Environmental Statement

Carbon Plantations Ltd. J S Young.

NON TECHNICAL SUMMARY

Project Purpose

The Carbon Plantations Ltd (CPL) proposed project will establish 22.24 hectares of new woodland on the J S Young site to the west of Hockwold Cum Wilton, within the administrative boundary of Kings Lynn and West Norfolk District Council. The project will consist of plantations of a fast-growing non-native hardwood tree alongside new native woodland creation. The plantation tree will produce hardwood for the massively undersupplied UK hardwood market and sequester large quantities of carbon, contributing to the fight against climate change. The native woodland and associated open areas will deliver a significant biodiversity gain as well as increasing habitat connectivity and the quality of existing woodland features. The project will deliver a managed woodland project that secures an income stream through the sale of hardwood and carbon sequestered. The project displaces intensive agricultural cropping. The basis upon which this land use change is possible is entirely down to the economics of return that the project can generate for landowners. This is only possible as a result of the quantity of hardwood timber and carbon sequestered by Phoenix One. No other tree has, to date, been identified that can deliver to this level.

The non-native tree is Paulownia Phoenix One (a hybrid of *fortunei* and *elongata*), of which over 440 ha has been planted in the East of England under consents granted, in 2021, to CPL under the Environmental Impact Assessment (Forestry) regulations 1999. These project sites are in place and managed subject to the conditions within the Statement of Reasons for consent. It is also grown at scale in some European countries (Spain, Italy, Germany). The UK Forestry Commission (FC) Environmental Impact Assessment (EIA) screening process and associated opinion advised that the project required consent based on its nature and size. This requires the production of an Environmental Statement (ES).

The project will establish woodland on agricultural land. To conform to the UK Forestry Standard (the UK governments' approach to sustainable forestry) this mix will consist of 74.99% Phoenix One, 14.25% native broadleaf woodland, 0.75% other conifer (Scots Pine) and 10.01% open areas. The native woodland will remain as a permanent feature. The open areas, Phoenix One understory, hedgerow boundaries and buffers will be managed to maximise biodiversity gain and this gain will be monitored. The Phoenix One will be grown as a plantation. It is established in year one and up to 10 years growth harvested in cycles. It then grows back from the root ball similar to a coppice. The intention will be to sell the wood into the UK hardwood timber market and used for construction, furniture, veneers, storage boxes and surf boards amongst other uses. It is light weight and structurally strong.

Management in the plantations includes pruning, targeted fertiliser placement and provision of water by drip irrigation in some years and harvesting. There will be a rigorous monitoring programme in place, as to be set out within the conditions of consent. Plantations have a life cycle of

up to 85 years with the potential to remove after the 35 year lease period with the landowners finishes.

The project has successfully passed through the Forestry Commission Woodland Creation Planning Grant (WCPG) stage 1 and 2. It is also UK Forestry Standard (UKFS) compliant. The project is registered with the Woodland Carbon Code (WCC) and has secured UK Government Woodland Carbon Guarantee contacts to purchase carbon units produced.

Potential impacts

Through the process of the WCPG stage 2 some potential impacts were identified, this included thorough stakeholder consultation as per Forestry Commission guidance. Many potential issues were addressed or mitigated as part of that process resulting in UKFS compliance.

A scoping meeting was then convened with an agreed list of organisations and public bodies (many of whom had already been consulted with prior to this requirement). This resulted in an issues log Annex 6.a "Scoping Meeting Issues Log" that would be considered as part of process.

There are 9 potential impacts that have been identified as a result of the WCPG stage 2 and scoping meeting processes. These have all been addressed within this ES.

- The invasiveness potential of Phoenix One to include competition with native flora and associated ecosystem change, Cost of control measures and the potential for introducing and hosting alien pathogens.
- Water reserves depletion affecting ground water and drinking water supplies.
- Landscape character change.
- Biodiversity changes on project sites and in the wider area.
- Degradation of soil carbon in peat soils.
- Damage to archaeological sites.
- Local residents' quality of life change.
- Carbon sequestration increases.
- Hardwood production increases.

Summary of impacts both positive and negative

There are 2 impacts identified that could have negative outcomes: invasiveness and landscape change. These have both the subject of mitigation of impact and their potential likelihood.

The potential of invasiveness could be a considerable impact, however the likelihood of this impact is very low. There is no evidence, to date, of invasiveness of this clone in any plantations under management, however the planned monitoring and control measures are rigorous. CPL accept that the precautionary principle approach (the unknown unknowns) remains. Alongside Forestry Research and the Forestry Commission, a mitigation, monitoring and control programme has been developed to counter any potential future eventuality, this captured with the conditions of consent. An ongoing Risk Assessment process reporting to the Forestry Commission and informing the NNSS (Non-Native Species Secretariat) will evaluate this plantation alongside those already given consent.

The impact of landscape change has been assessed through landscape analysis work and consultation with Norfolk County Council and Forestry Commission Landscape Advisors, concluding that landscape change will not affect overall landscape character. There may be local landscape impacts, these have been mitigated as much as possible through project design, however some remain but are considered localised and of low overall impact.

The impact on water (irrigation and water balance) and on local residents have been concluded as negligible. Natural England have also confirmed that the project site does not contain any fields with peat levels above the threshold of concern or where peat levels are capable of restoration.

The impacts on biodiversity have been assessed concluding there will be minimal impact on priority species and protected sites.

Carbon capture and UK hardwood supply have been concluded as all very positive. The project brings significant positive impacts across all these areas.

Overall CPL conclude that the positive impacts are significant and near certain. These outweigh the low likelihood of any potential negative impacts.

ENVIRONMENTAL STATEMENT

1 Introduction

1.1 Reasons assessment were called

The Carbon Plantations Ltd (CPL) proposed project will establish new woodland consisting of plantations of a fast-growing non-native hardwood tree alongside new native woodland creation as well as new open ground areas. The plantation tree will produce hardwood for the massively undersupplied UK hardwood market and also sequester large quantities of carbon, contributing to the fight against climate change. The native woodland and associated open areas will deliver a significant biodiversity gain as well as increasing habitat connectivity and the quality of existing woodland features.

The non-native tree, Paulownia Phoenix One (a hybrid of *fortunei* and *elongata*), which has already received consent for over 440 ha, in 2021, to CPL under the Environmental Impact Assessment (Forestry) regulations 1999. These project sites are in place and managed subject to the conditions within the statement of reasons for consent.

The non-native tree, Paulownia Phoenix One (a hybrid of *P.fortunei and P. elongata*), has been approved to be grown at scale in some European countries (Spain, Italy, Germany). It has not been subject to the traditional, but lengthy, 3 stage process for introduction of non-natives trees to the UK.

The opportunity this project represents requires the plantations to be planted in the short term. This would necessitate a change of land use and an assessment on the potential changes to local environments.

The Forestry Commission (FC) Environmental Impact Assessment (EIA) screening process and associated opinion advised that the project required consent based on its nature and size. This requires the production of this Environmental Statement (ES).

As advised by the FC, the project has followed a process of successfully completing Woodland Creation Planning Grants (WCPG) stage 1 and stage 2 and is now UK Forestry Standard (UKFS) compliant.

This **Environmental Impact Assessment (EIA) Environmental Statement** evidences the materials produced within WCPG stages1 & 2 as well as the outcomes from the EIA scoping meeting.

1.2 Scoping meeting conclusions

Scoping meetings were delivered on Wednesday 10 May 2023 and Friday 12th May 2023. Two meetings were held to accommodate Natural England participation. It included representatives from Natural England the Forestry Commission and CPL. All participants are documented in Annex 6. b "CPL EIA Scoping Meeting Agenda and Participating Organisations".

The scoping meeting minutes have been accepted by all participants as a true and representative record of the meeting and is shown in Annex 6.c "2023 Scoping meeting 1 & 2 - minutes and attendee list (Final)".

There we no additional scoping points identified in the first meeting to include or strengthen in the EIA statement.

In the second scoping meeting, and subsequent written follow up comments, Natural England raised the following points under biodiversity impacts:

- Screening for Habitat Regulation Assessment
- Potential Impact on priority bird species

The subjects of peat, archaeology, ground water and soils were not raised in the meeting. The archaeology survey work and peat assessment methodologies delivered within the WCPG2 process providing the evidence required to confirm no further action was required. The extensive information supplied as part of the WCPG2 process covered these and will be referenced within this statement.

It was proposed that responses to the above bullets would be strengthened through:

- Requesting that the RSPB supply any data available on breeding wader records on the site area and comment on potential wider impacts.
- Including all stone curlew records and RSPB comments in the EIA.
- Reconfirming the basis for Forestry Commission Ecologist opinion on breeding waders, Stone Curlew and Habitat Assessment status.
- Agreeing mitigating actions as part of the monitoring framework and or risk assessment and or risk log.

The minutes from the scoping meetings recorded that, despite many attempts to solicit additional responses or to engage with the scoping meeting, nobody attended the meetings from Norfolk County Council or the Environment agency.

1.3 Summary of potential impacts (positive and negative)

The main potential impacts of the project are defined within:

- The invasiveness potential of the non-native tree. Potential impacts identified from invasiveness include
    - Competition with native flora and associated ecosystem change.
    - Cost of control measures.
    - Introducing and hosting alien pathogens.
- Water reserves depletion affecting ground water and drinking water supplies.
- Landscape character change.
- Biodiversity changes on project sites and in the wider area.
- Degradation of soil carbon in peat soils.
- Damage to archaeological sites.
- Local residents' quality of life changes.
- Carbon sequestration increases.
- Hardwood production increases.

2 Site Description

2.1 Project location

This project site, on land under the ownership of J S Young Farms in West Norfolk, consists of a single block totalling 22.47 hectares and made up of 3 adjoining field, located to the west of Hockwold Cum Wilton and South of the Cut-Off Channel.

2.2 Location Map

The site is detailed in Annex 1.a "Site Context Map".

2.3 Site context

The site is relatively flat and made up of a black sand soil. Soil analysis are shown in Annex 2.a "Soil Survey Results".

The landscape type that the site sits in corresponds to The Peat Fen area within The Fens. The Geology of which can be described as glacial deposits on Jurassic and Cretaceous bedrock overlain by diverse deposits of sands, silts, clays and peat. The underlying geology is a combination of post-glacial alluvium and freshwater clays and post-Roman marine clays.

No evidence has been found to suggest that the proposed woodland planting will have any material effect on the appreciation of geology. The elevation is 10 m above sea level.

Annual rainfall is approximately 750 mm.

Despite scale, flat, open landscape with extensive vistas to level horizons, the aspect is not strongly characterised, partly due to the presence of vegetation on the edge of the character area.

The site sits within and is part of a landscape supporting the functional land cover of intensive agriculture where arable cropping predominates. Arable cropping typically includes wheat, barley, Sugar beet, maize, potatoes, onions. The project fields are currently managed as intensive temporary grassland and maize.

Fauna across the project site is characterised by a typical range of farmland birds.

There is a deer population across the project site comprising mainly of Roe & Muntjac with some Chinese Water Deer also present in the area.

The sites are land drained when in an arable rotation as per normal agricultural practice.

2.4 Land use

The entirety of the planted areas within the project will take place on arable fields which have a long history of intensive cropping of cereal and root crops requiring substantial annual soil disturbance, inorganic fertiliser, agrochemicals and fossil fuel burning to power required machinery.

2.5 Site designations

The following designations or priority habitats have been identified and appraised as part of the planning grant process with the Forestry Commission. Annex 2.i "JS Youngs Designations List".

There are no designated areas situated directly on or adjacent to the proposed project area, however the Breckland Special Protection Area (SPA) and Breckland Farmland Site of Special Scientific Interest (SSSI) are situated approximately 350 m to the north of the project site.

Other SSSIs in relative proximity of the proposed planting sites include:

- Stallode Wash, Lakenheath 3km to the south West
- Shippea Hill 6.5km to the south west.
- Pashford Poor's Fen, Lakenheath 5.0km to the south.
- Breckland Forest 5km to the east.

There are two County Wildlife Sites situated within the surrounding landscape:

- Poors Ground (289), situated approximately 755m to the west.
- The Cut-off Channel Hockwold (2188), situated approximately 677m to the west.

A small area of priority habitat Deciduous Woodland runs continuous to the project area, on the Sothern boundary.

2.6 New woodland creation category

The Forestry Commission "Low risk areas for woodland creation" maps https://www.forestergis.com/Apps/MapBrowser/ do not indicate these sites to be low-risk woodland creation areas because this category omits Agricultural Land Classifications of 3a and better.

2.7 Archaeology and the Historic Environment

The following features have been identified and appraised as part of the planning grant process with the Forestry Commission. Annex 5.a "NCC Archaeology Report - JS Young Farms".

Norfolk County Council Historic Environment Record (NCCHER) identified Hockwold Roman settlement (HER5316) - A large Roman rural settlement, excavated in the 1960s before the construction of the cut-off channel.

The site is in an area categorised as Enclosed Agriculture, typically Pre-Modern Form, something taken into account as part of the project design layout.

2.8 Landscape

The initial landscape analysis for the site is included in Annex 2.b "Landscape Analysis Work".

The project sits within an area characterised as an open landscape of systematically drained and enclosed fen, with linear tree belts and blocks of poplar which still exist within the landscape, most of which is employed for intensive combinable and root crop production.

The site falls within the local authorities Landscape Character Assessment (LCA) 9. Planned Fenlands.

The project area contains intersecting ditches/dykes, with no small in-field ponds or individual in-field trees. The Eastern field parcel adjoins a small strip of existing woodland.

The landscape is largely dominated by enclosure pattern, created from the network of ditches. Enclosure within the landscape has resulted in rectilinear field parcels and highly regular pattern of drainage ditches.

2.9 Water

There are no rivers or natural water bodies of scale within the project site areas. However, the river Little Ouse flows 1km to south of the proposed project area, in addition the Cut-off Channel, which flows northwards and intersects the River Wissey, is situated 250m to the North of the proposed site.

A Main Drain is located South of the proposed project area. This is controlled by the Internal Drainage Board (IDB).

The project area lies within the catchment of the South Level and Cut-Off Channel. The waterbody within this catchment is the Ely Ouse (South Level). The Ely Ouse has a 'moderate' ecological status and a 'fail' chemical status, with the overall waterbody classified as 'moderate' in 2019. The project area is underlain by the Cam & Ely Ouse Chalk groundwater body, indicated to have classifications of "poor" for both quantity and quality

The EA confirmed that the site in the south level fenland area and is not located on a primary aquifer. There are currently no surface water monitoring points for the area. The parcel is underlain by the Cam & Ely Ouse Chalk groundwater body, indicated to have classifications of "poor" for both quantity and quality.

There are no public or private drinking water supplies within 1km. However, there are two public water supply abstractions within a 7km radius.

2.10 Settlement and Local stakeholders

The area surrounding the planting sites is highly isolated with a very low population.

Local stakeholders have been identified and included in the consultation process.

3 Description of the proposals

3.1 Location

The location of project site is shown in Annex 1.a "Site context Map".

3.2 Area statement

The site planting design conforms to UKFS with the Paulownia One constituting (75%) of total areas and the remaining being split between native woodland (14.25%), Scots Pine (0.75%) and open areas (10%).

J S Youngs: (based on 5% Scots Pine on 100% of the native planting)

		Open Ground	***Native Planting***	***Other Non-native***	***Natural Regen***	***Paulownia***	***Total***
J S Youngs	(Ha)	2.25	3.2	0.17	0	16.85	**22.47**
	(%)	10.01	14.25	0.75	0	74.99	**100**

3.3 Purpose and ambition of the project

The overall purpose of the project is to deliver a managed woodland project that secures an income stream through sale of hardwood and carbon sequestered.

In delivering this project ambition objectives across key areas are detailed as the following:

Biodiversity:

- Maximise biodiversity net gain above the current base line being delivered through intensive agricultural practices.
- Increase the diversity of habitat within the local environment.
- Protect watercourses in close proximity to the project site.

Archaeology and the Historic Environment:

- Ensure the protection of known significant archaeological features through appropriate mitigation.

Landscape and visual:

- Minimise any visual impact of non-native tree species through effective project design.
- Mimic existing woodland species mixes to ensure the areas character profile is maintained and enhanced.
- Promote connectivity between woodlands where appropriate and possible to do so.

Water:

- Increase water use efficiency and sustainability above current practices.
- Reduce long-term water use below current rates associated with intensive agricultural practices.

Stakeholders:

- Encourage stakeholder engagement throughout the project design process.
- Minimise any negative impact by the project.

Timber:

- Maximise sustainable, consistent, and regular hard wood timber production from non-native tree species.

Carbon:

- Meet predicted carbon sequestration rates to generate income through the sale of carbon units.

3.4 Alternative site use

The alternative for the site is to remain in intensive agriculture, with irrigated cropping included in the rotation to utilise the opportunity of available water.

The project displaces intensive agricultural practices. The basis upon which this land use change is possible is entirely down to the economics of return that the project can generate for landowners. This is only possible as a result of the quantity of hardwood timber and carbon sequestered by Phoenix One. No other tree has, to date, been identified that can deliver to this level.

3.5 Project design

The design of the project has been informed by detailed Site Appraisal Plans. These have mapped on site features and surrounding features and landscapes. These are shown in Annex 1.b “Site Appraisal Plan”.

Design Concept Plans have been produced that accommodate existing features, use the opportunity of the native and open areas to buffer and enhance existing features and include operational feature such as wood loading areas and water hydrants. These are shown in Annex 1.c “Design Concept Plan”.

The final design plans for the project sites have been produced, building upon the initial Design Concept Plans, following incorporation of stakeholder and FC comments. These are shown in Annex 1.d "Final Woodland Creation Design Plan".

3.6 Project lifecycle

The overall programme will plant fast growing Hardwood trees alongside native trees and species rich open areas. A Carbon Mapping process will take place just prior to planting to act as a base for future calculations.

An optimum tree harvest cycle is anticipated every 9-10 years, however for the project to work, half of the plantation will be harvested after around year 5-6, effectively 'thinning' the woodlands in order that every subsequent 5 years optimum growth is achieved on half of the plantation cyclically. The Hardwood is essentially coppiced and regrows around 8 times before it exhausts itself and essentially fails after around 75-80 years. The management of the plantation would be classed as semi-intensive including some pruning, weed-suppression, irrigation, 2 to 3 fertiliser applications and up to 2 organic insecticide applications annually from May-September depending on the conditions. The Grass under sown will require some cutting too as well as other aspects of woodland management. All activities will be overseen and dictated to the contractor (or farmer) by CPL under direction from their technical partners and agronomist. CPL will work under contract with a UK based Agronomist with intimate knowledge of local soils to evaluate the plantations at various key stages throughout the year. In a harvest year, harvesting could begin anytime from November to March. Trees would be felled and stacked by the access gateway ready for collection after a period of 'air drying', usually lasting a few months. Standard Term Woodland Insurance covering public liability and woodland destruction by fire will also be in place for the duration of the project.

A grass mix (see "site preparation" below) is sown in the first Spring at the same time as the Trees are, or soon after tree planting, to attract insects and birdlife. Apart from some irrigation in the first 3 years to assist establishment and 2 to 3 fertiliser applications, the plantations are left alone to grow and just be monitored.

Phoenix One is a fast-growing non-native hybrid that delivers high wood and carbon sequestration yields. It is a deciduous hardwood that in 10 years of German trials has not produced flowers or pollen and is sterile. It grows from a root stock and is "coppiced" every 9-10 years. The tree will be grown in managed plantations, not dissimilar to poplars and will be secured within deer fencing.

The plantation cycle and associated landowner lease with CPL is for 35 years. After this period the trees could potentially be removed (subject to the regulatory requirements at the time), or the project lifecycle could be extended under landowner management conforming to the same regulatory requirements as under CPL management.

3.61 Site Preparation:

Detailed within Annex 3.a "Silviculture; Ground Preparation, Species Mix & Planting Design".

Ground preparation prior to planting will be assessed on a field-by-field basis with consideration of soil state and weather conditions. The below operational plan sets out the maximum extent of soil cultivations and has been planned with consideration of the UKFS aim around minimising short-term soil carbon loss whilst promoting early tree establishment and growth.

Prior to tree planting, a series of inspection pits will be dug across each block to assess the depth of plough pans and consequently the depth of any required sub soiling operations.

Detailed analysis work will then be undertaken to assess cation-exchange capacity, soil nutrients, soil carbon content in order to tailor site specific nutrient management and accompanying understory mixes.

Where necessary, a low disturbance sub-soiler and cultivation will be implemented shortly before planting. Sub-soiling to a depth no greater than that of routine cultivation operations associated with the sites former agricultural land use.

Much of the soil across this project has been degraded through years of modern agricultural production and has therefore lost integrity at depth, many of them creating a 'sedimented' layer rather than a true plough pan. The long-term ceasing of any cultivations as a consequence of the project will allow the soils to settle and re-generate, and this layer will not form and will be broken up as soils re-structure themselves. Paulownia is able to recover degraded soils through their long, dense root system avoiding erosion and the high nitrogen content of the leaf Annex 4.e "Portuguese Risk Analysis on the Introduction of Paulownia" Page 11.

3.62 Planting Technique & Tree Protection:

Notch planting method will be applied when planting the native element of the project, to provide effective soil root contact promoting root development. This efficient and speedy planting technique will allow the maximum number of whips to be planted in optimum conditions, encouraging a higher survival rate, and reducing replacement costs.

Native bare root stock will be planted when dormant, preferably in November to allow root establishment before the arrival of winter, making the tree more likely to survive any hot dry spells the following summer and reduce the impact of potential spring droughts.

Young Paulownia plants will be planted as plugs from June to August, this operation will be carried out by hand and involve planting individual plugs at set spacing in line with dripline irrigation runs. Irrigation will be used to wet the soil and assist planting where necessary. A combination of mulching and mulch mats will be used depending on location.

Where applicable trees will be planted offset from the rip lines, preventing the cracks created by subsoiling opening in dry weather and potentially exposing the roots.

Within this project, deer fencing will be erected around the perimeter of the entire planting block, protecting both the Paulownia and native tree species from a relatively high local deer pressure. This tree protection strategy will substantially reduce the projects plastic use, with native species fitted with only a wooden stake and spiral, and Paulownia requiring no individual guard.

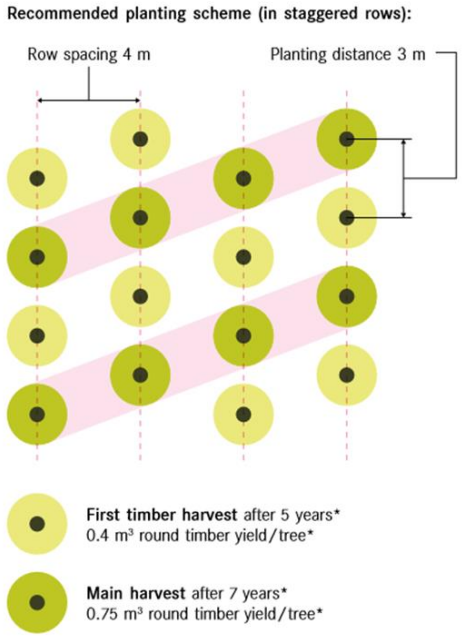
Native planting areas will be protected against weed pressure through use of appropriate spot spray herbicide applications during the initial few years of growth, whereas Paulownia, the bark of which is more sensitive to chemicals, will have mulch mats placed around the plug during planting which will suppress weeds until tree height exceeds the threat.

Weed competition will be further reduced through use of an understory with mixes including Birdsfoot trefoil, White clover, Alsike clover, Knapweed, Kidney vetch, Timothy (low percentage for tussock formation), Slender Red fescue and Smooth stalked meadow grass. This understory is also intended to reduce potential soil run off. The intensive weed control schedule outlined in the WeGrow Plantation Maintenance & Growth Report will not be fully employed in these projects in

order to achieve the biodiversity gains intended by the understory species mix Annex 3.e "WeGrow Plantation Maintenance & Growth Report" page 2.

3.63 Paulownia Planting Layout

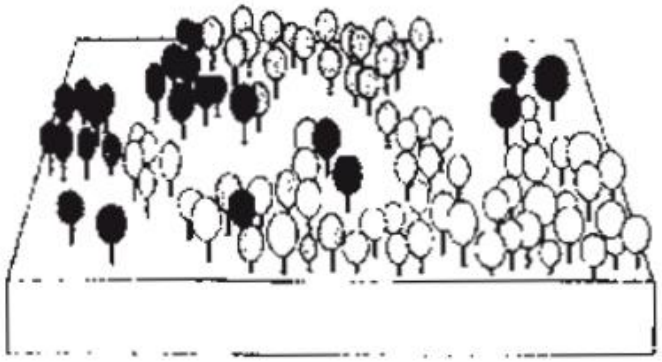
The Paulownia element of the project will be planted at a very low stocking density as depicted in the illustration below. This spacing use equates to 825 trees/hectare. Harvesting will occur in alternating rows every 6 – 7 years, meaning established Paulownia is always present and evenly distributed across the site. This has biodiversity and visual landscape benefits.



3.64 Native Planting Layout

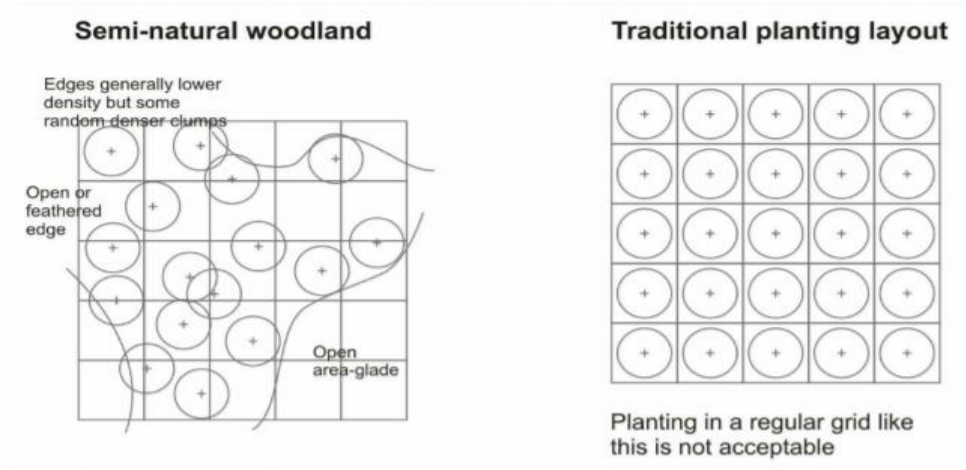
Where appropriate, elements of 'clump planting' will be employed to prevent slower growing species becoming out competed and promote habitat diversity. Single species clumps and clumps comprising of complementary species of various form and size will be incorporated into the woodland design.

Tree spacing within clumps and in adjacent clumps will be varied to avoid the appearance of rows and grids as well as to provide a range of light infiltration in order to increase wildlife diversity. Clump definition will phase out and tree spacing become more regular in areas closer to Paulownia growth to prevent a strong visual distinction between woodland types.

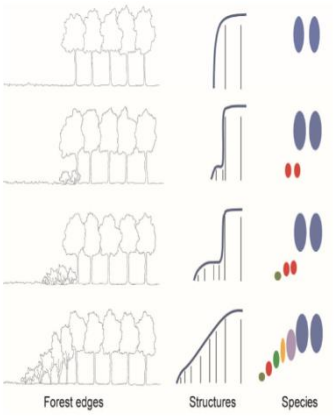


The sketch highlights the use of clumping.

The below diagram illustrates the use of feathered edging and varied spatial distribution in comparison to conventional tree planting.



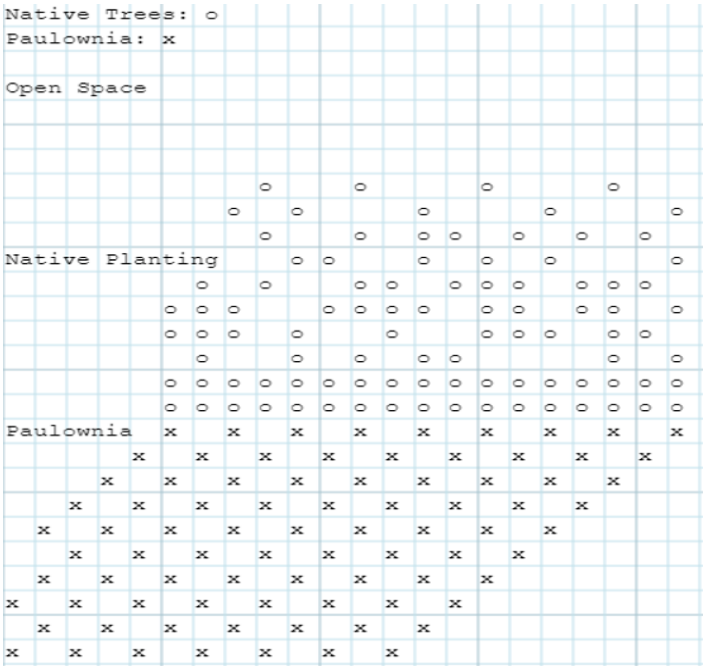
Native woodland edges will comprise of an evenly graded structure, as demonstrated in the lowest forest edge design option of the below diagram. This will be achieved through appropriate distribution of lower growing species on the woodland periphery with species hight gradually increasing to the interior of the woodland, providing a feathered edge effect.



As well as promoting visual qualities of the woodland due to increased space available for flowering, fruits/berries and foliage colours, this design feature will provide shelter functions and support a greater range of biodiversity.

3.65 Spatial Distribution:

In specific project areas where larger areas of open ground meet new native woodland planting, trees will be planted in a dispersed configuration, with stocking densities gradually increasing and becoming more unified before transitioning into the Paulownia planted areas. This will help to promote harmony between the new woodlands and surrounding landscape. The below diagram demonstrates the considered transition from open space through to native planting and the more regimented by sparse Paulownia.



3.66 Sourcing Stock

Paulownia Phoenix One plugs will be sourced from WeGrow – European market leader in supply of Paulownia stock and the developer of the Phoenix One variety suitable for sustainable growth in East Anglia and to ensure the highest quality of planting materials. All stock will be sourced in conformance with phytosanitary health legislation. Further information around WeGrow can be found on Page 46 of Annex 4.e "Portuguese Risk Analysis on the Introduction of Paulownia".

3.67 Native Planting

An appropriate species mix, and origin/provenance of stock will be used to ensure the woodlands future suitability to East Anglia. The diversity of the native species mix has been maximised to maximise biodiversity gain and as a mitigation to expected changes in climate.

Efforts will be made to source a portion of the native stock from origins up to 2 degrees south of the project site, particularly those species identified to be vulnerable in the Forest Research 2080 Ecological Site Classification (ESC) output. This should not only limit risk but enhance growth rates and result in woodland more adaptable to climate changes. Due to earlier flushing of southerly stock and increased risk from frost damage, a significant proportion of the species mix will be sourced more locally.

The project will aim to source no more than a third of native stock from a single region, maximising the long term prospects of the woodland as far as possible.

The native woodland mix has been selected using ESC (Ecological site classification) predictions across a baseline, 2050 and 2080 scenarios. These are shown in detail within Annex 2.c "ESC Output inc. DAMS Scores".

3.68 Native Woodland Planting Species Mix

Species	Native Status	Species Code	Yield Class (ESC)	% of Area
Pedunculate Oak	Native	POK	7	20
Silver Birch	Native	SBI	6	2.5
Hornbeam	Native	HBM	8	5
Field Maple	Native	FM	6	2.5
Wild Cherry	Native	WCH	7	2.5
Wild Crab Apple	Native	CAP		2.5
Dogwood	Native	DOG		1.25
Small Leaved Lime	Native	SLI	7	1.25
Beech	Native	BE	3	1.25
Black Poplar	Native	BPO	16	3.75
Common Alder	Native	CAR	5	25
Hawthorn	Native	HAW		10
Blackthorn	Native	PSP		7.5
Hazel	Native	HAZ		10

In addition to the above, the conifer species (Scots Pine) is also included representing 5% of total native planting.

3.7 Project operational activities

The Paulownia will be irrigated by a drip irrigation system. This highly efficient system allows for placement of water at the tree roots.

The native element of the project will not be harvested, aside from thinning, and instead managed to maximise biodiversity gain.

Harvesting of the Paulownia elements of the project will be dictated by ground conditions and minimising damage to the understory. Mechanical harvesting will be favoured where plantations grown in a uniformed manor, however hand harvesting carried out by skilled in-house teams is possible and will be carried out where required.

Brash from Paulownia harvesting will be chipped onsite and use as a mulch/humus. Depending on the quality and value, any excess chip may go into the composite wood industry. The level of chipping required at harvest is however relatively low in comparison to traditional conifer timber harvesting.

Hand pruning of Paulownia trees will take place several times a year for the first 3 years of growth. This will be timed in order for de-budding to be left on the floor, whilst larger branches will be chipped onsite and again used as a mulch Annex 3.e “WeGrow Plantation Maintenance & Growth Report” page 2.

Each Paulownia tree will be geo located in year one, and any failed stock will be replaced with the new tree being incorporated into the next applicable harvest cycle, a maximum of 6 years away.

Paulownia leaf drop occurs at first frost, where they will be left on site as humus for their high protein value. With a low C:N ratio they will break down swiftly with the understory will reduce any potential leaching of N & P. The captured nutrient will be utilised for early growth the following season Annex 4.e “Portuguese Risk Analysis on the Introduction of Paulownia” Page 35.

These aspects of maintenance of plantations are covered in Annex 3.e "WeGrow Plantation Maintenance & Growth Report" page 2.

3.8 Materials residues and emissions

The construction phase of the project will be characterised by site preparation and then plantation establishment.

Sites, as existing agricultural fields, will require no change to existing base line i.e., no clearance or invasive practices aside from a potential soil cultivation (using an agricultural tractor) in line with exiting agricultural practice.

Startup activities including site fencing will be delivered using mechanical and manual labour with standard agricultural machinery and planting of the tree plugs will be via manual labour supported by agricultural equipment for transport.

Emissions from the above will relate to diesel engine combustion and in line or less than for previous cropping regimes.

Access tracks around and within the plantations will be unsealed dirt tracks. They will have relatively limited traffic and most will be of a light vehicle in nature. Any water run-off would be absorbed within the surrounding planted understory or open areas.

Loading areas will be substantiated with hard core where appropriate and required.

Water will be precisely delivered through drip irrigation aligned with crop needs and uptake. This will not result in any excess residues.

All leaf biomass and wood chippings from harvest operations will remain on site to break down and contribute to organic matter build up to levels as appropriate for each tree.

3.9 Associated works

Irrigation piping will be enabled to project sites from existing farm infrastructure.

Around the site perimeter a 1.8m high deer fence will be erected to the specification provided in the Forestry Commission Technical Guidance 'Forest Fencing'. Wooden, creosote treated fence posts will be used, without planned use of a strutted stake assembly since the sites are not in particularly exposed locations, do not experience heavy deer pressure or sit on soft soils. Single width netting is planned, with use of spiral wire preformed fence connectors. Small river gates hinged on a wooden pole are planned where fence lines cross small water courses. A lack of PROWs and public access to the sites negates the need for stiles, ladders and dog latches anywhere along fence lines. The line of the fence shall be cleared of debris and be smooth enough to allow the bottom of the fence to seat with the ground and avoid gaps through which deer could enter underneath the fence.

The project site is self-contained.

4 Prediction of impacts

4.1 Impact 1: Invasiveness

4.11 Change from existing or baseline

Paulownia Phoenix one is currently grown commercially in the UK, CPL having been granted Consent under the Environmental Impact Assessment (Forestry) (England and Wales) Regulations 1999 [SI 1999/2228], as amended on four specific sites in December 2021.This subject to a set of 21 conditions of consent.

As a non-native tree, evidencing and information collation is required to demonstrate appropriateness and gain approval to grow in the UK. This information also informs any predicted change from baseline.

The focus of this exercise is in collating evidence in the following areas in order that a balanced view can be formed on any invasiveness risk associated with growing Phoenix One in managed plantations:

- The sterility of the Phoenix One cultivar.
- The potential for Phoenix One to establish in UK managed and unmanaged conditions.
- Plantation management requirements to demonstrate agronomic and operational control. and plantation design to ensure adequate thresholds for buffering and monitoring.
- The potential for Phoenix One as a food source, host, symbiont or vector for other damaging organisms (insect, fungal, viral).
- Phytosanitary certification to ensure sterility of plant materials entering the UK.
- Adoption of 7.d GB Risk Assessment Phoenix One May 2021 the Forestry Commission approved monitoring framework.

Evidence across these areas was summarised in WCPG2 paper Annex 3.f “Phoenix One Sterility and Invasiveness Summary”.

This paper set out the evidence to support the complete lack of flower or seed production in Phoenix One in 8 years 10 years of trial work, supporting sterility. It describes the highly controlled and exacting planting breeding process and the rigor of the phytosanitary controls. The paper summarises how plantations would be managed to reduce suckering and how the trees are harvested every 6-7 years, a number of years before any reproductive stimuli would normally be triggered. Integral to plantations design would be extensive buffering and sucker monitoring zones to ensure that there was isolation from external features minimising vegetative propagation risks. The basis of suggested monitoring parameters are also stated.

This document references the supporting papers:-

Annex 4.a “Paulownia Elongata Risk Assessment - Hawai Import”.
Annex 4.b “Paulownia Fortunei Risk Assessment - Hawai Import”.
Annex 4.c “Phytosanitary Certificate”.
Annex 4.d “Portuguese Risk Analysis on the Introduction of Paulownia - Ecological Characterisation”.
Annex 4.e “Portuguese Risk Analysis on the Introduction of Paulownia”.
Annex 4.f “Portuguese Risk Assessment for Phoenix One”.
Annex 4.g “Prof. Dr. Ralf Pude, University of Bonn - Phoenix One Sterility Statement”.
Annex 4.h “University of Bonn Phoenix One Sterility Report”.
Annex 7.d “GB Risk Assessment Phoenix One May 2021”.

The "Annex 3.f "Phoenix One Sterility and Invasiveness Summary" set out the status of information at the time of WCPG2 (March 2021).

This information was based on 7 years of scientific evidence (this is now 10 years) and feedback from European plantations that demonstrates Phoenix One performance in European climatic and growing conditions. CPL appreciates extensive evidence from the UK is absent and have evidenced data from Europe aligning as closely as possible climatic and agronomic conditions. Initial evidence from UK growing conditions is now available. The evidence, documented as part of monitoring as set out within the conditions of consent, from the first established plantation in the UK, supports that from all other sources cited above.

The scoping consultation meeting did not raise any questions on invasiveness (encapsulating sterility, neglect). Captured in Annex 6.a "Scoping Meeting Issues Log".

There is now a detailed set of conditions in place accompanying implementation of the existing CPL projects. The set of conditions around invasiveness are within conditions d,e,f.g Detailed clauses are contained within the main headings below:

- Condition (d): The applicant shall implement procedures to monitor and assess the potential for reproduction and invasiveness of the Paulownia hybrid variety planted. This is not required on non-Paulownia parts of the plantations.
- Condition (e): The applicant shall implement third-party verification of the monitoring and assessment of the reproduction and invasiveness of the Paulownia hybrid variety planted. This is not required on non-Paulownia parts of the plantations.
- Condition (f): The applicant shall implement any remedial action that the Forestry Commission should deem necessary based on observed flowering, seeding, or seedling production, or any asexual reproduction such as suckering.
- Condition (n): The applicant shall provide written evidence on request that they are continuing to work with the Non-Native Species Secretariat (NNSS) to revise update and inform the NNSS Risk Assessments as monitoring data becomes available.

There is an expectation that a similar set of conditions would be applied to this EIA. The full set of conditions is shown in Annex 7.b "Pioneer Anonymised Conditions of Consent".

Trial work for new forestry species normally takes many years (20 or 30). This timescale for Phoenix One would not allow this project to proceed and the opportunity for delivering to carbon and UK hardwood requirements (see section 4.8 and 4.9) would be lost. CPL propose that the data from European plantations in addition to the detailed monitoring and mitigation plans would serve to negate the requirement for many years of traditional forestry trial work.

A risk register was originally compiled, with expert input from the John Innes Centre. Version one submitted to the Non-Native Risk Assessment Forum (NNRAF) process for review. Comments were received, considered and incorporated into a version 2. This informed the conditions of consent.

The risk assessment process focuses on the hybrid Phoenix One (as opposed to other Paulownia varieties) and a managed plantation approach. It aligns identified potential risks with CPL mitigating actions as to be agreed.

This risk assessment is included in Annex 4.j "GB Non-Native Species Risk Analysis Phoenix One Vs 2".

Condition (n): "The applicant shall provide written evidence on request that they are continuing to work with the Non-Native Species Secretariat (NNSS) to revise update and inform the NNSS Risk

Assessments as monitoring data becomes available." Ensures that the risk assessment process remains live and ongoing.

NNRAF provided no additional comment within the scoping of this EIA. Additional supporting papers have been researched that strengthen the evidence that, to date, there are no reports of Phoenix One exhibiting invasiveness traits. These papers include:

Annex 4.k" A case for the Non-Invasiveness of Paulownia".
Annex 4.l "Paulownia in China – Zhu et al".
Annex 4.m "Comparison of Influrescence and Infructescence Within Different Paulownia Genotype Lines".
Annex 4.n "Paulownia Invasive or Not (Gillard)".
Annex 4.o "Berg et al 2019 - Survivorship attained diameter height and volume of three Paulownia Species USA".

In summary the evidence provided sets out the case that managed plantations of Phoenix One present a very low risk of becoming invasive, that management actions will be designed to further minimise risks and that a rigorous, Forestry Commission approved, monitoring plan with mitigating actions would be implemented as captured within the conditions of consent.

In this case CPL believe that the change from baseline would be negligible.

4.12 Nature of the change

The change from baseline would be negligible.

4.13 Confidence level of prediction

CPL is confident given the alignment of information sources supporting the non-invasiveness position.

4.14 Relationship to standards/policies

The plantation design is UKFS compliant.

A monitoring framework has been designed by UK Forest Research and is in place as part of the conditions of consent for previously granted CPL EIA's.

4.15 Basis for predictions

Predictions are drawn from the scientific publications, researched papers and risk assessments contained within the annexes. The technical experience of the plant breeder, WeGrow, is also evidential.

4.16 Method of impact identification

CPL will commit to carry out monitoring of the plantation sites and will ensure that adequate resources are in place to deliver this obligation as set out in Annex 7.b "Pioneer Anonymised Conditions of Consent". These have been included in the financial model and further Resources are to be invested for this purpose exclusively.

A copy of the original draft monitoring framework produced by Forest Research is include in Annex 7.a "SRF Monitoring Framework". This is now encapsulated within the conditions of consent schedule.

4.17 Uncertainties and unknowns

There is uncertainty over Phoenix One flower or seed production attributes beyond the 10 years of published trials data as discussed in earlier sections.

The plantation designs, plantation buffering and plantation monitoring all contribute towards minimising impacts of the uncertainties described.

4.2 Impact 2: Water

4.21 Change from existing or baseline

The impact of water usage by the project has been assessed across irrigation demand, on water resource balances and effects on private water supplies as identified in the WCPG2 scoping work.

Irrigation

Plantations in Spain indicate that commercially grown Paulownia trees require between 7 and 10 litres of water per day during the initial establishment stage. Once established, water demand in the first three years drops to an average of between 4l and 6l per day during the growing season. In much of the UK there is insufficient rainfall to meet this demand and supplementary irrigation is required at key times using SMD meters (Soil Moisture Deficit).

The residual estimated irrigation demand on light soils in the east of England is 451m3/ha in year 1 rising to 715m3/ha in year 3. This compares favourably with the irrigation demand of vegetable crops in similar conditions. Peak, year 3, Paulownia irrigation demand is about 30% that of main-crop potatoes grown in similar conditions and average annual demand over a 10 year cropping cycle is about 40% that of a typical commercial carrot/potato/Onion rotation.

The above is included within an irrigation report produced by Paul Bradford MCIWEM C.WEM in Annex 3.b “CPL Report - Paulownia Irrigation Demand” specifically for this project. This report concludes water requirements to be considerably under that of conventional root crops creating a positive position to the existing baseline of agricultural cropping. This is a positive impact.

This water is supplied via an efficient trickle irrigation system and subject to existing abstraction licencing with the Environment Agency.

Water resource balance

The Environment Agency, Forestry Commission and academia have carried research into the impact of forestry on water resources. This is important because much of East Anglia is in water resources deficit as a result of historic over abstraction. The research shows that all types of woodland significantly increase infiltration rates, by between 17% and 60%, but that this benefit can be offset by increased rainfall interception and evapotranspiration (ET) from the canopy. Interception and ET is broadly determined by tree type, canopy size and planting density. Mature coniferous forestry with its dense canopy and long growing season has a significant adverse impact on water resources whereas broadleaved woodlands have a more nuanced effect. Studies show that beech and ash can increase groundwater recharge, in comparison to grassland, by between 17% to 25%, but mature oak, which is better adapted to scavenging water during prolonged periods of drought can reduce recharge in dry conditions by between 16% and 45%.

On balance, the evidence suggests that Paulownia may have a benefit on the overall water resource balance. This is articulated in a paper by Paul Bradford in Annex 3.g “High Level Water Balances”.

The trees are grown at a low density and are maintained in an immature state, only reaching full canopy cover for a 2 year period before they are cut. Recharge rates under juvenile deciduous trees have been found to be 3 to 4 times greater than for mature trees and separate research concludes that 'groundwater recharge can be enhanced under moderate planting densities'. Paulownia has a short growing season and because it is native to high rainfall regions, is not adapted to scavenge deep groundwater.

With summer rainfall predicted to drop by up to 57% in the summer and increase by 33% in the winter, by the 2070's (UKCIP high emissions scenario), landscape scale, flood attenuation and water retention features we become increasingly important. Paulownia plantations reduce flood flows by increasing infiltration rates and soil water storage capacity. Soil carbon storage under Paulownia can increase by up to 5%. As well as reducing atmospheric carbon, this improves the health, structure and water holding capacity of the soil. An increase in the amount of organic matter in the soil of 1%, one can increase the quantity of water held per Ha by 222m3/ha. Given that the project is expected to increase the percentage of organic matter in the soil by up to 5%, we could potentially store an additional 1110m3 of water per Ha. Much of this water is prone to run-off in conventional agricultural systems, so the plantations reduce the risk of both flood and drought and topsoil erosion. Monitoring to assess the changes to environmental water fluxes, carbon sequestration and habitat improvement as a result of the plantations will be incorporated into the project design.

A further water report contained in Annex 3.c "Paulownia Water Use Report" adds to this logic by assessing the balances between infiltration, soil water storage, transpiration and interception and concludes that we do not see the plantations making significant losses to the re charge systems rather by making the rainfall 'effective' we will change the nature of the re charge and eventually hopefully store water for later use, rather than drawing on valuable aquifer reserves.

We believe that the analysis articulates that the change from existing baseline is negligible, most probably positive.

Private water supplies

The Environment Agency identified no drinking supplies recorded within 1km radius of the area of the site. However, there are two public water supply abstractions within a 7km radius. The second are boreholes operated by Anglian Water Limited due East and North East from the site and the closest point is 6.5km away.

Other

The acidification of surface water is not an issue for this site as demonstrated by the FC Land Information Search undertaken as part of Woodland Creation Planning Grant Stage 2. This is documented in Annex 1 "Forestry Commission Approved WCPG Stage 2 Document - JS Youngs (V2)".

The Internal Drainage Board (IDB) were consulted early on in the WCPG process regarding the potential impact the project could have on routine management of IDB drain on the southeast boundary of the site. Based on IDB advice, 9-metre open area buffers were added to project areas adjoining relevant IDB drains Annex 5.i "Internal Drainage Board".

The Environment Agency expressed no concern over local water dependent protected sites Annex 5.b "Environment Agency - Woodland Creation Project on Water - J S Young". Natural England highlighted potential sensitivities of local water dependent protected sites to certain activities

involving the drainage or modification of watercourses, none of which the project intend to engage in.

The scoping meeting issues log did not raise any points on water:

The two points raised by the Environment Agency in the previous scoping meetings for the 2021 consents were covered within the meeting for completeness. These confirmed that on prevention and mitigation for water run-off that management of the woodland planting would include an understorey, this to be established at the beginning of the woodland creation process, providing a solid environment to manage run off and will ensure bare ground is not left thus minimising the risk. A key point of the project is soil stabilisation and improving degraded soils over the existing industrial agricultural use currently practiced on the field parcels.

On the second point that Irrigation will be provided by existing abstraction licenses and that a trickle irrigation variation was already in place. No further source irrigation water would be required.

4.22 Nature of the change

The requirement for irrigation water will be around 60% less than for existing agricultural cropping. This driven by less consumption and greater efficiency in application.

Water resource balance will remain in a similar position as for the current agricultural cropping.

4.23 Confidence level of prediction

The confidence level for irrigation water is high and within CPL project control.

The confidence level for water resource balance is high but subject to greater variability and will be the subject of ongoing monitoring.

4.24 Relationship to standards/policies

Irrigation is subject to abstraction licensing by the Environment Agency that align with the EU water framework directive. Trickle license variations will be in place.

4.25 Basis for predictions

This report provides a synthesis of known baseline irrigation requirements and UK specific agro-climate and soil type factors. It uses the methodology set out in the Environment Agency's 'Optimum Use of Water' Guide as a template for estimating the 'design dry year' Paulownia irrigation requirements for any given agro-climatic zone and soil type in England and Wales.

4.26 Method of impact identification

Through the monitoring framework set out within the statement of conditions.

4.27 Uncertainties and unknowns

The changing nature of ground water baselines as wider water usage and the climate changes will be a consistent unknown.

4.3 Impact 3: Landscape character change

4.31 Change from existing or baseline

The landscape character analysis was originally set out in the WCPG2 papers Annex 1.a "Site Context Map", Annex 1.b "Site Appraisal Plan" and Annex 2.b "Landscape Analysis Work".

The project is not located within any nationally designated landscapes or areas categorised as having a sensitive landscape by the local authority, and aside from the novel species use the proposals are not particularly complex. The Forestry Commission did not therefore request the completion of a full Landscape Visual Impact Assessment (LVIA).

Landscape analysis work was undertaken to develop a greater understanding of landscape character and further ensure woodland plantings would not significantly impact the local landscape character. The results of the survey sought to identify key features within the landscape; species pattern, existing woodland connectivity and expansion, semi-natural features. It is also worth noting, there are no public footpaths which directly cross through or border the proposed project area.

In a post scoping meeting response, Norfolk County Council confirmed that 'from a Landscape perspective I broadly have no issues with the proposal' Annex 5.q "Consultation Response – NCC" in addition to some further points around sketches and understory species mix.

Description of Baseline & Wider Landscape Context:

The proposed site consists of 3 adjoining field parcels intercepted by a network of ditches. The area is situated adjacent to a small deciduous spinney situated to the south of the most eastern field parcel. The Block is bound by arable land to all sides, and has historically been cultivated for crops.

The project areas fall within several landscape assessments on National & District level. On a National level, the project is spread across the National Character Area (NCA) profile (formerly Joint Character Areas (JCA)) 46: The Fens and 85: The Brecks. The NCA 46 is characterised by its large-scale, flat, open landscape with extensive vistas to level horizons The NCA 85, also known as Breckland, consists of a low, gently undulating plateau, largely covered with sandy soils of glacial origin.

Norfolk do not have a county-wide character assessment, but instead have the Breckland Landscape Character Assessment, published by Breckland District Council, and the King's Lynn and West Norfolk LCA (2007) covering the adjacent district area. Of the landscape types identified within the districts, the site has potential links to aspects of E10: Feltwell, a landscape character area within The Fens – Open Inland Marshes character type, which corresponds to The Peat Fen area within The Fens.

The planting sites shares key characteristics with E10: Feltwell, in particular the strong geometric and linear landscape patterning defined by large scale intensive arable farming with extensive field units divided by a regular network of drainage ditches and dykes, long straight roads, large straight rivers and cut off channels.

The site also encompasses the large scale landscape with extensive vistas and wide open skies characterised by E10: Feltwell, as well as the Drainage channels and dykes flanked with golden rushes and bright green grass banks.

The project also falls within the local authorities Landscape Character Assessment (LCA) 9. Planned Fenlands, described as a vast open landscape of systematically drained and enclosed fen with individual farmsteads. Historically extensive areas of north Lakenheath were planted with poplars, many of which have been removed, but linear tree belts on the banks and blocks of trees still exist within the landscape.

Minimising Change from Baseline:

Landscape sensitivity has been a crucial factor throughout the planning and design process, with key targets around minimising adverse visual impacts, maintaining existing landscape character profiles

and promoting landscape scale woodland connectivity. This has been achieved through early identification of more localised landscape character and enclosure patterns, a considered approach to LCA identity and an understanding of how the project can contribute to NCA objectives where possible and appropriate.

Landscape analysis was undertaken to identify localised sensitivities and explore options for the NCA to be maintained through specific aspects of design and landscape enhancement. This analysis also identified Public Rights of Way for most appropriately placing native planting belts to provide a visual buffer from the potentially regimented appearance of the plantations, most notable from the PROW that passes to the east of the site. In other areas of the project, native boundary belts have been incorporated to reinforce the existing level of enclosure and promote a sense of connectivity between landscape features whilst increasing the species and age class diversity of woodland.

Field boundaries within and around the planting sites mainly consist of dykes and ditches. The large field sizes and lack of hedges make for a relatively weak pattern of enclosure. The condensed planting site make for a relatively low impact to the wider landscape enclosure. Open ground buffers of 6 metres either side of internal and external historic boundaries will help to preserve the current landscape pattern. An open ground buffer has also been incorporated between the central and western parcels, to reinstate a field boundary previously lost to intensive agriculture.

In reference to 85: The Brecks, agricultural intensification and improvement have in some places resulted in the loss and damage to landscape features, including traditional infield coppices and shelter belts, something the project design aims to improve through the incorporation of field boundary native woodland planting.

It is unlikely that the proposed woodland would be visible from neighbouring landscape character areas due to the presence of vegetation on the edge of the Feltwell character area – i.e. the Planned Fenlands to the south (as identified in the Suffolk Landscape Character Assessment).

The landscape is largely dominated by enclosure pattern, created from the network of ditches. Enclosure within the landscape has resulted in rectilinear field parcels and highly regular pattern of drainage ditches. The overall shapes of forest and woodland plantations within the landscape are frequently geometric which has been reflected in the proposed woodland planting.

A significant emphasis of the native planting silvicultural elements has been put on landscape character, in particular softening the visual appearance of both Paulownia and new native planting. This has been achieved in a number of ways detailed in Annex 3.a “Silviculture; Ground Preparation, Species Mix & Planting Design” including graded edge structure, achieved through appropriate distribution of lower growing species on the woodland periphery. As well as dispersed planting configuration, with stocking densities gradually increasing and becoming more unified before transitioning into the Paulownia planted areas. This is intended to promote harmony between the new woodlands and surrounding landscape.

Positive Change Contributions:

NCA 85: The Brecks 3rd Statement of Environmental Opportunity (SEO) hinges around the management of forest plantations for climate change adaptation and regulation, with a noted example to achieve this being to “*Explore the potential for new woodland types, including species more resilient to potential challenges of climate change and new tree diseases”*.

The management regimes associated with coppiced woodland, as compared to pasture farming, would be less intense and result in reduced movements. As such, there would likely be a beneficial effect on the sense of tranquillity and isolation within the character area.

The preservation of existing natural features aims to maintain the spirit of the place. Although the landscape comprises of flat farmland with limited hedgerow or hedgerow tree cover resulting in an open, exposed character, the non-native planting will be screened effectively by utilising native species, in a naturalised planting pattern, around the perimeter.

4.32 Nature of the change

The nature of both the project and the landform that it's situated within make the potential effect on the landscape character baseline established in 4.31 above more likely to be direct, in the form of impacts to the local landscape, as opposed to indirect and related to character changes beyond the boundary of a character area/landscape type. Furthermore, due to the intricacies associated with landscape character assessments, and the variety of competing stakeholder interests in the project design, the project will have both positive and negative impacts on landscape character, contributing to certain elements and detracting from others.

Taking into consideration all elements that form landscape character, including natural, physical and cultural features, the net effect of this proposal on the landscape character profiles outlined above would be positive and long lasting.

4.33 Confidence level of prediction

The confidence level of these predictions is considered high, partly due to the highly analysed and documented nature of landscape character profiles allowing for a comprehensive baseline to be established, as well as the emphasis put on landscape character preservation during project design.

4.34 Relationship to standards/policies

The project design process has complied with the National Planning Policy Framework (NPPF)[1] para 174 which recognises the importance of understanding the local landscape character.

In addition to this, the project meets the UK Forestry Standard requirements around sensitive woodland design in relation to landscape character types.

4.35 Basis for predictions

The Landscape analysis work utilises key landscape and visual receptors as a method for analysing effects and determining predictions on specific local landscape points.

National and District level landscape character assessments, encompassing natural, physical and cultural features were used as a baseline for measuring scope of predictions against.

Forestry Commission landscape advisors were also involved in the planning and design stages of the project, and Norfolk County Council confirmed that 'from a Landscape perspective I broadly have no issues with the proposal' Annex 5.q "Consultation Response – NCC".

4.36 Method of impact identification

Ongoing monitoring of native elements of project to ensure predicted tree heights are met and associated screening delivered. Initially, any failed native stock will be replaced to ensure native belts provide full extent of intended visual buffering.

4.37 Uncertainties and unknowns

Whilst Paulownia Phoenix One has many similarities with existing local woodland and trees, their form and foliage colour hasn't before been seen in The Fens NCA, the visual contrast of which presents a level of uncertainty, particularly during summer months. This impact will be limited to an extent by the present lack of woodland cover. The visual change associated with the Paulownia coppicing regime employed is predicted to have a lower impact than that of traditional clear-fell regimes, however, the scope of landscape variation that coppicing will create is not fully known.

4.4 Impact 4: Biodiversity changes on project and surrounding sites

4.41 Change from existing or baseline

This project, to establish high carbon sequestration woodland, has been designed throughout to ensure an overall biodiversity gain. The planting areas replace intensively managed farmland with associated agrochemical inputs, with crops having been grown as a monoculture with very little diversity being allowed to flourish. This is generally reflected through declining soil health, low invertebrate levels (particularly insects), seed and pollination sources and associated farmland fauna and flora.

Project sites have been carefully selected to ensure that no existing biodiverse habitat (priority habitat) have been included within the project.

This project will deliver biodiversity benefit through a range of habitat creation zones including native woodland creation (14.25% of project area, 3.2 ha), other conifer (Scots Pine) (0.75% of project area, 0.17ha), open space (10.01% of project area, 2.25 ha), Paulownia and associated understory (74.99% project area, 16.85 ha).

The project adheres to the Lawton review principles of positive biodiversity change through creating a bigger better and more connected landscape.

Open areas have been used to create large habitat corridors across the project site whilst preserving all historic boundaries (hedges, ditches). This builds on and enhances the size of these existing features and promotes habitat connectivity.

The open area buffers around water courses will be established using a proportion of tussocky grasses to minimise water run off as suggested by environment agency consultee feedback. This will also generate an additional habitat type for invertebrates and ground feeding birds.

The creation of woodland will reduce risk to adjoining water courses through a number of means. Nitrate as a diffuse pollutant associated with arable agricultural practices will cease, and improved soil structure and organic matter will in time increase soil stability and water holding capacity. The effect of this being reduced run off leading to a reduction in dissolved nutrients which can potentially pollute water courses. Soil run-off will be reduced via the grass/clover sward established across the project site.

The project will create new habitats and target maximising the quality of these. Native woodland – planting mixes will mirror local context as well as building in future resilience. To achieve this, tree mixes will include: Pedunculate oak (20%), Scots Pine (5%) and other mixed native broadleaved species (75%) (to include in the mix hazel, hornbeam, field maple, wild cherry, hawthorn, wild crab apple, dogwood, small leaved lime and black poplar). In open areas and Paulownia understory the low shading of the Paulownia trees will allow for the establishment of a biodiverse understory alongside the other, sunny aspect, open areas across the project sites. The principle across these areas will be to establish and manage a diverse flora that delivers food sources to insects and birds

(pollination and seeds). Mixes will include: Birdsfoot trefoil, White clover, Alsike clover, Knapweed, Kidney vetch, Timothy (low percentage for tussock formation), Slender Red fescue, Smooth stalked meadow grass.

Existing features, primarily hedges and woodland will receive open area buffers to improve the quality of these features and prevent encroachment by farming operations.

The project design has focused on joining up existing features and creating new wildlife corridors between habitats. The external perimeters to the project totals 2km of biodiversity interface with the surrounding farmland. The addition of internal connectivity features increases this further to 2.7km. In total 2.25ha of pollination and seed rich buffers will be created and managed. The native woodland has been used to link existing woodland.

Overall, the change from existing baseline will be very positive.

A number of specific biodiversity areas were assessed around features on and adjoining this project site.

Natural England set out their comments in their Annex 5.n "Natural England Final Case Response" as part of WCPG2 consultation. They followed up with a further written response to the scoping meeting covering similar points in Annex 5.r "NE Post Scoping Meeting Response". The response included the following points laid out together with accompanying data and evidencing in response.

- The Breckland Farmland SSSI was identified during screening and subsequently raised by Natural England during initial consultation with relevance for the projects potential for impacting on the functionality of the SPA in supporting Stone Curlew. Natural England stated that there is a large enough distance from the Breckland SPA to eliminate the need for habitat Risk Assessment Annex 5.n "Natural England Final Case Response". However, in the follow up from the scoping meeting NE changed this view and requested that the project be screened for a HRA Annex 5.r "NE Post Scoping Meeting Response".

- A Habitat Risk Assessment "Annex 7.c Habitat Regs Screening Form - JS Youngs" screening conducted by the Forestry Commission concluded the project would have no likely significant effect on European Site qualifying features (Stone Curlew, European nightjar, Woodlark). This conclusion has subsequently been supported by NE in writing Annex 5.u "Natural England Agreement of HRA Screening"

- The proposed planting site is located 0.25km from the SSSI at its closest point. RSPB data show that there were 2 Stone Curlew nest sites just within the 1 km buffer from the proposed planting area, one in 2013 and one in 2016 Annex 2.d "RSPB Stone Curlew Nest Records". Further correspondence with the RSPB indicate an additional nest in 2020 approximately 700m from the site Annex 5.j "RSPB (Tim Cowen)". There are no nest records on the site, as expected given the soil type is not favored by Stone Curlews being a black sand as opposed to the sandy/chalk where the records are from. The farmer at J S Young Farms also confirms that they have not observed any Stone Curlew activity on or in close proximity to the proposed planting site. The farmer actively works with the RSPB on other parts of the farm within the Breckland Farmland SSSI where there have been records.

- The proposed site is physically disconnected from the Breckland Farmland SSSI by the cut off channel and by public road. There are also trees, hedges and farm buildings within this separation area. We believe that the site will not impact on Stone Curlew, this is supported in writing from the RSPB Annex 5.j "RSPB (Tim Cowen)" who stated that "my opinion is that this scheme is probably far enough away to not significantly effect stone-curlews nesting within the Breckland SPA"

- Natural England also highlighted that potential impacts on breeding waders should be assessed and any historical data presented within the EIA. The Forestry Commission map browser (see Forestry Commission Map Browser (forestergis.com) indicates a medium to high score for breeding waders, 5 equalling to the highest risk score value and 1 the lowest risk score. Lapwing scored 5, Redshank scored 4, snipe scored 2, Oystercatcher scored 2 and all other breeding waders scored 1 as a starting point for site specific evidencing.

- The Forestry Commission ecologist indicated that a breeding bird survey was not required stating that the E-W drainage feature has functionally disconnected the proposal woodland creation site from the SPA/SSSI further north and whilst the wader sensitivity mapping does indicate the area enveloped by the proposal to be within a higher sensitivity zone for Lapwing the impact on the local population of a UKFS compliant woodland creation project is likely to be negligeable (as there is an existing presence of woodland and interconnective hedgerow networks to the south of the aforementioned drainage feature implying the existence of a predator shadow as well as there being a significant amount of suitable arable land for the species to be displaced into) Annex 5.p "Jay Doyle FC Ecology National Lead".

- Data records from NBN Atlas Bird records Annex 2.j "NBN Atlas Bird Record" show no records on site of any wader species. Within a 1 km buffer they show a single record of Lapwing from 2017 and another from 2013.

- Data from the Local Environmental Record Centre (LERC) through NBIS (Norfolk Biodiversity Information Service) Annex 2.j "NBN Atlas Bird Records", Annex 2.k "LERC Data" shows no records on site of any wader species. Within a 2 km buffer records are present for Lapwing between 2006-2019, Redshank 2003-2019 and Oystercatcher 2002-2019. There is only a single breeding record within this dataset, of Redshank between 2002 and 2011, on Hockwold Washes, 507m from the proposed planting site.

- The lack any records or any type on the site is significant. The single breeding record in the wider vicinity is distanced. The wider farmland landscape within which the site is situated could be used by Lapwing, and to some extent Redshank and Oystercatcher, particularly in the winter months and so casual observation records align with reasonable expectations.

- RSPB Lakenheath reserve lies 1 Km to the South of the site. The RSPB reserve warden has indicated that they have no objection to the proposals Annex 5.s "RSPB Lakenheath Fen".

- Norfolk Wildlife Trust did not respond with comments on potential impacts on CWS. In a previous consultation for a similar project in the near in the vicinity where opinion was sought on the same set of CWS, Norfolk Wildlife Trust confirmed the proposed woodland

planting will not have a significant impact on any County Wildlife Sites (CWS) situated nearby to the planting site Annex 5.t "Norfolk Wildlife Trust Response (Pioneer)".

Given the data available and consultee responses and the lack of any records on the project site we believe that across the above specific biodiversity areas identified there will be no significant impacts on biodiversity.

4.42 Nature of the change

A specific target for this site will be the opportunity to increase the resilience and connectivity of existing woodland. New woodland belts will connect the existing woodland area adjoining the project. The project area is close to the cut off channel, a key habitat for turtle doves. The project will target habitat creation for this declining species. A condition of the felling licence to remove existing mature poplars that surrounded part of the project area, was that restocking should be of low bushy species, targeting Turtle Dove habitat. This design feature had been incorporated into project design and supported by RSPB Annex 5.j "RSPB (Tim Cowen)".

The hawthorn feathering around woodland edges will target achieving the 4m wide 3m minimum criteria for turtle dove nesting habitat. In addition to this, the bare area blocks will be in part cultivated (and augmented if necessary with fumitory) to encourage annual arable plants, an important feed source for turtle doves.

Where project areas are in the vicinity of butterfly rich habitats the pollinator mixtures will be enhanced to offer butterfly feedstock to align with the fly times of local species.

4.43 Confidence level of prediction

The confidence level is high given the degree of positive land use change and the low existing baseline.

4.44 Relationship to standards/policies

The opportunity this project presents to achieve a big biodiversity gain is significant and supports the direction of travel as set out by UK Government net zero commitment by 2050 and biodiversity gain targets.

4.45 Basis for predictions

Predictions are based on a range of research and documented evidence that records and demonstrates an increase in biodiversity as a result of soil organic matter improvement, enhancing floral diversity and scale, protecting and enhancing existing features, The project delivers across all these aspects.

4.46 Method of impact identification

These are set out in detail in Annex 3.d "Biodiversity Report Summary".

The project will measure

- Invertebrates through pit fall trapping.
- Floral diversity through quadrat sampling.
- Soil biodiversity through fumigation extraction of soil microbial biomass.
- Soil carbon through isotope techniques.
- Hedgerow biodiversity using the Defra hedgerow survey handbook.
- Birds biodiversity using a common bid survey methodology as proposed by the RSPB.

This measurement and monitoring is documented within the statement of conditions Annex 7.b "Pioneer Anonymised Conditions of Consent".

4.47 Uncertainties and unknowns

The ability to establish a biodiverse understory in the Paulownia plantation may require some experimentation with floral species mixes to determine the most effective and sustaining understory. The project will look at understories in European plantation as well as those that thrive in UK woodland as part of determining the most appropriate site-specific mix.

4.5 Impact 5: Degradation of soil carbon in peat soils

4.51 Change from existing or baseline

The potential for peat soils to lose their carbon stocks through drying out, or the opportunity for them to be restored and sequester increased atmospheric carbon is recognised in the England peat action plan https://www.gov.uk/government/publications/england-peat-action-plan

Planting trees on peat may cause peat soils to dry out.

The site falls within the Natural England peat map as "Deep Peaty Soils", however a Forestry Commission and Natural England agreed methodology was used to determine SOM % and therefore whether a peat survey would be required. Appendix 2.e shows the results of the organic matter content determined by Loss on Ignitions tests. All results are below 30% which concludes that the site doesn't contain restorable peat and no further action is required.

This impact is not therefore relevant.

4.52 Nature of the change

N/A

4.53 Confidence level of prediction

N/A.

4.54 Relationship to standards/policies

The England peat action plan https://www.gov.uk/government/publications/england-peat-action-plan.

4.55 Basis for predictions

Natural England assessment

4.56 Method of impact identification

N/A.

4.57 Uncertainties and unknowns

N/A.

4.6 Impact 6: Damage to archaeological and historic sites

4.61 Change from existing or baseline

An archaeology report produced by Norfolk County Council Historic Environment Record (NCCHE) identified several records around the proposed planting site, most notably Hockwold Roman settlement (HER5316) - A large Roman rural settlement, excavated in the 1960s before the construction of the cut-off channel. A systematic structured/organised metal detector survey advised by the Forestry Commission identified no requirement to incorporate any mitigation into the

project design. This is supported by David Robertson (FC Historic Environment Advisor) who determined that no mitigation would be required.

Consideration has been given to the protection of historic boundaries including ditches/dykes. All boundaries including those internal to the planting blocks have had a 6-metre open ground buffer incorporated into the project design. The planting sites sit entirely within the HLC Enclosed Agriculture (Typically Pre-Modern Form), described as gradually enclosed predominantly for agricultural use. Maintaining field boundaries will preserve field shape and form.

The lack of historical features in the vicinity of the planting site negated the need for a site specific Historic England report, a position taken based on research and analysis during Stage 1 of the WCPG. Despite this, insight was taken from Historic England reports prepared for similar Pioneer project and applied to the design principled for this site.

Given the accommodation of consultee concerns as part for the initial design the project represents no significant change to the existing baseline position.

4.62 Nature of the change
N/A.

4.63 Confidence level of prediction
High confidence.

4.64 Relationship to standards/policies
Norfolk Local Authority Historic Environment Team policy.

4.65 Basis for predictions
Mitigation as part of project design.

4.66 Method of impact identification
N/A.

4.67 Uncertainties and unknowns
None.

4.7 Impact 7: Local residents' quality of life changes

4.71 Change from existing or baseline
The change to baseline will be as a result of land use change on the fields in the vicinity of local residents. Agriculture production and associated management regimes will be replaced by woodland and associated management regimes.

Effects on local residents could fall under visual effects, healthy environment, road congestion and noise pollution.

The visual landscape will change.

Biodiversity levels will change.

The plantations, aside from at the harvest period every 6-7 years, are self-contained. The harvest cycle will involve the transport of wood from the site. This is unlikely to very different from usual traffic from agricultural machinery. There is likely to be no change from a road traffic/congestion perspective.

The management practices that can generate noise, disturbance and residues will change.

4.72 Nature of the change

The visual aspect will change from agricultural cropping to a mix of Paulownia plantation, native woodland and open space.

The biodiversity of the local area will increase as described in the biodiversity section of the report. There is much evidence that connections and interactions with nature improve human wellbeing. This is a positive impact.

The level of agrochemical inputs, fossil fuels, noise pollution and congestion from agricultural machinery will reduce as agricultural activity is replaced by extensive woodland management. This is likely to have positive effects on air quality, reduce run off from fields and reduce disturbance for local residents.

4.73 Confidence level of prediction

The confidence in the physical nature of change is high. The site is highly isolated with a complete lack of dwellings within 0.4km and just 4 dwellings within 1km, all of which are heavily screened by existing trees.

4.74 Relationship to standards/policies

The design of the project conforms to UKFS. Integral to achieving this standard and within the methodology is a requirement to understand and address where possible local stakeholder views.

4.75 Basis for predictions

The woodland design plans depict the design of the plantations, native woodland and open areas.

Local stakeholder feedback record annotates potential impacts, there was no direct local resident feedback due to the absence of dwellings as a result of site isolation. The Parish Council supported the proposal during consultation Annex 5.d “Hockwold PC Response”.

4.76 Method of impact identification

Any future impacts (positive and negative) channeled through feedback to landowner or CPL will be understood and if required addressed where possible.

4.77 Uncertainties and unknowns

The timeline for any impact (positive or negative) to manifest itself is not certain and should be managed through the mechanism for impact identification.

4.8 Impact 8: Carbon sequestration increases

4.81 Change from existing or baseline

The UK is committed to net zero carbon emissions by 2050. This is a front-line Government policy.

Achieving this ambition will be through a reduction in greenhouse gas emissions, clean technologies being adopted, carbon capture techniques and an increase in carbon sequestration.

Carbon sequestration, within the Youngs land area context, could be driven through new woodland creation, peat land restoration and better soil management.

Trees store carbon because they use CO2 in the process of photosynthesis to feed their growth (produce wood), woodland soil is also rich in organic materials and therefore carbon stocks.

All this means that UK forestry is a net carbon sink, currently estimated at around 18MtCO2e.

However, even today tree cover in the UK is far lower than its closest neighbours – just 13% compared to the European average of 38%.

Through the UK Governments 'The Environmental Targets (Woodland and Trees Outside Woodland) (England) Regulations 2023' states that "by the end of 31st December 2050 at least 16.5% of all land in England is covered by woodland and trees outside woodland."

The figures are associated with the Government's commitment to the Committee on Climate Change's net zero projections https://www.theccc.org.uk/publication/net-zero-the-uks-contribution-to-stopping-global-warming/ advocating the need for 30,000 ha of new trees being established in the UK every year to 2050, to take woodland cover in the UK from 13-17%.

June 2021 statistics on new woodland creation from Forest Research indicate that targets are not being achieved.

https://www.forestresearch.gov.uk/tools-and-resources/statistics/statistics-by-topic/woodland-statistics/

The Committee on Climate Change (CCC) 2021 progress report to Parliament indicated that the Forestry Commission's target for increasing the area of forest under active management had been missed

https://www.theccc.org.uk/wp-content/uploads/2021/06/Progress-in-adapting-to-climate-change-2021-Report-to-Parliament.pdf

There is a pressing need to harness the benefits that woodland can deliver and pressingly within a short-term timescale as the world faces dramatic climate change inpats. Traditional and historical forestry models are being realigned to deliver to the challenge.

Yield class (YC) is a measure used in UK forestry to gauge the productivity of trees and it can, therefore, also be used, as the CCC does, as an indicator of how much carbon they are absorbing. As yield class is based on the annual volume of timber being added by a tree on a particular site under specific conditions. The faster the tree grows, the higher the yield class and the higher the carbon storage.

Agricultural soil management has not been widely focused on practices that build soil carbon by ensuring winter green covers, incorporation of crop residues and non-inversion tillage techniques. These are outlined in the soil association article "Seven ways to save our soils" https://www.soilassociation.org/media/7458/7_ways_soils_final.pdf.

Even with these practices soil carbon sequestration is estimated to deliver around 0.5t/ha per year of addition carbon captured and stored. In most situations agricultural practice will not contribute to carbon sequestration and thus climate targets.

Woodland carbon capture is much more positive. Traditional native woodland can deliver 8 – 12 t per ha averaged over a 35-year period. Paulownia, in a managed plantation, is predicted to deliver 7 x the carbon capture rates of native woodland at over 65t/ha/year. This project across J S Young Farms and the mix of 75% Paulownia, 15% native woodland (including Scots Pine) and 10% open area is predicted to deliver approximately 30,000 tonnes of captured carbon over the 35-year lifecycle.

This is a huge change from a baseline that, given continuation of current agricultural cropping practice, would be predicted to deliver between 0 and 600 tonnes over the same period.

4.82 Nature of the change

The change would be through a capture of atmospheric carbon. Predicted as 30,000 tonnes. This carbon would be stored in the soils that the project manages and the timber from the commercially managed woodland.

4.83 Confidence level of prediction

Highly confident. The carbon sequestration predictions have been researched and evidenced, subject to commercial due diligence and form a significant basis for the investment case and business model.

4.84 Relationship to standards/policies

- Contribute towards the UK Governments 'The Environmental Targets (Woodland and Trees Outside Woodland) (England) Regulations 2023' which states that "by the end of 31st December 2050 at least 16.5% of all land in England is covered by woodland and trees outside woodland."
- The UK Forestry standard (UKFS) determines the species mix in the woodland areas. This project is UKFS compliant. https://www.gov.uk/government/publications/the-uk-forestry-standard
- The UK Woodland carbon code (WCC) determines the framework for carbon sequestration predictions and carbon yield. This project is registered with the WCC. https://woodlandcarboncode.org.uk/
- The Woodland Carbon Guarantee (WCaG) is the UK government reverse auction process that contracts to purchase sequestered carbon units that are compliant with WCC and received offers in the auction processes. https://www.gov.uk/guidance/woodland-carbon-guarantee. All of the project area on J S Youngs has achieved a contract offer in this process.

4.85 Basis for predictions

The carbon predictions have been produced using the Forestry Commission Woodland Carbon calculation spreadsheet as required to register the project with the WCC. This spreadsheet was modified, in consultation with the FC, to accommodate Paulownia that does not a present have a yield class assigned.

Although ESC does not provide an assessment for Paulownia, UK trials and research carried out by the producer WeGrow support species suitability. Carbon calculations used for the Woodland Carbon Guarantee scheme demonstrate the high yield class (& timber production) potential of the tree.

The site has a DAMS score of 12 (sheltered) and therefore does not limit the intended species mix, all of which have a very high DAMS suitability score for the site. As demonstrated in the ecological site classification (ESC) outputs Annex 2.c "ESC Output inc. DAMS Scores".

4.86 Method of impact identification

The WCC process subject to validation, by a FC approved verifier, to ensure that the project sites are established as per the agreed plans. After every 5 years the carbon capture is calculated by a verification visit by the FC approved verifiers. The Soil Association and the Organic farmers and Growers are the current approved verifiers.

CPL will also me measuring the soil carbon impacts by using an isotope-based methodology (https://www.omniaprecision.co.uk/terramap/ This will baseline active soil carbon. CPL will revisit and ground truth geo located sites every 4 years to assess the increasing levels. C:N ratio will be tracked inn a similar way to the above analysis showing the changes in soil ratios as the system begins to 'settle' from modern arable production

4.87 Uncertainties and unknowns

The plantation growth of the Paulownia element will be subject to UK climate and growing conditions that have been untested to date. Carbon modelling has however been based on similar climatic and management conditions in Europe and is expected to yield similar results.

4.9 Impact 9: UK Hardwood production increases

4.91 Change from existing or baseline

The UK is one of the largest net importers of forest products by value in the world, second only to China. In total, 80% of the nation's wood is imported.

The UK timber sector is predominated by softwoods. There are also issues with the uses that wood products are being put to. From a carbon accounting perspective, there is a considerable difference between wood used in construction, which may last a century or more, and wood used in fencing, which may last 15 years. Evidence also suggests that at least half of UK-grown wood was being used in relatively short-term applications, such as paneling, fencing and pulp. A further quarter was being burned for energy. These short-term end uses release the carbon captured on wood negating some of the benefits of woodland as a carbon mitigation strategy. This is a complex area are discussed within a RSPB report on Woodlands for Climate and Nature http://ww2.rspb.org.uk/Images/Forestry%20and%20climate%20change%20report%20Feb%202020_tcm9-478449.pdf

The commercial production of Paulownia offers a different opportunity. Paulownia is a hardwood with a very high tensile strength to weight ratio. It is generally used as a plywood, a veneer, for making furniture, storage crates, musical instruments, surf boards and in the construction industry. These in general are long term applications for the wood produced.

This project will produce approximately 14,000 tonnes of Paulownia timber over the 35 years. This is a very positive impact.

4.92 Nature of the change

The present land use agricultural cropping produces no timber.

4.93 Confidence level of prediction

The confidence level is high. The timber production models has been researched and evidenced, subject to commercial due diligence and form a significant basis for the investment case and business model.

4.94 Relationship to standards/policies

The UK Forestry standard (UKFS) determines the species mix in the woodland areas. This project is UKFS compliant. https://www.gov.uk/government/publications/the-uk-forestry-standard

4.95 Basis for predictions

Although ESC does not provide an assessment for Paulownia, UK trials and research carried out by the producer WeGrow support species suitability. Carbon calculations used for the Woodland

Carbon Guarantee scheme demonstrate the high yield class (& timber production) potential of the tree.

The site has a DAMS score of 12 (sheltered) and therefore does not limit the intended species mix, all of which have a very high DAMS suitability score for the site. As demonstrated in the ecological site classification (ESC) outputs Annex 2.c “ESC Output inc. DAMS Scores”.

The timber production models has been researched and evidenced, subject to commercial due diligence and form a significant basis for the investment case and business model. Due to Paulownias' versatility and light strength to weight ratio coupled with its fast growing nature, it lends itself for the most suitable timber for future markets in mostly non-decorative hardwood, including all sustainable uses.

The harvest cycle is based on 8 harvests within the 35-year project timeline. Each harvest will be of 50% of the plantation. This means that any individual tree is harvested every 9 years.

The native plantings will remain indefinitely.

4.96 Method of impact identification.

The sale of the Paulownia timber is underwritten by a floor price for 10 years. The quantity of sale will be recorded as a measure of output and impact.

4.97 Uncertainties and unknowns

The plantation growth of the Paulownia element will be subject to UK climate and growing conditions that have been untested to date. Timber modelling has however been based on similar climatic and management conditions in Europe and is expected to yield similar results.

The price of hardwood timber is underwritten by a floor price for the first 10 years and likely to increase.

5 Significant impacts and mitigation

5.1 Impact 1: Invasiveness

5.11 Approach to evaluation

CPL has consulted and worked with the Forestry Commission throughout the WCPG1 & WCPG2 process to ensure a project design that allows for invasiveness risks to be minimised.

The Non-Native Risk Assessment Forum (NNRAF) process, introduced at a later stage in project formulation in the original EIA process , has also been embraced to accommodate a wider perspective on the parameters to evaluate.

The above dialogue together with the feedback from the scoping meeting puts CPL in a strong position to understand all perspectives and collaborate on evaluation design and deliver ongoing evaluation of project sites.

The monitoring framework, designed by Forest Research, will form the basis for that evaluation of any impacts, this has been formally incorporated into the conditions of consent in the existing EIA’s.

5.12 Thresholds of concern

These will be clarified and documented within the monitoring framework

5.13 Avoidance/reduction/remediation/compensation

Project designs and plantation management, described earlier in this statement, have been formulated and will be delivered to ensure avoidance and reduction measures are an integral part of design and ongoing plantation management. These include site selection framed within avoidance of sensitive features, buffers and sucker monitoring zones, operation practice to minimize apical dominance suppressing suckering and physical destruction of any identified potential invasiveness features.

If a threshold of concern was crossed appropriate and proportional actions would be taken such as destroying problem trees. These to be agreed within the monitoring framework and within the conditions of consent.

5.14 Expected effectiveness of mitigating proposals

These are expected to be highly effective.

5.15 Residual impacts

CPL recognise some residual concerns that cannot be addressed at this point in time (and without several further years of trial work in UK conditions). CPL is committed to long term transparent monitoring and will indemnify any mitigation that may become necessary.

5.2 Impact 2: Water

5.21 Approach to evaluation

CPL will confirm that the key monitoring parameters as set out within the previous conditions of consent remain appropriate.

These covered:

- Rainfall – Open and below canopy.
- Baseline evapotranspiration (ET) demand – Penman Monteith (ETo) (wind speed, solar radiation, humidity, barometric pressure).
- Plant actual ET estimate (ETc).
- Irrigation application rates.
- Soil water content at different depths (5, 10, 20, 30, 50 and 100 cm).
- Runoff/infiltration estimates –baseline and under forestry.

To enable comparison with the baseline of agricultural production these parameters would be monitored within plantation and then in a suitable local location outside. This would need to be across a number of years to accommodate annual climatic variance.

The range of parameters, methodology of approach would be finalised and agreed with the Environment agency.

5.22 Thresholds of concern

The thresholds of change from the baseline would be agreed with the Environment Agency.

5.23 Avoidance/reduction/remediation

Please see the Ecological Site Classification output Annex 2.c “ESC Output inc. DAMS Scores” the highlighted native species mix have been chosen based on their overall suitability, including water use and drought tolerance. They therefore have no additional water demand through irrigation

5.24 Expected effectiveness of mitigating proposals

The information collated across all water areas has outlined a high likelihood that there will be no change or a positive change against baseline.

Irrigation and associated abstraction licensing is subject to Environment Agency control and the "hands off" mechanism that would be brought into play in extreme circumstances to manage abstraction quantities.

Water resource balance change would be determined over an extended timescale to accommodate annual fluctuations. It would also need to be against the background of groundwater baseline change as the climate changes. The timescale for meaningful evidence is likely to be 10 plus years.

Ultimate mitigate would be a reduction in plantation size/density or in plantation management. This would affect the economic returns and business model that underpins the project and all alternatives for mitigation would be explored if and when this point was reached.

5.25 Residual impacts

None likely.

5.3 Impact 3: Landscape character change

5.31 Approach to evaluation

Prior to more detailed site-specific design options, screening and consultation took place to identify and finalise suitable planting sites and areas. Landscape formed an integral part of this stage, with potential sites chosen away from statutory and local authority landscape designations.

The first step in the design process involved the development of Site Context Map Annex 1.a "Site Context Map" to highlight any significant environmental features, settlements, roads and other infrastructure. This was followed by a more detailed Site Appraisal Plan Annex 1.b "Site Appraisal Plan", involving the evaluation of landscape analysis information, and representation in a map-based format with more detailed features depicted on the site. Consideration of the 7 forestry design principles was also taken at this stage.

Following a more detailed synthesis exercise pulling together various sources of information and survey data, a Design Concept Plan Annex 1.c "Design Concept Plan" was produced to demonstrate a viable woodland design option, and an Outline Landscape & Visual Appraisal then carried out on that design.

5.32 Thresholds of concern

The thresholds of change from the landscape character profile baselines have been established through landscape analysis carried out as part of Stage 2 of the WCPG, which concluded the level of change as being UK Forestry Standard compliant.

5.33 Avoidance/reduction/remediation/compensation

Mitigatory factors associated with preserving landscape character are focused around planting location, layout, species mix and design, all of which are implemented at the outset and are to an extent irreversible. Consequently, all efforts regarding landscape character have been invested into the avoidance of adverse impacts, with little scope for remedial action or successive compensation.

5.34 Expected effectiveness of mitigating proposals

A high level of informed mitigatory design built into project layout and silviculture elements provides a high expected effectiveness of mitigating proposals.

5.35 Residual impacts

Despite the requirement to produce a UKFS compliant woodland proposal whilst meeting the hardwood timber output necessary for the projects financial structure and fulfilling the conditions of various statutory and non-statutory consultees, the final project design accommodates the majority of landscape character requirements. Residual impacts associated with landscape character which haven't been addressed in the project design to some extent are minimal.

5.4 Impact 4: Biodiversity changes on project sites

5.41 Approach to evaluation

Our intention is to monitor across 4 project biodiversity areas:

a) Plantation understorey.
b) Native woodland plantings.
c) Bare areas/Buffer strips.
d) Hedgerows.

Across these ecosystems we will evaluate invertebrates, floral diversity, soil microbial biomass, soil carbon, birdlife.

A more detailed description is set out in Annex 3.d "Biodiversity Report Summary".

5.42 Thresholds of concern

None identified

5.43 Avoidance/reduction/remediation/compensation

Natural England's points raised during consultation around Impact on European protected sites, Stone Curlews and Breeding Waders have all been assessed and where relevant incorporated into project design and ongoing management. Data from the site does not evidence a habitat important for the species of concern and therefore a requirement to avoid/reduce/remediate/compensate.

The conversion or agricultural land into woodland will reduce risk to adjoining water courses through a number of means. Nitrate as a diffuse pollutant associated with arable cropping practices will cease, and improved soil structure and organic matter will in time increase soil stability and water holding capacity. The effect of this being reduced run off leading to a reduction in dissolved nutrients which can potentially pollute water courses.

Any risk associated with the potential invasiveness of the non-native tree species and its potential impact on the local environment will be managed and mitigated through project design and within the statement of conditions, previously agreed with the Forestry Commission.

5.44 Expected effectiveness of mitigating proposals

The mitigations are expected to be positive and effective in maintaining and improving biodiversity. Connectivity of habitats will be increased and resilience improved.

5.45 Residual impacts

None identified.

5.5 Impact 5: Degradation of soil carbon in peat soils

5.51 Approach to evaluation

Consultation with Natural England and reference to the Natural England peat map of "Deep Peaty Soils" through the Forestry Commission Map Browser. The site falls within the Natural England peat map as "Deep Peaty Soils", however a Forestry Commission and Natural England agreed methodology was used to determine SOM % and therefore whether a peat survey would be required. Appendix 2.e shows the results of the organic matter content determined by Loss on Ignitions tests. All results are below 30% which concludes that the site doesn't contain restorable peat and no further action is required.

5.52 Thresholds of concern

A Forestry Commission and Natural England agreed methodology was used to determine SOM % and therefore whether a peat survey would be required. Appendix 2.e shows the results of the organic matter content determined by Loss on Ignitions tests. All results are below 30% which concludes that the site doesn't contain restorable peat and no further action is required.

5.53 Avoidance/reduction/remediation

N/A

5.54 Expected effectiveness of mitigating proposals

N/A

5.55 Residual impacts

N/A

5.6 Impact 6: Damage to archaeological and historic sites

5.61 Approach to evaluation

Consultation with NCCHE with subsequent reports produced and analysed in collaboration with Forestry Commission archaeology advisors steered mitigation measures.

5.62 Thresholds of concern

Thresholds of concern agreed with internal Forestry Commission archaeology advisers in consultation with NCCHE

5.63 Avoidance/reduction/remediation

Avoidance though mitigation measures employed.

5.64 Expected effectiveness of mitigating proposals

Mitigations are expected to be effective based on the extent of expert input, research and advice.

5.65 Residual impacts

None expected

5.7 Impact 7: Local residents quality of life changes

5.71 Approach to evaluation

The design and planning process undertaken as part of WCPG2 set out to identify local residents who may be impacted by the project. Due to the remote location of the site no local residents were identified as being directly impacted.

5.72 Thresholds of concern

The main threshold identified related to potential long distance (1+km) views of the project. Concerns over the change in view from properties is not a threshold that is easily quantifiable and a more subjective measure, especially given the negligible potential impact in the case.

5.73 Avoidance/reduction/remediation/compensation

Planting of native buffers around site perimeters is intended to mitigate against the potentially regimented view of the Paulownia planting. Increased native planting and open areas are intended to improve visual aspect.

5.74 Expected effectiveness of mitigating proposals

The mitigating proposals will help maintain views across the wider landscape character profile.

5.75 Residual impacts

None

6 Summary statement of the significant impacts

There are 2 impacts identified that could have negative outcomes: invasiveness and landscape change. These have both the subject of mitigation of impact and their potential likelihood.

The potential of invasiveness could be a considerable impact, however the likelihood of this impact is very low. There is no evidence, to date, of invasiveness of this clone in any plantations under management, however the planned monitoring and control measures are rigorous. CPL accept that the precautionary principle approach (the unknown unknowns) remains. Alongside Forestry Research and the Forestry Commission, a mitigation, monitoring and control programme has been developed to counter any potential future eventuality, some of which have already been designed into each plantation block. An ongoing Risk Assessment process incorporating the NNSS (Non-Native Species Secretariat), DEFRA, Academia and all commercial operations will constantly evaluate the new plantations.

The impact of landscape change has been assessed through landscape analysis work and consultation with Norfolk County Council and Forestry Commission Landscape Advisors, concluding that landscape change will not affect overall landscape character. There may be local landscape impacts, these have been mitigated as much as possible through project design, however some remain but are considered localised and of low overall impact.

The impact on water (irrigation and water balance) and on local residents have been concluded as negligible. Natural England have also confirmed that the project site does not contain any fields with peat levels above the threshold of concern or where peat levels are capable of restoration.

The impacts on biodiversity have been assessed concluding there will be minimal impact on priority species and protected sites.

Carbon capture and UK hardwood supply have been concluded as all very positive. The project brings significant positive impacts across all these areas.

Overall CPL conclude that the positive impacts are significant and near certain. These outweigh the low likelihood of any potential negative impacts.

7 Consultees

Additional organisations participated in the scoping meeting as recorded in Annex 6.b "CPL EIA Scoping Meeting Agenda and Participating Organisations".

8 Annex List

		Appendices
Primary Outputs	Forestry Commission Approved WCPG Stage 2 Document - JS Youngs (V2)	1
Visual Outputs	Site Context Map	1.a
	Site Appraisal Plan	1.b
	Design Concept Plan	1.c
	Final Woodland Creation Design Plan	1.d
Survey/Analysis Outputs	Soil Survey Results	2.a
	Landscape Analysis Work	2.b
	ESC Output inc. DAMS Scores	2.c
	RSPB Stone Curlew Nest Records	2.d
	Peat Sample Summary	2.e
	Soil Survey	2.f
	Archaeological Metal Detecting Survey	2.g
	FC-NE Agreed Soil Sample Methodology	2.h
	JS Youngs Designations List	2.i
	NBN Atlas Bird Records	2.j
	LERC Data	2.k
Key Supporting Documents	Silviculture; Ground Preperation Species Mix Planting Design	3.a
	CPL Report - Paulownia Irrigation Demand	3.b
	Paulownia Water Use Report	3.c

	Biodiversity Report Summary	3.d
	WeGrow Plantation Maintenance & Growth Report	3.e
	Phoenix One Sterility and Invasiveness summary	3.f
	High Level Water Balances	3 g
Invasiveness/Sterility Material	Paulownia Elongata Risk Assessment - Hawai Import	4.a
	Paulownia Fortunei Risk Assessment - Hawai Import	4.b
	Phytosanitary Certificate	4.c
	Portuguese Risk Analysis on the Introduction of Paulownia - Ecological Characterisation	4.d
	Portuguese Risk Analysis on the Introduction of Paulownia	4.e
	Portuguese Risk Assessment for Phoenix One	4.f
	Prof. Dr. Ralf Pude, University of Bonn - Phoenix One Sterility Statement	4.g
	University of Bonn Pheonix One Sterility Report	4.h
	Defra Invasive Alien Species Team Mail	4.i
	GB non native species risk analysis Phoenix One Vs 2	4.j
	A case for the non invasiveness of Paulownia	4.k
	Paulownia in China – Zhu et al"	4.l
	Comparison of inflorescence & Infractescence within different Paulownia genotype lines"	4.m
	Paulownia Invasive or not (Gillard)	4.n
	Berget at al Survivorship, attained diameter, height & volume of three Paulownia species, USA"	4.o
	Paulownia Phoenix One - RAv2 NNRAF Comments on Draft Risk Assessment	4.p
	Paulownia Phoenix One - RAv2 Draft Risk Assessment	4.q
Consultee Responses	NCC Archaeology Report - JS Young Farms	5.a
	Environment Agency - Woodland Creation Project on Water - J S Young	5.b
	Natural England - Water Dependent Protected Sites	5.c
	Hockwold PC Response	5.d
	Consultation Request - Cross Drove Fishery	5.e
	Consultation Request - RAF Lakenheath	5.f
	Consultation Request - NCC	5.g
	Consultation Request - Norfolk Wildlife Trust	5.h
	Internal Drainage Board	5.i
	RSPB (Tim Cowen)	5.j
	District Council- Private Water Supplies - Hockwold	5.k
	Consultation Request - Historic England	5.l
	Consultation Request - NE Peat Assessment	5.m
	Natural England Final Case Response	5.n
	David Robertson Response to Witham Archaeology	5.o
	Jay Doyle FC Ecology National Lead	5.p

	Consultation Response - NCC	5.q
	NE Post Scoping Meeting Response	5.r
	RSPB Lakenheath Fen	5.s
	Norfolk Wildlife Trust Response (Pioneer)	5.t
	Natural England Agreement of HRA Screening	5.u
Scoping Meeting	Scoping Meeting Issues Log	6.a
	CPL EIA Scoping Meeting Agenda & Participating Organisations	6.b
	2023 Scoping meeting 1 & 2 - minutes and attendee list (Final)	6.c
Other	SRF Monitoring Framework	7.a
	Pioneer Anonymised Conditions of Consent	7.b
	Habitat Regs Screening Form - JS Youngs	7.c
	GB Risk Assessment Phoenix One May 2021	7.d