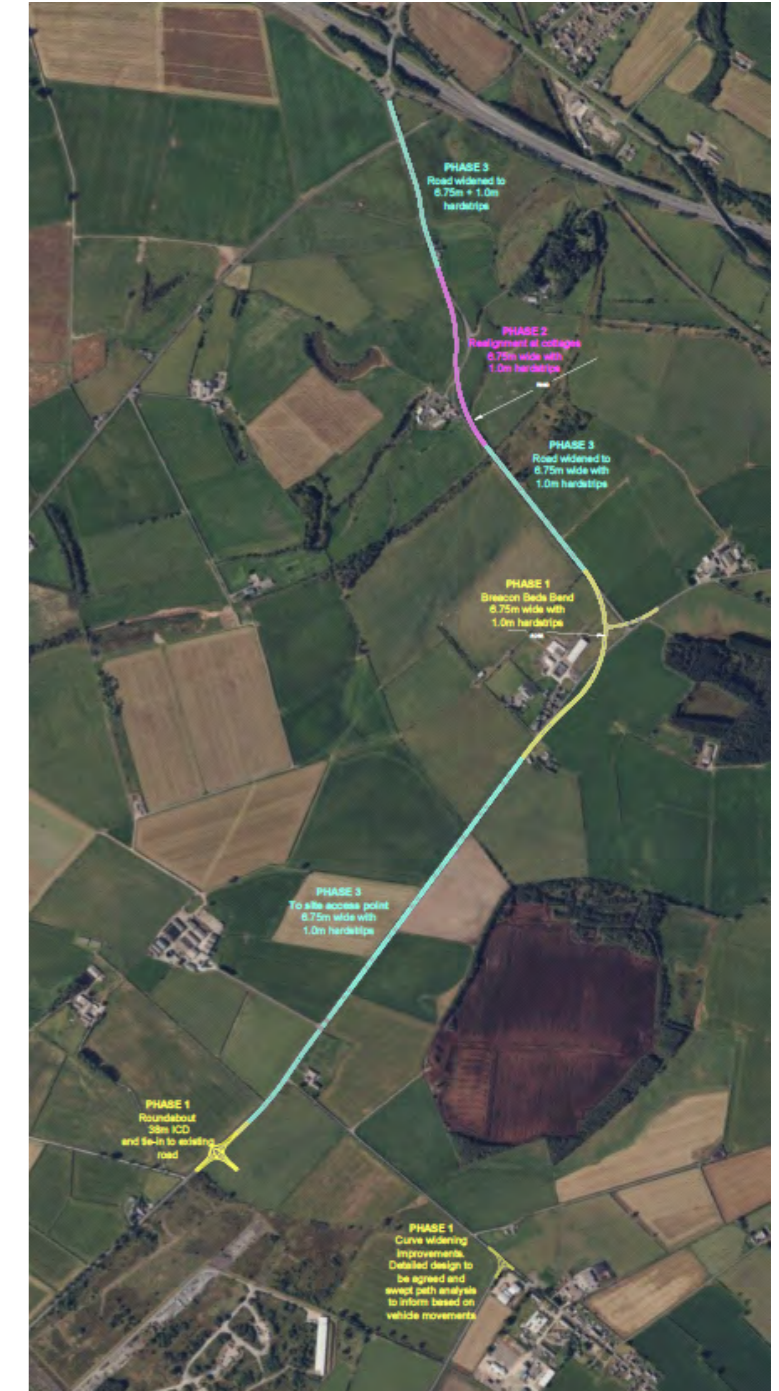
Secondary accesses to the site from B/C Class road network will be restricted and provide for necessary sightlines with entrance control points allowing a minimum of 2 No HGV waiting at security control points.

Internal roads including active travel provision will be integrated into individual development phases and incorporate corporate and street detailing in accordance with Design Guidance (Designing Streets/ SCOTS National Roads Development Guide).

Rail connections are available in Annan (5km) and Gretna (14km) with Chapelcross having no freight railhead or capacity for railfreight handling. Limited railfreight services are available in Dumfries and Carlisle.

Key Metrics

- Staged road Upgrade circa 3.75km from Jct 20 A74(M) to Primary Site Access
- Local Improvements to Creca Road/Annan Road Junction and Enterprise Campus Access Junction
- New Chapelcross Primary Site Access (Roundabout circa 36m Inscribed Circle Diameter (ICD))
- Signage to Strategic and Local Road Network



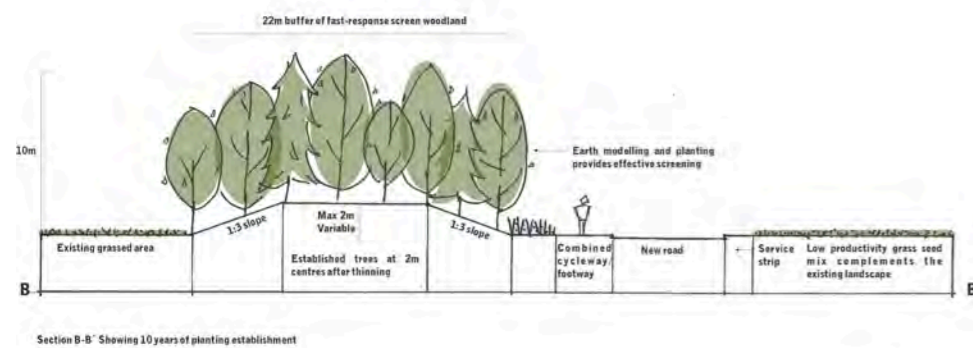
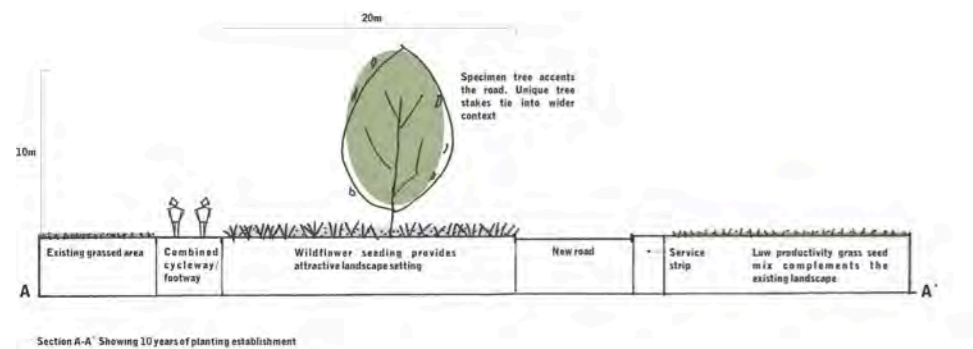
Landscape Framework

Chapelcross is located at approximately 70 to 80 m (AOD), at the head of a small valley formed by the Gullielands Burn. To the north, the ground gently rises to a local high point, at 126 m AOD.

Landscape character surrounding the site is predominantly defined by the agricultural land use. Field patterns, boundary hedgerows and woodlands define small estates, farms, and rural open space with woodland largely aligned to hydrological features and former rail corridors. The Chapelcross site boundaries are defined through a combination of formal and informal roadside hedgerows (mixed / beech/hawthorn) with occasional in line field boundary trees and small woodland copses. None of the site is covered by environmental or landscape designations.

As a part of the core infrastructure there is a need to protect and enhance the existing habitats, and build on the Site Biodiversity Action Plan through a landscape framework that is complementary to development. Early implementation of landscaping can ensure it is delivered in advance of built-development phases, and embedded into long-term environmental management of the site for biodiversity and natural capital. Seeking to provide a Green Network across the site, the priority investment within Landscape Framework would require:

- Development of extensive site boundary treatment, through reinforcement of hedgerows and development of planted native species 'shelterbelts' creating stronger habitat connectivity across and beyond the site. This would seek to extend and reflect the structure of the River Annan / Gullielands Burn/ Gill Burn corridor and existing shelterbelts trending NE/SW to the west of the site.
- Native woodland planting and habitat management within development areas, integrated with surface water management to develop a strong blue-green infrastructure network that can be further enhanced through site/plot landscape and management for biodiversity over time.

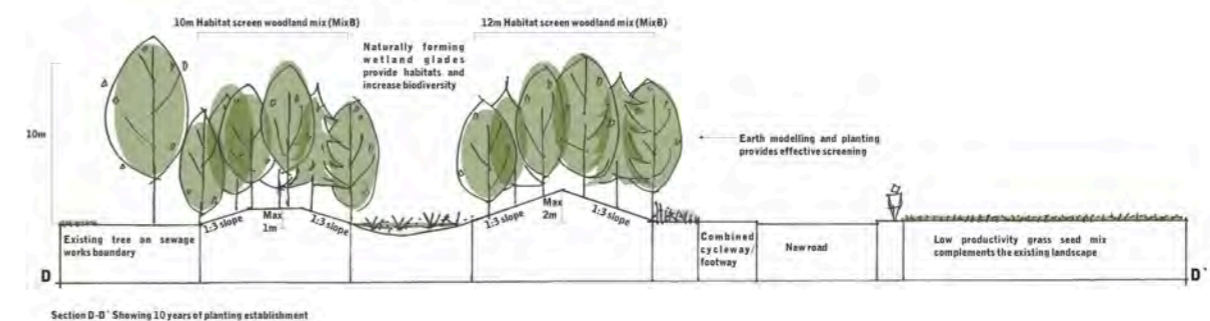
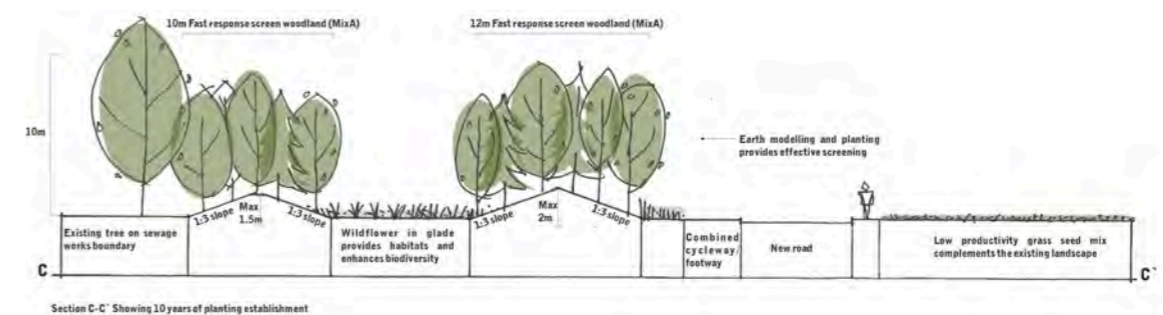


Concept Landscape Illustration

- 'Daylighting' sections of the existing Gullielands culvert as part of a renewed Blue-Green infrastructure for the site – integrated within development and creating opportunity for habitat creation, new landscape features, and nature-based solutions to water management.
- Biodiversity measures will seek to provide overall enhancement to the sites existing natural capital. Significant opportunities exist in enhancing traditional field boundaries, hedgerow restoration, and introduction of pollinator species supporting associated key LBAP Species (birds / invertebrates / mammals / flowering plants / lichens/etc.) Developing the 'farm woodland' pattern through a combination of shelterbelts /copses supports biodiversity whilst also establishing 'green verticality' within the wider landscape which alongside boundary landforms will screen foreground views. New woodland planting should avoid habitats that are already of defined biodiversity interest/
- Developing habitat around surface water management (Gullielands Burn Daylighting / SUDS elements) provides for the retention/attenuation and treatment of surface water whilst contributing to habitat biodiversity and amenity. Riparian habitats and SUDS element will be incorporate habitat design supporting reptile/amphibians, invertebrates and birds and ensuring connectivity of habitats across the site.
- Where possible as part of future detailed planning, opportunities to retain, extend, or reinstate the mix of species rich acid grassland, lichens and moss habitats that have emerged on areas of the former airfield should be explored and form part of individual plot landscaping. This can continue and extend the NRS Biodiversity Acton Plan for the site, supporting locally important species and habitats.

Key Metrics

- Total Site Area 190 ha
- Boundary Treatments 2,500 linear metres
- Woodland Planting & Biodiversity Habitat Zones circa 40-50 ha
- Tree/Woodland Planting circa 200,000-250,000 forest transplant trees/hedgerow



Green Roofs

Incorporated as part of future development – potential to extend existing lichen / moss habitats and add to site biodiversity.

Gullielands Burn

Opportunities to daylight sections of the Gullielands Burn as part of enhanced blue-green infrastructure

Site Boundary Treatments

Native species shelterbelts and hedgerow planting providing landscape screening and contributing to habitat connectivity

Development Plot Landscaping

Embedding landscape features within individual plot boundary treatments and external areas and to create high amenity and place quality

Management for Biodiversity

Ongoing active management of site habitats to remove invasives, support locally important species, and positively integrate within future development.

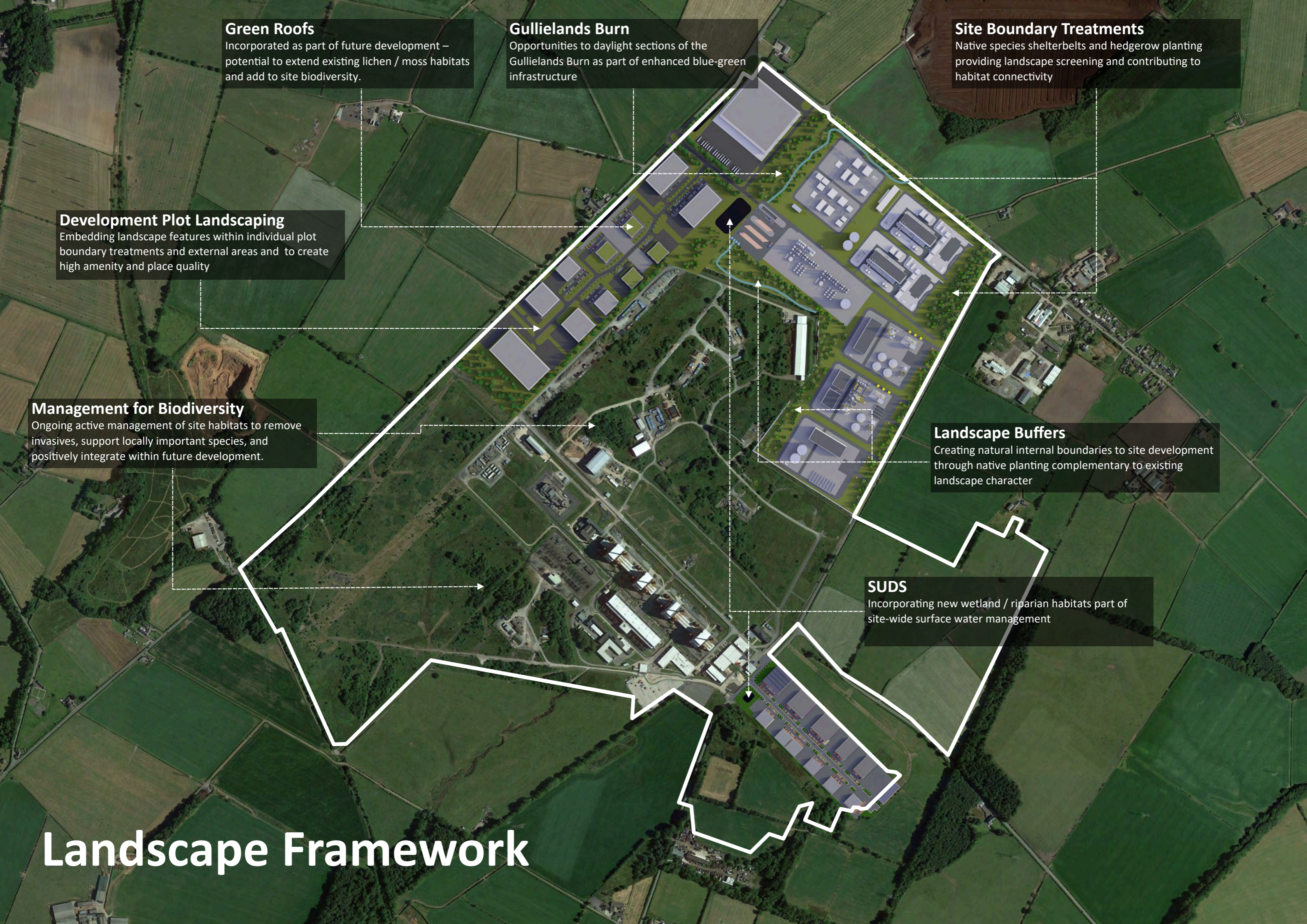
Landscape Buffers

Creating natural internal boundaries to site development through native planting complementary to existing landscape character

SUDS

Incorporating new wetland / riparian habitats part of site-wide surface water management

Landscape Framework



Utilities & Drainage Framework

Chapelcross forms a potentially strategic industrial location based on the legacy of nuclear energy and the present transition to net zero and a decarbonised economy. Site utilities and existing infrastructures require significant reinvestment to fully meet future development needs, but core assets for energy, water, drainage, and digital services exist within or adjacent to the site.

The core utility infrastructure of Chapelcross is the 132kV/33kV Grid Supply Point – situated adjacent to the former Nuclear Power Station. At present, the 132kV circuit connections could potentially allow up to 50MW, limited by upstream capacity and with export connections linked to ongoing network reinforcement works due for completion in 2028. The major investments in power supply and grid infrastructure at Chapelcross could include:

- Development of an 11kV network with sub-stations established within the development zone core road network to service the Green Industry and Enterprise Campuses.
- Establishment of understanding/agreements with Scottish Power Energy Networks and National Grid on the timing of grid export capacity from the site.
- Development of a Private Wire network to facilitate connections to the Hydrogen Campus from nearby Solar Farm developments and/or onshore wind development in the region (subject to future commercial feasibility and arrangements).

Gas Connections – Intermediate Pressure Gas

SGN operate a Medium Pressure gas main system located 725 metres to the west of the site (at its nearest point). Whilst no gas connection for space heating or process purposes are envisaged from the existing natural gas network, extension of that network to the site offers opportunity for export and blending of site generated hydrogen. SGN anticipate that blending natural gas with up to 20% hydrogen to be feasible – subject to future legislative and regulatory processes and completion of safety testing. A connection to the existing Intermediate Pressure pipe with both an import and export pipeline together with associated governor/hydrogen blending intake will be required – to be configured and delivered by the developer in close coordination with SGN as required to meet specific operational and health & safety requirements.

Foul Drainage Systems

An existing Scottish Water combined sewer serves the former power station site and the village of Creca and discharges to the west. The existing pipework is 150mm diameter and as such would typically serve up to 400 household equivalents. The developed CX site will result in a requirement to upgrade the existing system to provide for increased PE (population equivalent).

The Development masterplan will inform the Scottish Water PDE (Pre Development Enquiry) process and which will likely result in the requirement for a Drainage Impact Assessment (DIA).

- A gravity system to the existing Scottish Water network is anticipated.
- Upgrade to the Scottish Water network will require to be funded by the CX development.
- Sewer corridors (servitudes) between the Development Campuses and the foul sewer outfall will require to be negotiated and preserved in order to facilitate connections to the Scottish Water system.

Surface Water Sewer Drainage Systems

The existing surface water drainage system pre-dates sustainable drainage (SUDs) requirements and the surface water drainage system associated with proposed development will be SUDs compliant and providing the following criteria:

- Attenuation of surface water discharge to green field run-off equivalents and including attenuation of developed brown field areas.
- Surface water treatment following SEPA Simple Index Tool mitigation indices and pertinent to particular land uses and development components.
- SUDs facilities located outwith 200 year plus climate change flood risk areas and no flood risk to off site areas.
- Surface water system design to facilitate betterment and improvements to the Gullielands Burn via culvert daylighting and attenuation of previously unattenuated of hard surface run off to Dumfries and Galloway Council design criteria and climate change criteria.

Sewer corridors (servitudes) between the Development Campuses and the surface water outfalls will require to be negotiated and preserved and discharge to the Gullielands Burn at key points.

Water Supply Network

The existing water supply network had a large supply capacity to the site during the power station operation and the previous capacity of circa 200m³ per day would provide for a Population Equivalent of circa 2000 employees for domestic use and assuming canteen provision within the developments.

The Development masterplan will inform the Scottish Water PDE (Pre Development Enquiry) process and which will likely result in the requirement for a Water Impact Assessment (DIA).

The former raw water extraction pump station and supply pipework from the River Annan that served the power station has been decommissioned however the potential for re-commissioning by the securing of a new SEPA CAR Licence for abstraction, installation of new pumps and recommissioning/ re-lining of the rising main pipework will represent an option for delivering high volume raw water supply to, for example, a hydrogen production facility.

Digital

Openreach have been approached to develop an indicative cost for the provision of high capacity fibre network(s) to the site. The networks will be able to be fed from several point sources and will be able to offer services from a range of providers.

Site infrastructure access roads can incorporate free issue Openreach ducting and chamber covers for installation by the roadworks contractor.

Key Metrics

- Grid export capacity is programmed for 2028 increasing export capacity
- Surface water drainage includes opportunity for 'daylighting' 990 linear metres of Gullielands Burn
- New surface water connections (c. 1,200 linear metres)

Drainage Strategy Framework Plan

Catchment	Plot Discharge Rate per hectare of developable area (l/sec/ha)	Greenfield Runoff (Q2) /Basin Discharge Rate (l/sec)	Suds Basin Volume 200yr + 38% CC Volume available on Plan - additional attenuation will be required as noted within some plot areas (m ³)
A	10.0	41.00	2,400
B	Unrestricted Prior Basin	25.40	3,050
C	Unrestricted Prior Basin	28.30	3,400
D	15.0	63.30	3,800
E	11.0	76.30	3,500
F	Unrestricted Prior Basin	20.50	1,450

CATCHMENT C
 Total area = 6.08ha
 Impermeable Area (70% of 6.08ha) = 4.26ha
 Discharge rate 28.3l/sec
 200yr +38%CC Attenuation Volume = 3,400m³

CATCHMENT B
 Total area = 5.45ha
 Impermeable Area (70% of 5.45ha) = 3.82ha
 Discharge rate 25.4l/sec
 200yr +38%CC Attenuation Volume = 3,050m³
 Assumes Area B discharges freely to Basin B

CATCHMENT A to site boundary
 Greenfield Total Area = 8.78ha
 Q2 = 41.0l/sec

CATCHMENT A
 Total area = 8.78ha
 Impermeable Area (70% of 8.78ha) = 6.15ha
 Attenuation shown at Basin A assumes upstream attenuation/treatment provided within development plots. Restricted to 10l/sec/ha of developable area.

BASIN A
 Incoming Flow = 61.5l/sec
CATCHMENT A
 Basin A Volume available 200yr +38%CC Attenuation Volume = 2,400m³

BASIN A Greenfield
 Discharge Rate = 41.0l/sec

BASIN B Greenfield
 Discharge Rate = 25.4l/sec

CATCHMENT D to site boundary
 Greenfield Total Area = 13.58ha
 Q2 = 63.3l/sec

CATCHMENT D
 Total development area = 10.15ha
 Impermeable Area (70% of 10.15ha) = 7.11ha
 Attenuation shown at Basin D assumes upstream attenuation/treatment provided within development plots. Restricted to 15l/sec/ha of developable area.

BASIN F Greenfield
 Discharge Rate = 20.5l/sec

CATCHMENT F to site boundary
 Greenfield Total Area = 3.95ha
 Q2 = 20.5l/sec

CATCHMENT F development area
 Total area = 2.90ha
 Impermeable Area (70% of 2.90ha) = 2.03ha
 Discharge rate 20.5l/sec
 200yr +38%CC Attenuation Volume = 1,450m³

BASIN C Greenfield
 Discharge Rate = 28.3l/sec

BASIN D Greenfield
 Discharge Rate = 63.3l/sec

BASIN D Greenfield
 Incoming Flow = 106.5l/sec
CATCHMENT D
 Basin D Volume available 200yr +38%CC Attenuation Volume = 3,800m³

BASIN E Greenfield
 Discharge Rate = 76.3l/sec

BASIN E Greenfield
 Incoming Flow = 102.0 l/sec
CATCHMENT E
 Basin E Volume available 200yr +38%CC Attenuation Volume = 3,500m³

CATCHMENT E to site boundary
 Greenfield Total Area = 16.37ha
 Q2 = 76.3l/sec

CATCHMENT E
 Total development area = 13.27ha
 Impermeable Area (70% of 13.27ha) = 9.29ha
 Attenuation shown at Basin E assumes upstream attenuation/treatment provided within development plots. Restricted to 11l/sec/ha of developable area.

Key:

- Gullielands Burn - Daylighting Option 1
- Gullielands Burn Daylighting - option 2
- Existing Gullielands Burn piping (Exact location unknown)
- Proposed Drainage Outfall
- Existing Culvert Manhole
- SUDs Basin
- SUDs Basin Maintenance access

Rev	Date	Description	Issue	Checked by

IronsideFarrar
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Project Name
Chapelcross Strategic Development Framework
 Dumfries and Galloway Council
 The Surface Water Drainage Strategy

Scale
 1:2500

Date
 26.06.24

Project Size
 A1

Quality Assurance
 Checked by NK

FOR PLANNING
 61078-33-007-P01

Not to Scale for Construction Purpose





5.0 Development Campuses

The Development Framework defines a series of development campuses creating an adaptable land-use framework that build on the core site strengths, reflect national and regional policy, anticipates potential regulatory and user requirements and sets out a flexible masterplan adopting industrial masterplan best practice. Key requirements have included:

- **Place-making & Adoption of Best Practice** Recognition of the need to build a quality of place that supports investment and creates an environment that reflects the scale and different forms of development recognising the Chapelcross as an employment destination.
- **Supporting and mitigating Landscape Change** Developing a new landscape framework that integrates future development into the landscape and creates strong visual containment and boundaries that screen foreground elements (security fencing/secondary structures/parking) and enhance setting of the site within the wider landscape.
- **Building on the Environmental Capacity of the Site** Enhancing biodiversity and value of local habitats and extending opportunity to increase ecological capacity (culvert daylighting/habitat development & management) including habitat restoration.
- **Market Awareness & Sector Benchmarking** Investors are typically risk averse (risks to cost/programme/delivery) and seeking sites with understood risk profiles, supportive land owner interests and a level of clarity around land-use consent risk and established engagement with key interests and regulatory bodies.
- **Integration with Adjacent Land-Uses** Chapelcross is a settled landscape with residential and commercial uses within the locality. Detailed site planning for access and the incorporation of buffer zones and advance landscape boundary treatments will minimise the potential for significant impact.
- **Infrastructure First** Development including its construction phase has the potential for local disruption and where an infrastructure first approach can both mitigate impacts (traffic / construction activity/ landscape and visual / local amenity) and secure local benefits.

Chapelcross involves a longer term programme with phased development over the period 2025-2050. Early investment in infrastructure including landscape infrastructure will create a market-ready site facilitating investment, de-risk delivery and establish a new maturing landscape setting for plot and site development.



-  Green Industry Campus
-  Hydrogen Campus
-  Enterprise Campus
-  Energy Campus



Hydrogen Campus

Hydrogen will be a core driver and enabler of Chapelcross' future as a Green Energy Hub. The Hydrogen Campus supports this by providing a flexible, large-scale land area with capacity for hydrogen production, co-located and downstream production of derivatives such as ammonia or synthetic fuels, and related commercial and skills & innovation activity. It has the potential to provide a regional-scale facility that maximises the potential of renewable energy capacity and becomes a key hub in Scotland's hydrogen economy.

The production, distribution and use of hydrogen, especially green hydrogen, will be a key part of Scotland's energy transition and achieving the ambitious net-zero carbon objectives. Hydrogen can be stored, liquefied and transported via road, rail, sea, and pipelines – and has wide-ranging application as a low-carbon energy source especially in energy-intensive industry and heavy-duty transport.

Chapelcross has been identified as a strategically important location and opportunity for hydrogen production in both NPF4 (National Development 17) and in Scottish Government's Hydrogen Action Plan (2022) as a regional hydrogen hub. The site represents one of a number of leading hydrogen production opportunities in Scotland and the Development Framework responds to this and supports hydrogen as a catalytic land use activity that will support a sustainable long-term future for the site. It seeks to position Chapelcross as a strong location for investment in this fast-growing sector - drawing on locational advantages and existing power and water infrastructures which can support hydrogen production and distribution, as well as growing a strong local supply-chain around hydrogen and the energy sector. and with the potential for infrastructure investment to be supported through the Borderlands inclusive Growth Deal.

Hydrogen Campus – Hydrogen Production including Off-take Manufacturing

- Large-scale graded site on a single or alternatively twin development platform
- Area requirements for large scale production 40-50ha
- COMAH Regulation Compliance - Upper Tier / EPR Regs/ IPCC
- Secure site controls / boundaries / asset Integrity (CIA- LPS 1175 Standard)
- Grid Supply Point connection (132kv GSP)
- Water Supply / Abstraction and facilities for discharge- raw water management
- Core storage facilities with max stand-off / buffer zone allowances
- Co-location opportunity to test & demonstration / hydrogen products facilities



Production Site

The Hydrogen Campus encompasses land at the north-east of the Chapelcross site – bound to the east and north by the C43a local road and to the south and west by wider NDA landholding including the Nuclear Licensed Site. In total the area provides 33 ha – which is predominantly greenfield with limited constraint. A section of the Gullielands Burn currently runs beneath the site where it has been culverted as part of the development of the Nuclear Power Station. The Illustrative Masterplan shows the potential for ‘daylighting’ of the Burn and re-alignment around the Hydrogen Campus – addressing a potential development constraint and enabling new blue-green infrastructure.

The scale of the Hydrogen Campus reflects market-driven requirement and demand for significant, unconstrained land areas required for hydrogen production. This provides for flexibility in site configuration, access, operational activity, and safeguarding of the long-term potential to scale production as the market for hydrogen matures and grows. Subject to operator requirements, it also allows potential for greater on-site storage and/or co-location of secondary downstream activity associated with hydrogen production, including derivative products such as ammonia or synthetic fuels.

The Campus is positioned to address these market drivers – offering potential for a range configurations depending on technology and commercial model. Within the land available for development, it includes those areas furthest removed from residential settlement receptors such that the risk of significant environmental impact are mitigated through site planning. It also incorporates stand-off distances and exclusion zones to adjacent Nuclear Licenced Site – supporting hazard management planning, health & safety and operational flexibility.

The Campus would be principally accessed via the B722 at the north of Chapelcross site – via a new junction and internal distributor road within the site. The Illustrative Masterplan provides potential for Campus to operate as secure site with controlled access. Secondary access points to the Campus from the south may be provided – dependant on the nature and operational requirement of uses within the Campus. These would provide appropriate site access / entrance set-back from the road to avoid queuing onto the rural road network.

Producing Green Hydrogen

Green Power

Chapelcross benefits from pre-existing infrastructures and assets offering competitive advantage for Green Hydrogen production – most fundamentally the availability of renewable power, raw water and a largely unconstrained site of scale.

Dumfries & Galloway and the wider south of Scotland region possesses significant renewable energy capacity as a result of extensive development of on-shore wind over the last 20 years. The region is a significant net exporter of clean electricity – and currently much of this renewable energy capacity is ‘constrained’ whereby there is insufficient capacity in the grid to export it and generators are required to reduce their output. This creates significant regional opportunities and potential competitive advantages for hydrogen production which can utilise excess and/or constrained renewable energy to produce a zero-carbon source of energy.

Potential reform of wholesale electricity markets is currently under review by Ofgem and UK Government. The prospect of ‘zonal pricing’ under consideration could result in comparatively lower electricity costs given the region’s significant renewable generation capacity and further strengthen Chapelcross’ locational advantage for hydrogen production and other energy intensive activities.

To provide Green Hydrogen via a grid connection, it is likely that a Power Purchase Agreement would be required with renewable energy provider, and compliance with relevant standards around additionality and temporality. Alternatively, private wire connections could be formed between renewable energy development and hydrogen production to create a direct link and feedstock to Green Hydrogen production. Subject to commercial arrangements, this could include planned solar power development at Chapelcross and further growth of renewable energy across the region.



Water Supply

The electrolysis process involved in producing Green Hydrogen requires significant quantities of de-ionised water (from which hydrogen is split from oxygen). In some instances water is also required as part of the cooling process.

Preliminary discussions with Scottish Water have also indicated that there may be capacity within their regional network to support hydrogen production at Chapelcross. Specific volumes and associated commercial terms would be subject to further review with Scottish Water – but this could serve production at small-medium scale in the initial phases of development.

Alternatively, and/or as production is scaled up, abstraction from the River Annan (3km from the Hydrogen Campus) presents a potential source of freshwater to support Green Hydrogen production.

Significant volumes of water were previously abstracted from the river as part of the Nuclear Power Station operations and a range of redundant infrastructures remain in-situ with the potential for adaptation and/or replacement to support Green Hydrogen. A 600mm (sub-terrain) pipeline connects the pumping station on the River Annan to the eastern edge of the Nuclear Licensed Site. Subject to further confirmation of condition – this could have capacity to serve hydrogen production.

The level of abstraction capacity from the River Annan should be discussed with SEPA at the earliest stage of project development. Available flow data for the River (mean flow 31m³/s at the nearest monitoring station) indicates there is potential for a sustainable level of abstraction that could support hydrogen production – though specific parameters and conditions would be agreed with SEPA through early engagement. If undertaking abstraction, opportunities to support enhancement of riparian ecology and habitats around the Milnbie Weir should also be explored, through fish ladders / pass and other measures, in consultation with SEPA and local interest groups.





Hydrogen Off-Take

The site presents a range of potential opportunities for off-take of green hydrogen, subject to future feasibility and commercial considerations. These include:

- **Heavy Goods Vehicle (HGV) re-fuelling** for the A74(M) and/or A75 corridors as they transition to hydrogen as an alternative zero-carbon fuel source. The site is situated within the key road freight and distribution & logistics corridor between the Central Belt and North-West England with potential to support decarbonisation of these sectors. Subject to future commercial and operational considerations this could be direct from the site or may involve distribution to other re-fuelling stations along the A74(M). Hydrogen demand modelling for HGVs (Ricardo / Scottish Enterprise, 2023) indicates Dumfries & Galloway has among the highest potential demand in Scotland – with up to 197GWh of demand per annum by 2045.
- **Blending of hydrogen** to the existing gas network. An SGN Intermediate Pressure Gas Main is located 720m west of the site at its nearest point and c.1.5km from the primary development areas. Preliminary discussions with SGN have recognised the potential for hydrogen blending as part of the decarbonisation of existing gas network. The UK Government has indicated provisional support for hydrogen blending where this can be an enabler to green hydrogen production – and subject to future safety and operational tests.

An alternative and longer-term option for blending may also arise from the National Gas Transmission pipeline situated 13km east of the site.

- **On-site utilisation** of green hydrogen within Green Industrial processes that may emerge elsewhere at Chapelcross, or part of the production of hydrogen derivatives (e.g. Ammonia / Synthetic Fuels / Methanol / Liquid Hydrogen) that could be subject to future demand. The Scottish Government has set out the potential applications of hydrogen and areas of significant market opportunity, with fertilisers (ammonia) and energy exports representing some of the region's best market opportunities.

Servicing hydrogen (and derivatives) demand that may arise from ferries and other marine transport at Cairnryan Port situated on the west coast of Dumfries & Galloway and directly accessible via the A75.

New Junction
Offset from main carriageway to manage speed

Secure Access / Gatehouse

Landscape Frontage
Native Species contributing to Place Quality and Enhancement of Biodiversity

Creca Bend
Widening existing tight bend to improve visibility and site access

Landscaped Buffer Zones to Nuclear Licensed Site

Hydrogen Production Facility
Electrolysers and Balance of Plant


Utility Wayleave Corridor
Water Supply, Grid Connection & Potential Off-site Connection to SGN network from Hydrogen Campus

Potential Secondary / Direct Access
Set back from existing road

H₂ Demonstrator / Pilot / Innovation Facilities

Hydrogen Campus

Illustrative Masterplan



Green Industry Campus – Advance Manufacturing & Circular Economy

- Ready and direct accessibility to public road network / Service spine road
- Open access / non-secure boundaries. Building perimeter/external space security
- Plot offering variable market responsive scale 0.5-5ha and expansion capacity
- Standard industrial utilities and strategic site SUD's
- Capacity to meet Planning/Building Standards/ Fire – Regulatory Requirements/ etc
- Public Realm and amenity
- Levels of frontage /amenity defined by landscape framework

Green Industry Campus

The Green Industry Campus provides the industrial, commercial and business space that supports manufacturing and allied support services including supply chain activity within the Green Energy Hub. The Campus supports this by providing a mixed-use industry park (Use Class 4 /5 /6) comprising plots and advance units/flexi-space within modern industrial, light industrial and smaller floorplate pavilion buildings. It offers a range of development opportunities for innovation, advance manufacturing, and a range of circular economy sectors and activities. The Green Industry Campus (20ha) creates a new regional-scale facility with a strong sectoral focus on energy transition.

Chapelcross has been identified as a strategically important location and opportunity for hydrogen production in both NPF4 (National Development 17) and in Scottish Government's Hydrogen Action Plan (2022). In addition the Chapelcross area is an important hub for nuclear decommissioning, solar PV energy and regional activity associated with circular economy and waste management. Linked to this existing sectoral presence and planned growth in green energy, there is clear opportunity for development of co-located industrial, supply-chain, and service support activity to form part of the Green Energy Hub proposition at Chapelcross.

This is recognised and supported within NPF4 and LDP2 which allocate land at Chapelcross for business & industrial use, particularly on brownfield land within the site and where this can complement wider energy sector uses. A key objective of CX Programme is to enable job-creation and skill development in the green economy and the approved SOBC identifies a range of commercial opportunities and interest at the site which may be complementary to and form part of a 'Green Energy Hub'. This includes low-carbon distribution & logistics, circular economy & waste management, manufacturing for energy transition, data & energy storage, food & drink, and wider R&D and innovation activity. The production of green hydrogen at Chapelcross may also be a catalyst and opportunity to attract other 'downstream' industrial activity seeking to co-locate to hydrogen.

The Green Industrial Campus responds to these priorities and objectives – providing a dedicated and purpose planned campus that is suited to a mix of high-value industrial, supply-chain and wider commercial activity. It plays to the site’s strengths of grid infrastructure, large-scale available land areas, and proximity to key transport corridors (A74(M) and A75), providing potential for a nationally competitive ‘Green Industrial’ proposition that makes a significant contribution to job creation and regional industrial capacity.

Green Industry Campus

The Green Industry Campus (along with the Enterprise Campus) provides the business space and infrastructure to accommodate energy transition supply chain and complementary commercial uses within the Green Energy Hub. It comprises a 20ha rectangular plot at the northern edge of the Chapelcross site – closest to the B722 and accessible to the A74(M) corridor. It would provide c. 10-15 year employment land supply requirements for the Annan HMA (annual take-up c. 1.5 ha/annum) – supporting long-term commercial and industrial capacity in the area.

The site of the Green Industrial Campus is broadly level – including areas of the former airfield and greenfield areas at the northernmost extent. It benefits from few development constraints and has potential for a range of configurations – capable of responding diverse commercial requirements and future operational need.



Layout & Buildings

The Illustrative Masterplan proposes a range of fully serviced development plots with buildings across a range of sizes and potential land uses – from 1,400 sqm to 20,000 sqm. Typical heights of 9-13m are provided- suitable for modern light industrial and supply-chain activities within flexible single-storey units. At the centre of the Campus, a cluster of ‘pavilion’ buildings set around structural landscaping and public is provided – suitable for smaller commercial / office / R&D activity. In total, the Illustrative Masterplan demonstrates potential for 50,000+ sqm flexible industrial & business development in the Green Industry Campus.

The Illustrative Masterplan provides standard and regular plot sizes and ratios with a balance between buildings, flexible external space for servicing, parking and storage, and boundary treatments. This is configured around the central spine road to define a common ‘street’ frontage with natural surveillance and opportunities for landscape planting and placemaking to create a high amenity business environment. Servicing and operational spaces are located to the rear and substantially screened by buildings, public realm, and car parking.

Plot sizes and buildings are complementary to provision within the Enterprise Campus (7.0 ha) on the south-eastern boundary (to be developed by SOSE). The Enterprise Campus will be delivered as an early phase and market take-up and interest should inform the demand for smaller light-industrial and office space within Chapelcross.





Access & Infrastructure

The Green Industry Campus takes advantage of frontage to the B722 – with direct access via a proposed new Roundabout Junction (c. 36m diameter) which would provide a primary common user access to the Chapelcross site. Secondary site access opportunities may be required elsewhere on B722 with consideration of appropriate junction spacing, visibility, and tie-in to existing road.

A central spine road (incorporating footways) provides the primary internal site access network – designed to DMBR standard suitable for Heavy Goods Vehicles (HGV) and serving the multi-functional industrial / commercial uses and associated parking and servicing areas.

Common services and utility networks (power / water / drainage / digital) are embedded within the spine road verges – forming a core infrastructure corridor for the site around which flexible development plots can be configured. Power will be by means of an 11kV network with sub-stations with potential for private wire systems for larger users (Solar PV) together with a water distribution and fibre digital network. An additional utility corridor / wayleave is provided at the south of the Campus to allow for services to connect to the adjacent Hydrogen Campus, including potential gas and water pipelines and grid connection cabling.

Strategic sustainable drainage provision (retention/detention ponds) provide capacity for 50% of site treatment and surface water attenuation – while providing blue-green infrastructure to support site biodiversity and amenity.

Single User Site

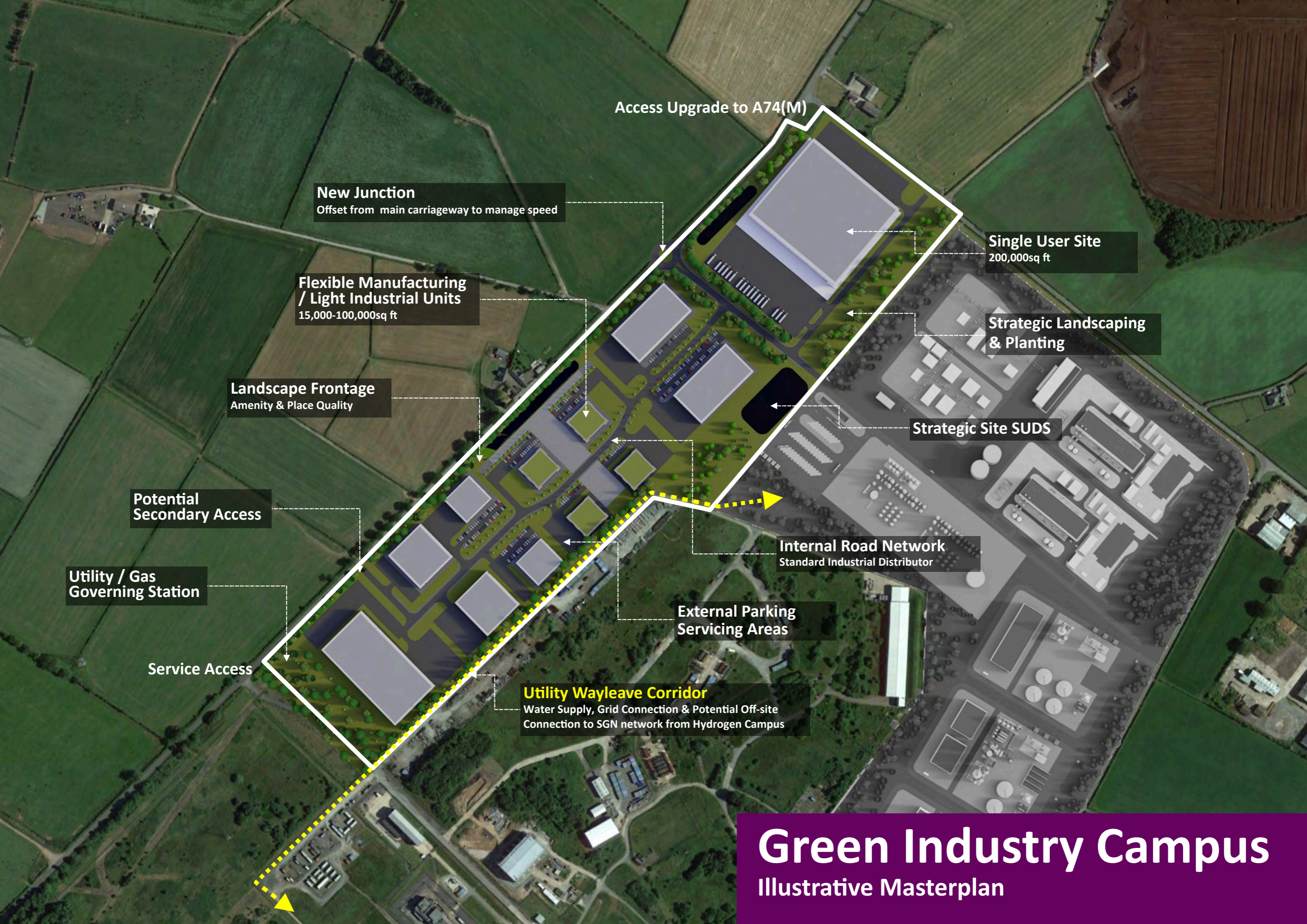
Within the Illustrative Masterplan, the largest development plot is situated at the northern edge of the site – on the corner of the B722 and the local Creca Road. It provides potential for a discrete site of 5+ha which could be operated and accessed independently from the wider Green Industry Campus. It is situated at a key entrance point to Chapelcross from the A74(M) corridor, and with greater land area provides stronger marketability and ability to respond to demand for larger-scale industrial uses which may seek a ‘single-user’ site. Subject to demand and future requirements, the plot could be sub-divided, or amalgamated into the Hydrogen Campus, but at this stage is ‘safeguarded’ to preserve flexibility and scope to attract a wide range of users.



While subject to future need and evolving market opportunities across the Green Economy - primary areas of potential demand for the Green Industry Campus are identified as:

- Advance Manufacturing to support energy sector– across the full range of materials, components and plant / equipment involved in generation, distribution, and use of renewable energy. This could include manufacturing and fabrication / assembly services for grid infrastructure (pylons, insulators), hydrogen (electrolysers, compression & purification equipment, pipelines), solar energy components, and circular economy (re)manufacturing.
- Wider energy sector supply chain seeking to co-locate and align operations within a strong Green Energy regional market. This could include supply-chain facilities around construction & deployment of renewable energy projects, operations & maintenance including remote monitoring technologies and applications, and secondary material / component supply services.
- Circular economy activity seeking to capitalise on the region’s strong potential for recycling, re-use, and re-deployment of renewable technology. Across Dumfries & Galloway and wider Borderland region there has been significant deployment of renewables for over 20 years – and there is now a fast-emerging market for decommissioning and recycling of components and high-value materials. This can include specialist and innovative recycling of blades with treatment of carbon fibres and resins, and solar PV panels involving silicon, glass, aluminium and other precious metals.

The Green Industry Campus at Chapelcross is ideally placed to support the establishment of circular processes for the renewables sector, most acutely for on-shore wind where significant level of infrastructure and plant is nearing the end of its operational life. Across Scotland there are up to 5,500 operational turbines which will require future decommissioning – a significant opportunity for recycling of material assets to grow the circular economy particularly as re-powering gathers pace. In the short-medium term, there are 735 wind turbines which have been operational since 2010 or earlier within the Central Belt and South of Scotland alone and will likely require decommissioning this decade. Key renewables operators as are committed to 100% wind turbine blade recycling by 2030 and zero waste to landfill by 2030, subject to the existence of a commercially feasible solutions.



Access Upgrade to A74(M)

New Junction
Offset from main carriageway to manage speed

Flexible Manufacturing / Light Industrial Units
15,000-100,000sq ft

Landscape Frontage
Amenity & Place Quality

Potential Secondary Access

Utility / Gas Governing Station

Service Access

Utility Wayleave Corridor
Water Supply, Grid Connection & Potential Off-site Connection to SGN network from Hydrogen Campus

External Parking Servicing Areas

Internal Road Network
Standard Industrial Distributor

Strategic Site SUDS

Single User Site
200,000sq ft

Strategic Landscaping & Planting

Green Industry Campus

Illustrative Masterplan



Enterprise Campus

The Enterprise Campus will provide early delivery of flexible commercial and industrial units – suitable for a wide range of business activity seeking to locate at Chapelcross. It will provide serviced development plots capable of accommodating different unit sizes, configurations, and operations across Energy Transition and wider industrial sectors and supply chains. The Campus has the capacity to appeal to and accommodate both SME / entrepreneurial activity, as well as established businesses looking to expand and grow their presence at Chapelcross.

The Enterprise Campus will be delivered by SOSE as key early phase investment at Chapelcross – providing new capacity at the site that will be complementary to later delivery and growth of the Hydrogen Campus and Green Industrial Campus.

The site was acquired by South of Scotland Enterprise (SOSE) in November 2023 -and they are advancing enabling works and development support to secure investment in the site. It forms part of SOSE’s wider programme to create new opportunities for ambitious investment into growing sectors such as energy transition, as well as advancing innovation, raising the regional profile, and awakening entrepreneurial talent.

The site is currently allocated within the LDP for business & industrial use as part of the wider Chapelcross allocation – with recognised potential to support job creation, innovation, and growth of local and regional industrial capacity. It has the potential to deliver market-ready employment land in the short-term – bringing early development activity and investment momentum that would support realisation of the wider ‘Green Energy Hub’ proposition at Chapelcross.

- Enterprise Campus – Mixed Use SME Flexi-space**
- Ready and direct accessibility to public road network / service spine road
 - Open access / non-secure boundaries. Building perimeter/external space security
 - Plot offering variable scale 0.2-1.0ha
 - Standard Industrial Utilities and strategic site SUD’s
 - Capacity to meet Planning/Building Standards/ Fire – Regulatory Requirements/ etc
 - Levels of frontage /amenity defined by landscape framework

Enterprise Campus

The Enterprise Campus comprises 7ha of long-term vacant brownfield land, situated opposite the current entrance to the Former Nuclear Power Station at the south-eastern edge of the site. Historically it formed part of the Chapelcross airfield – with part of the runway crossing the site and still visible today. The site benefits from few development constraints and has potential for a range of configurations within its area - it is rectangular broadly flat with no significant level changes. The primary point of access is from the local road (C43a) passing the site at its north-western boundary.

Development of the site would equate to around a 5-year employment land supply requirement for the Annan sub-region (Annual Take-up circa 1-1.5ha/annum).

Layout & Buildings

Complementing the larger industrial capacity within the Green Industry Campus, the Illustrative Masterplan provides a flexible mix of serviced plots and industrial and supply-chain units configured for smaller businesses seeking to locate at Chapelcross. Buildings range from c. 2,300 sqm to c. 900 sqm, with potential for a small number of micro units / workshops of 278 sqm. Typical heights of 9-13m are provided- suitable for modern light industrial and supply-chain activities within flexible single-storey units.

In total, the Illustrative Masterplan demonstrates potential for 16,000+ sqm flexible industrial & business development in the Enterprise Campus. The scale, layout and configuration of buildings is flexible with potential for plots to be combined if required to meet early demand and market need for larger units.

The Illustrative Masterplan provides regular, divisible plots well suited to a range of user requirements. Standard plot ratios provide a balance between buildings, flexible external space for servicing, parking and storage, and landscaping / boundary treatments. This is configured around a new central spine road (detailed below) to define a common street frontage with clear natural surveillance and opportunities for landscape planting and placemaking features to create a high amenity business park environment.



Access & Infrastructure

The Enterprise Campus is principally accessed from the rural distributor road (C43a) at its north-western boundary – though there is also alternative secondary access from the south. The Illustrative Masterplan proposes a primary site access at the centre of the Site's north-western boundary – providing a bellmouth junction leading to a 'spine' road within the site. The spine road is straight and through the centre of the site - minimising cost risk / complexity, providing a single shared access to all plots, and allowing for phased delivery if required. It is anticipated the road would be designed to 7.3m DMRB Standard – suitable for Heavy-Goods Vehicles (HGV) and servicing of a range of industrial / logistics users.

Common services and utility networks (power / water / drainage / digital) are embedded within the spine road verges – forming a core infrastructure corridor for the site around which flexible development plots can be configured. Power will be by means of an 11kV network with sub-stations with potential for private wire systems for larger users (Solar PV) together with a water distribution and fibre digital network.

The Illustrative Masterplan identifies areas for the provision of SUDS infrastructure, at the northern extents of the site (reflecting site topography). SUDS basins will attenuate and treat water prior to discharge to the Gullielands Burn, which is in part culverted beneath Nuclear Power Station. SUDS infrastructure will incorporate new blue-green landscape features and where appropriate new native species planting – adding to local biodiversity and overall place quality / site amenity.





Flexible Enterprise & Commercial Units
10,000-25,000 sq ft units

Internal Road Network
Standard Industrial Distributor

External Servicing & Parking

On-Site Landscaping
Enhancing Amenity & Place Quality

Existing Woodland

Proposed Solar & BESS Development

Strategic Site SUDS

Retained Access

New Site Access

Enterprise Campus

Illustrative Masterplan



Energy Campus

The Energy Campus is not an area of current development masterplanning but provides opportunity for longer-term investment seeking to retain and renew capacity for energy sector activity. This will include nuclear decommissioning, solar, BESS, potential future opportunities around nuclear supply-chain and energy-sector circular economy. Nuclear decommissioning is a long-term committed activity and other opportunities may exist if policy, technology and investment changes support wider nuclear activity (fusion/ SMR's/ manufacture/ decommissioning)..

The Energy Campus at Chapelcross relates to residual areas of the site within Nuclear Decommissioning Authority ownership – separate from planned Hydrogen, Green Industrial and Enterprise Campuses. It is included as part of the Development Framework to ensure a coordinated approach to development across the site as a whole and to support the key objective of the CX Programme to maintain beneficial use of the site over the full decommissioning period (to 2095).

At present, land within the Energy Campus comprises c. 90ha and includes:

- Areas of former Nuclear Power Station including former reactor buildings and the site of former cooling towers
- CXPP facility formerly used for the processing of Tritium
- Buildings, warehouses and waste storage / handling facilities associated with ongoing nuclear decommissioning activity
- NRS site offices and staff facilities
- Site internal roads and accesses, including parking areas.
- 132/33kv Substation and associated power infrastructure including cabling and overhead lines (operated by SP Transmission)
- Large areas of open acid grassland and mixed scrub

Energy Campus – Future Energy Sector Uses including Nuclear/Solar

- Restricted Access (Licensed Nuclear Decommissioning Zone)
- Uses compatible with NDA Licensed Area
- Secure site controls / boundaries / asset Integrity (CIA- LPS 1175 Standard)
- Variable plot/platform undetermined. Larger scale and capacity for buffers
- Grid Supply Point connection (132kv GSP)
- Standard industrial utilities and strategic site SUD's
- Capacity to meet Planning/Building Standards/ Fire – Regulatory Requirements/ etc

Energy Campus - Long-Term Opportunities

The Development Framework does not propose immediate development or investment activity within the Energy Campus. It is recognised that significant areas will remain linked to decommissioning and supporting NRS operations— and that any future development proposals will be dependent on land release and de-licensing in close coordination with those activities.

Over a medium to longer-term horizon as decommissioning advances – opportunities may emerge on areas of land surplus to requirement and which can support the wider function of a ‘Green Energy Hub’ at Chapelcross. The legacy of the former Nuclear Power Station provides existing energy infrastructure (sub-station) and land areas with opportunities for new green energy production, storage, and distribution, as well as flexible industrial / commercial facilities linked to the green energy sector.

Land areas available and specific development opportunities will be subject to the programme and requirements of decommissioning activity, but could include:

- Solar Power – proposals are already emerging for a 12MW array on surplus land at the west of the Nuclear Licenced Site to provide direct renewable supply to NRS’s on-site activity. This is in addition to proposed solar arrays beyond the site at Jockstown (38MW) and on land to the south and east (150MW). Further opportunities may arise for solar power within the Energy Campus connected to on-site grid infrastructure and/or directly connected to Hydrogen and Green Industry Campuses.
- BESS – owing to the presence of on-site grid infrastructure battery storage at a range of scales could form part of a future Energy Campus mix. Proposals are emerging for a 150MW BESS development (linked to solar) on former NDA owned land to the south of the site.
- Future nuclear supply-chain activity – which could include a wide range of activities dependent on future nuclear energy policies and needs. The UK Government has set an ambition to develop up to 24GW of nuclear power by 2050 through a mix of GW-scale projects and Small / Advanced Modular Reactors. Given existing Nuclear Licencing and available land – Chapelcross is potentially well placed to service range of supply chain needs that may emerge from new nuclear applications and technologies. This could include manufacturing, fabrication, and component assembly, and/or wider innovation-led and demonstrator projects as part of a renewed nuclear eco-system – though in all cases would be subject to future policy around nuclear energy at UK and Scottish Government levels.
- Future Grid Infrastructure – Long-term future planning for the grid transmission network (HND Beyond 2030) identifies a potential new high-voltage circuit routing from south-west Scotland to north-west England (WCN2). It remains a ‘low maturity’ option at Scoping stage – but potential routing would be via the Chapelcross area and could be linked to upgrade and renewal of on-site grid infrastructure.
- Expansion Areas – subject to development of Green Industry and Hydrogen Campuses and as requirements evolve— currently Licenced Land areas could form future expansion for these uses and support their growth over the medium-longer term.

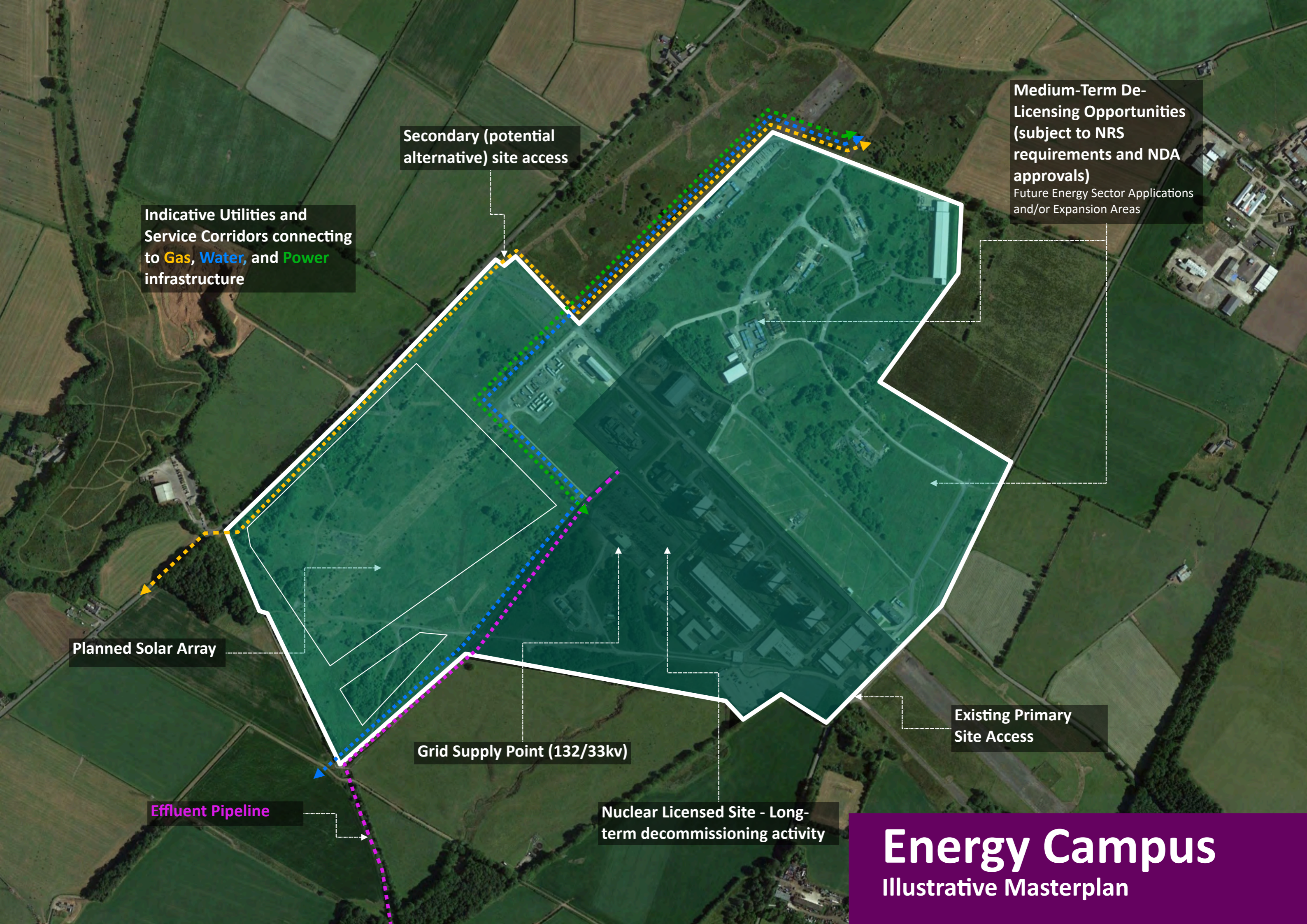
Infrastructure

There is significant pre-existing infrastructure and utilities within the Energy Campus. This includes overhead circuits and cabling linked to the substation as well as utilities associated with the former Nuclear Power Station, particularly the effluent pipeline running from the site to the Solway Firth. Future development of the Chapelcross Energy Hub will necessarily involve new utility and service connections within the Campus to link grid, water, gas, digital and other infrastructures to other areas of the site. Indicative corridors for utility provision within the Energy Campus are noted – and would be further developed in response to development needs and in coordination and joint planning with NRS as site operator and utility providers.

Future Planning & Development

The Development Framework supports long-term and gradual transition of the Energy Campus to support a range of potential future energy applications and uses. Given the time horizons and dependencies with nuclear decommissioning activity – Illustrative Masterplans aren’t proposed for the Energy Campus, but key development and placemaking principles that should form the basis for future planning would include:

- At all times coordinating development activity with NRS and NDA to ensure compatibility with planned decommissioning activity and their site operational requirements.
- Short-medium term focus on energy, generation, storage and distribution activity – capable of being co-located within Nuclear Licenced Site. Longer-term diversification and/or incorporation of nuclear-based activity will be subject to future policy and sectoral need.
- Protection of existing utility & service infrastructures (including Grid Supply Point / Overhead Lines) and safeguarding potential for their future renewal or upgrade.
- Seeking to align utility provision within common corridors and routing that minimise disruption and constraint to development opportunities. This will include connections to on-site and off-site infrastructure (gas / water / digital) required to service other Campuses and ensure sustainable management of surface water.
- Considering potential for alternative site accesses as necessary to service land uses within the Energy Campus from the B722.
- Landscape management in line with currently adopted NRS Environmental Management Plan – integrating and extending mitigation measures currently in place through decommissioning to address potential impacts. Integrating site wide landscape and environmental infrastructure to ensure habitat connectivity and a cohesive landscape framework as development emerges across the wider site.



Indicative Utilities and Service Corridors connecting to Gas, Water, and Power infrastructure

Secondary (potential alternative) site access

Medium-Term De-licensing Opportunities (subject to NRS requirements and NDA approvals)
Future Energy Sector Applications and/or Expansion Areas

Planned Solar Array

Grid Supply Point (132/33kv)

Effluent Pipeline

Nuclear Licensed Site - Long-term decommissioning activity

Existing Primary Site Access

Energy Campus

Illustrative Masterplan

6.0 Delivering the Framework

Delivering Objectives

The Chapelcross Development Framework has been developed as an enabling tool to support the site development. The Phasing Plan sets out a route-map and a robust forward planning framework to support the successful execution of the development addressing both short-term and long-term objectives.

The Phasing Strategy objectives are as follows:

- Create a market -ready investment location
- Accelerate future investor programming
- Reduce third party agreement risks/programmes (utilities/infrastructure networks)
- Facilitate early investment through public sector infrastructure – Infrastructure First
- Establish a flexible site plot framework and mitigate consent and approvals risks
- Establish a momentum for site investment and development

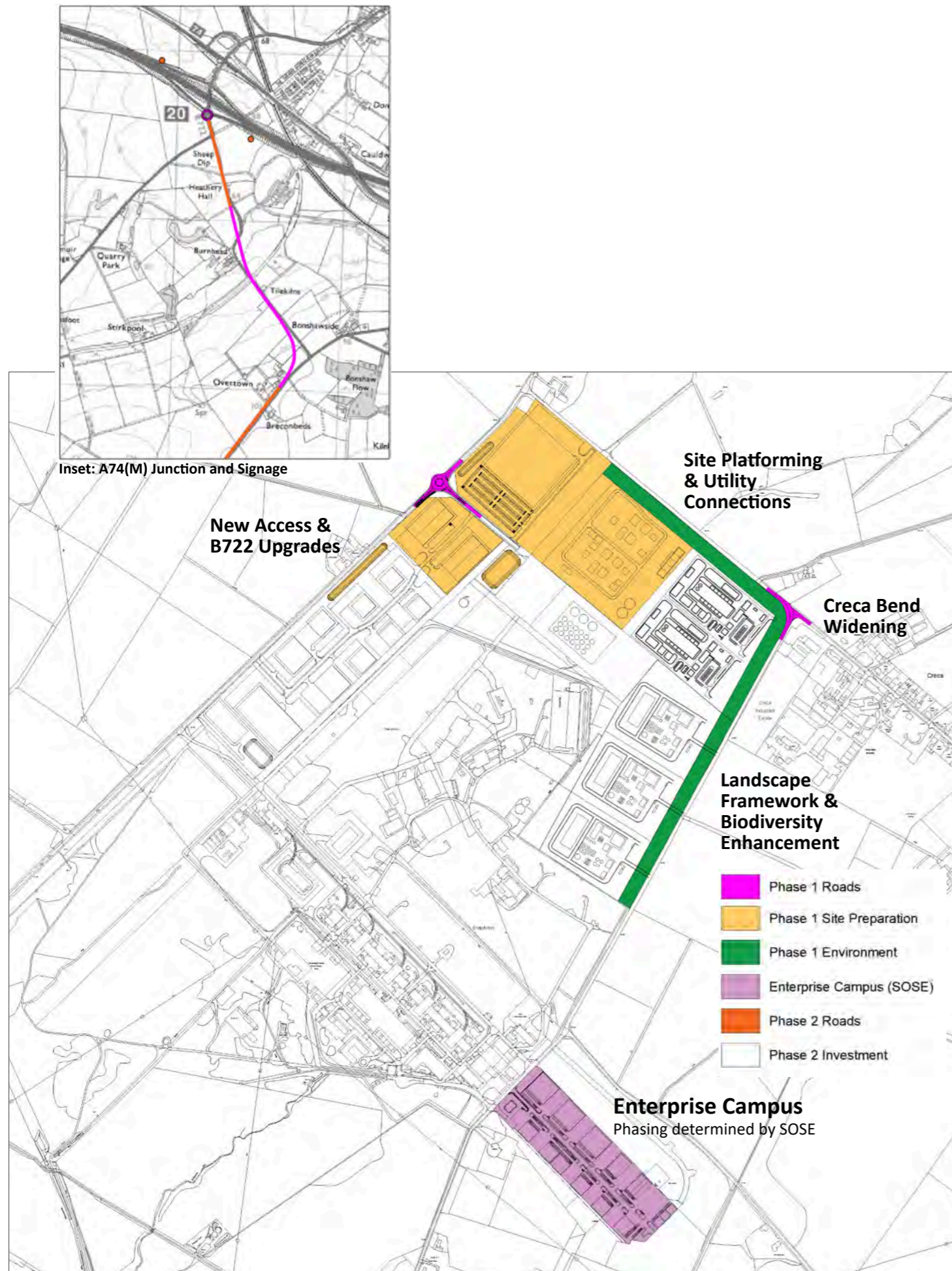
The Phasing Strategy supports the long-term masterplan ambitious and objectives in:

- Protecting site development flexibility for future investment and capacity to meet a wide range of investor needs across scale of site, development plots, and infrastructure.
- Delivering a core landscape framework across the site and creating essential infrastructure connections in terms of access, utilities, drainage, and digital connectivity.

Chapelcross is a large strategic site. Phasing is seeking to prioritise key components and define those components that can offer added value if programmed within early phases based on investor requirements, market demand, Outline Business Case and financial planning. Framing the early phase investment within a logical sequence of activity supports the objectives and ensures efficient use of resources and minimal disruption between infrastructure provision and investor construction programming.

The Phasing Programme over-riding goal is to ensure Chapelcross can offer ‘market readiness’. The Development Framework and its adoption as Supplementary Guidance shows intent but not readiness. Investment in infrastructure and site platforming will create sites for with the potential for accelerated investment and low development programme risk reflecting investor requirements.

In the context of a fast-changing energy sector it may be appropriate for the Development Framework and infrastructure planning therein to be periodically revisited to ensure phasing and delivery remains aligned to market need. This can include a framework of Monitoring & Evaluation led through the CX Programme.



Development Framework Phasing Plan

Reviewing Phasing Options

The Chapelcross Programme SOBC outlines potential areas of enabling investment at Chapelcross and provides an indication of phasing priorities. The Development Framework seeks to provide further detail on the scope of infrastructure and site preparation and defines delivery objectives (see above).

Options for phasing have been identified as:

CX Phasing – Option 1	
Infrastructure First: Initial Phase focus on transport connectivity	
Benefits <ul style="list-style-type: none"> • Secures Upgraded strategic A74(M) B722 route • Secures early spend on infrastructure 	Disbenefits <ul style="list-style-type: none"> • Limited benefit to site market readiness • Unlikely to accelerate investment • Commits high % of capital to road • Limited marketing value
CX Phasing – Option 2 (Recommended)	
Infrastructure First: Initial focus combination of On-Site & Off-site Infrastructure	
Benefits <ul style="list-style-type: none"> • Create market ready proposition • Likely to accelerate investment • Balances spend across infrastructures • Create momentum for marketing • Address ‘key challenges’ of access/site • Reduces investor risk 	Disbenefits <ul style="list-style-type: none"> • Commits investment to SOBC proposition & illustrative masterplan • Potential for investment ahead of need
CX Phasing – Option 3	
Advance all Consents/Approvals & Align infrastructure spend with Initial Investor support	
Benefits <ul style="list-style-type: none"> • No advance spend ahead of committed investment • Secures all approvals including infrastructure design / contract ready • Some investor risk reduction 	Disbenefits <ul style="list-style-type: none"> • No spend on committed Borderlands Programme funding • No market -ready proposition to offer investors / project momentum • No CX competitive advantage over alternative sites

In terms of the delivery objectives and maximising leverage and momentum for the project the Development Framework would recommend the development of Option 2 with key funders / partners as best delivering on the SOBC and Development Framework objectives.

Project Phasing

The Phasing Plan is strategic and can be adjusted to reflect market responses to marketing and site promotion and financial resource availability and drawdown programmes.

The development framework is configured to create a plan with ready capacity to adjust and amend plot configurations and service network needs to address the needs of future investors.

Separate from phasing strategy in relation to the NDA landholding (set out below), SOSE are actively planning enabling and development works on the Enterprise Campus. Development of the Enterprise Campus will be delivered as an early action and independent of wider site infrastructure and enabling works. It will provide advance units to boost industrial capacity at Chapelcross and catalyse further development within Hydrogen, Green Industrial and Energy Campuses as part of later phases.

Phase 1 Infrastructure	Phase 2 Infrastructure + Developments	Phase 3 Development
<ul style="list-style-type: none"> • Road Network Improvements • Signage • Chapelcross Site /B722 Junction • Site Platforming (Entrance Sites) • Utility/Service Networks • SUDs/ Surface Water Drainage • Landscape Framework 	<ul style="list-style-type: none"> • B722 Upgrade • Signage • Internal Roads (phased) • Site Platforming • Developer Utilities/Services • SUDs/ Surface Water Drainage • Landscape Framework 	<ul style="list-style-type: none"> • Further Site Access Improvements • Signage • Internal Roads (phased) • Site Platforming • Developer Utilities/Services • Developer SUDs • Landscape Management

Phasing also involves timeously address the Next Steps in the technical delivery of Chapelcross and working with key partners, wider agencies and statutory utility providers to ensure the further technical assessments are advanced in a logical and sequential process. It is anticipated that this may include:

Post Development Framework Activities

- Development of a Site Investor Pack and Prospectus
- Adoption of Development Framework (Masterplan Consent Area or Supplementary Guidance)
- Establishment CX Brand / Logo / Naming / Website
- Presentation of Development Framework to key bodies/agencies/partners
- Presentation of Development Framework to local groups / stakeholders
- Initial/Additional Technical Studies / Validation (SI-GI/PDE/DIA/WIA/TA/etc)
- Complete Environmental Impact Assessment for Masterplan incl. NZ-Carbon Modelling
- Develop Project Risk Register with key partners /agencies
- Completion of Outline Business Case and Updated Economic Impact Assessment /BCR
- Completion of Phasing Strategy aligned to OBC / Spend Profile
- Establish Governance Framework

Infrastructure & Site Development Design Development Stage 1

- Establish Chapelcross Programme Strategy and Defined Work Packages
- Programme Procurement of Project Management Services (In-house/Out-sourced)
- Procurement of Development Support – Initial Planning & Design Team (In-house/Out-sourced)
- Advance Phase 1: Infrastructure & Site Design to ACE Stage 3
- Identify Planning/Consenting Strategy & Requirements (PD/PPiP/etc)
- Develop Construction & Environment Management Plan

Phase 1 Infrastructure Package

Based on the Development Framework and adopting an ‘Infrastructure First’ approach, a package of ‘Phase 1’ advance works have been identified. As shown on the indicative Phasing Plan these comprise road network improvements and advance delivery of site utilities and environmental infrastructures. In combination the proposed package of works focus investment on a combination of on-site and off-site works to optimise site readiness and future delivery.

The Phase 1 Infrastructure Package has been subject to preliminary Cost Review to provide order of magnitude costings and ensure alignment with available funding streams from Dumfries & Galloway Council and Borderlands Inclusive Growth Deal. Cost estimates are provided separately in a confidential appendix.

Project Partnerships & Delivery

To help deliver the vision and ambition for the region, the Chapelcross Programme partners will continue to work with core stakeholders including South of Scotland Enterprise, Scottish Development International, Dumfries and Galloway Council, Transport Scotland, Skills Development Scotland and other relevant agencies. The CX Programme is strongly aligned with the Borderlands Growth Deal Programme and both Scottish and UK Government policy delivery of a just transition to a decarbonised energy sector and economy.

Dumfries and Galloway Council will as the Planning Authority work collaboratively to ensure coordination across regional economic, social and environmental programmes, and support the alignment of interests to create a Green Energy Hub of long-term sustainable value.

Development Framework Adoption

Critical to phasing and timely delivery of market-ready sites will be securing a status for the Development Framework within the Development Plan. It is anticipated that, subject to further review by D&GC Planning Officers and referral to Committee, the Development Framework will be adopted as ‘Planning Guidance’ superseding the 2015 Development Framework. This would support site marketing and promotion and provide a common basis for further consultation and engagement through the planning process.

Whilst not part of the Development Plan, it would be a material consideration in the decision making process for future development proposals at Chapelcross.

The option of developing the Framework into a Masterplan Consent Area has been considered but considered premature at this stage and may not be suitable given the diverse and specialised range of end users that may emerge.

LDP3

D&GC are in the early stages of prepared a new Local Development Plan (LDP3). This will be prepared as a ‘new style’ LDP that is place-based and delivery focused, addressing requirements of National Planning Framework 4 (in which Chapelcross is a National Development) and Local Development Planning Guidance (2023).

The Development Framework will inform and support preparation of LDP3 – providing updated site objectives / priorities and a basis for renewed policy and site allocations that recognise the full potential of the Chapelcross site as a Green Energy Hub driving sustainable growth.

Future Planning Considerations

Future planning processes will be subject to eventual confirmed phasing, market need and emerging investor interest. This may involve Planning Permission in Principle for significant parts of the site, and/or a combination of applications for individual elements within the site and in the surrounding area. In all instances these should be developed in close consultation with D&GC as planning authority as well key stakeholders including NDA, NRS, SEPA, NatureScot, and local communities surrounding the site.

Initial phases of development are likely to be assessed and consented against the Local Development Plan comprising NPF4 and LDP2. However medium to longer-term development and future phases are likely to be brought forward in the context of future Development Plan(s), including LDP3. The Development Framework will remain a material consideration should be considered in the planning and development process to ensure coordinated delivery across the site.

Building from the Development Framework and Illustrative Masterplans therein, key development and placemaking considerations that should form the basis for further detailed planning of Campuses are set out below:

Land Use & Spatial Planning Considerations



- Adopting the broad principles within Illustrative Masterplans to define coherent and structured layout of Campuses with advance infrastructure and initial plots that open up the site and allow for advance marketing. Provide for flexible development plots that respond to market requirements and range of potential occupiers / sectors.
- Developing plot specific configurations with appropriate balance / ratio between flexible industrial buildings, external operational areas, parking and servicing for large-goods vehicles, and boundary treatments & landscape features.
- Prioritising employment generating land uses and activities with an energy transition sectoral focus – including commercial, manufacturing, supply-chain activities that contribute to establishment and long-term growth of the 'Green Energy Hub'. A mix of development units should be provided including for small-medium and innovation businesses as well as larger-scale industrial activity.
- Seeking to maintain and 'safeguard' potential single-user site at northern edge of the site – ensuring ability to appeal to development capacities / requirements of larger-scale industrial users and/or long-term flexibility and expansion.

Hydrogen

- Maximising where possible separation from sensitive receptors and with early consideration of relevant COMAH and Hazardous Substance Consent requirements associated with storage of hydrogen and/or other high hazard activity.
- Alongside hydrogen production and storage, seeking to incorporate test & demonstration facilities for new technologies and applications, and potential innovation & training functions that can support wider hydrogen and 'green economy' within Dumfries & Galloway.

Infrastructure & Accessibility Considerations:



- Establishing clear phasing of site infrastructure delivery in terms of site access and internal road network, utilities & services, and drainage – to create market-ready serviced plots across Campuses. This should include integration of the programming / phasing for off-site roads/access infrastructure with the delivery of the initial site plots.

Roads & Site Access

- Development of new road access to the site from the B722 (New Access Junction) as a dedicated site entry point. Secondary site access opportunities may be required elsewhere on B722 or from local Creca Road, with consideration of appropriate junction spacing, visibility, and tie-in to existing road.
- Development of internal road networks and plot servicing areas suitable for flexible industrial use in line with SCOTS Guidance and D&GC Roads Standards. Configuring plot accesses, layouts, and servicing areas with adequate space and appropriate depth to allow for turning and manoeuvring of large good vehicles within the site.
- For Hydrogen Campus in particular, specific consideration should be given to provision and management of internal 'secure site' boundaries with controlled access suitable for specialist chemical and industrial activity.
- Fully considering and assessing vehicle trips to/from the site (including commuters trips, HGV movements, and potential tube-trailer hydrogen distribution) relative to the capacity of the road network and planned upgrades, in close consultation with D&GC Roads.

Drainage & Ground Conditions

- Ensuring that development incorporates measures for treatment of surface water drainage and to minimise the risk of flooding – through combination of permeable surfaces, soakaways, and other SUDS features (supporting site-wide / strategic SUDS infrastructure).
- Detailed review of the potential for re-instatement of abstraction infrastructure from the River Annan through investment and renewal of pumping station and pipeline, in close consultation with SEPA, Scottish Water and local landowners.
- Targeted Site Investigations to identify and scope potential remediation requirements for land associated with former airfield and/or Nuclear Power Station.

Utilities & Services

- Safeguarding of utility / service wayleaves and corridors to connect Campuses to wider on-site and off-site infrastructures including Grid Supply Point, SGN Gas Network, and private and/or municipal water supplies.
- Ensuring appropriate stand-off / exclusion to high-voltage overhead cables crossing the site and the scope of service diversion of the existing 11kv power line crossing the east of the site – to be agreed with SP Distribution.
- Incorporation of stand-off distances and exclusion zones to site boundaries with Licensed areas of the NDA site – providing appropriate controls over hazard management, health & safety and operational flexibility.

Placemaking & Environment Considerations:



Design

- Providing industrial buildings of high quality design, incorporating sustainable and durable cladding, materials and detailing. Measures to minimise resource use and total energy demand through passive and active measures should be incorporated within design.
- Focusing design and architectural detailing to key building frontages and points of entry, fenestration and signage, along with simple, clean cladding and building materials. Building design should contribute to place quality and support development of a high amenity business & industrial location.
- Incorporation of public realm and placemaking features within the Campus where possible to complement buildings and core infrastructures as they are developed – including paths and access, signage, cycle provision, and landscape planting. Placemaking can create a strong investment environment, through attractive and high amenity location with defined character and appeal.
- Ensuring that where possible buildings provide ground floor activity to site frontages and public realm, enclose external service spaces, and are compatible with the principles of ‘Secured by Design’ for commercial developments.
- Developing bespoke ‘Green Energy Hub’ signage – linked to core infrastructure and with defined guidance / framework for plot development that creates common style and identity across the site. Incorporating wayfinding & site entrances as well as building signage to elevations.
- Further design development and site configuration should include consideration of landscape & visual impacts in the context of the existing site and forthcoming solar development. This should inform approach to height, massing and building form as well as configuration of external plant or storage equipment.

Green & Blue Infrastructure

Further development of landscape and environmental infrastructure to include:

- Landscape buffers to internal and external site boundaries with native tree, hedgerow and other mixed planting contributing to the landscape character of the area, and with special consideration for nearby residential receptors.
- Utilising SUDS and blue-green infrastructure as part of site landscape framework to provide an attractive setting, contribute to biodiversity, and break-up areas of parking and built development.
- Incorporate landscape features within development plots, servicing areas, and common areas to create high amenity Campus development.
- Exploring opportunities to integrate and support local habitats and biodiversity features as part of site landscaping and built development – contributing to overall enhancement of biodiversity across the Chapelcross site. This may include green roofs, bird / bat boxes, and (re)integration of existing native species as part of grassland or woodland planting. Roof areas may also be suitable for rainwater capture / grey water recycling, and/or solar panels.
- Exploring measures to re-align and ‘daylight’ the culverted Gullielands Burn – with appropriate separation from development and management to support new wetland / burn habitats within the site.

Hydrogen

- If undertaking abstraction from the River Annan, explore opportunities to support enhancement of riparian ecology and habitats around the Milnbie Weir, through fish ladders / pass and other measures, in consultation with SEPA and local interest groups.
- Incorporating Best Available Techniques to minimise and mitigate emissions to air, surface and ground waters, and noise / odour impacts. Close regard should be had to emerging SEPA guidance around Green Hydrogen production and methods of environmental control.

Planning Assessment & EIA

Subject to the eventual nature of future planning applications, it is anticipated that development at Chapelcross will require comprehensive Environmental Impact Assessment. This will include assessment of full suite of environmental topics, assessing potential for environmental effects in line with EIA Regulations (2017) and where appropriate identifying necessary mitigation and compensatory measures to be provided. A level of baseline and technical appraisal / assessments have informed the masterplan process and would continue to be built upon and extended as part of the full statutory Environmental Impact Assessment. Based on the broad scale and mix of land use identified in the Development Framework it is anticipated the EIA would be required to cover the following topics:

- Planning Policy
- Population & Human Health
- Ecology, Nature Conservation & Bio-diversity
- Geology, Soils & Contaminated Land
- Water Environment, Drainage & Flood Risk
- Greenhouse Gas Emissions
- Air Quality / Odour Assessment
- Air Quality
- Noise Environment
- Landscape & Visual
- Cultural Heritage
- Traffic, Transport, Movement
- Cumulative Impacts
- Disruption Due to Construction
- Other

In addition to Environmental Impact Assessment, further assessments and studies will be required to support future application. The final list and scope of planning deliverables would be agreed with D&GC through further pre-application engagement and with regard to the nature of proposed development, but could be anticipated to include:

- Planning Supporting Statement
- Transport Assessment
- Tree Survey
- Ground (SI) Conditions Report
- Air Quality Assessment
- Noise Impact Assessment
- Flood Risk Assessment
- Drainage Assessment
- Ecological Surveys (incl. Habitats and Protected Species)
- Landscape & Biodiversity Net Gain Proposals
- Construction Environmental Management Plan

National and major developments (or those requiring EIA) may likely to require a Health Impact Assessment to consider potential for impacts on wider determinants of health such as poverty & inequality, physical exercise, safety, and greenspace.

Separate from the planning consenting requirements, a CAR License will be required for the proposed re-alignment and potential daylighting of sections of the Gullielands Burn. This will be developed in close consultation with SEPA and will require further detailed modelling, and design development of the burn channel and connections to ensure works are compliant. PPC Permits will also be required for hydrogen production and potentially for other industrial activities depending on the scale and nature of environmental emissions.

Chapelcross Masterplan Framework

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