Pitstone Quarry
Landscape Restoration

Landscape Design Principles and Materiality

12732-LUC-SH-001

Version 2.00
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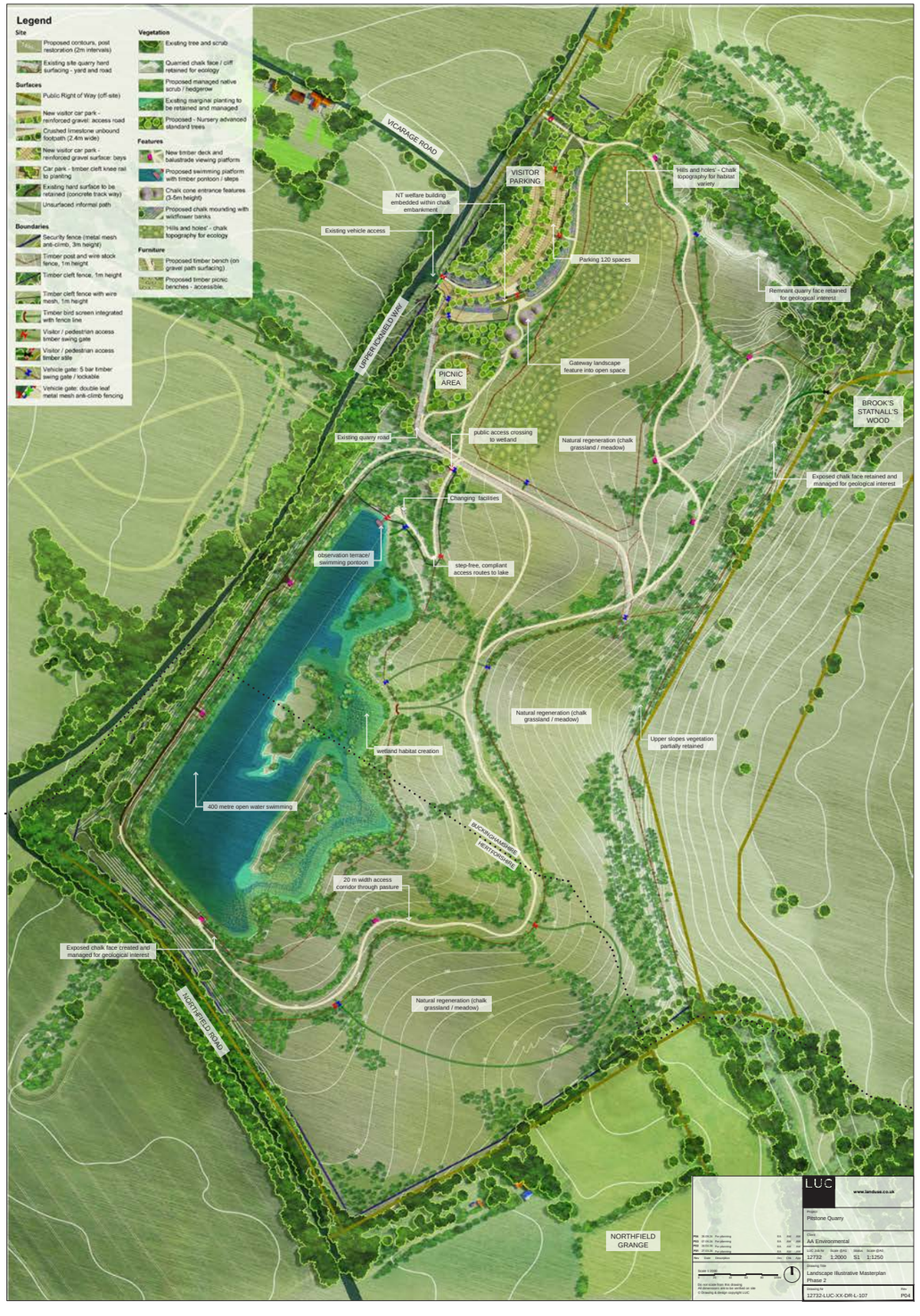
Prepared by LUC

Existing Site
2023

Landscape - Illustrative Masterplan

Phase 1 - Partial Restoration / Active Quarry Site

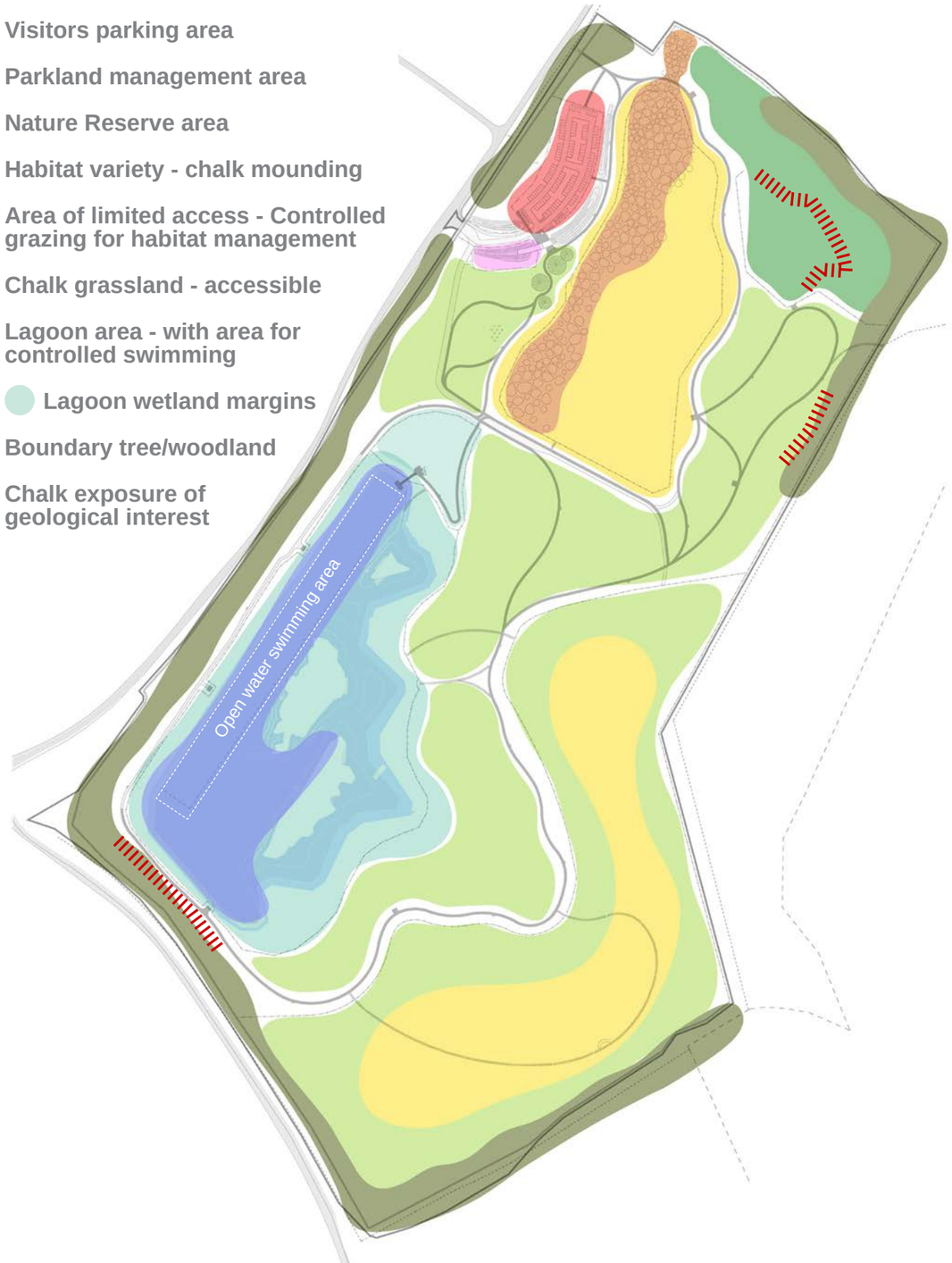
Phase 2 - Completed Land Restoration



Landscape materiality
Character areas - Site wide

Key

- Visitors parking area
- Parkland management area
- Nature Reserve area
- Habitat variety - chalk mounding
- Area of limited access - Controlled grazing for habitat management
- Chalk grassland - accessible
- Lagoon area - with area for controlled swimming
- Lagoon wetland margins
- Boundary tree/woodland
- Chalk exposure of geological interest



Chalk grassland managed by grazing

Chalk mounding to promote ecological diversity. Image: Aston Clinton Rag Pits SSSI (chalk quarry site)

Restricted access - nature reserve and area of geological interest

Lagoon - exisitng water body

Indicative image: gravel surface - 120 spaces car park set within native tree planting to provide screening and shade

Regenerated chalk grassland

Landscape materiality
Hard surfacing: Site-wide

Key

- Crushed limestone unbound paths
- Timber decking to viewing terraces
- Water access - timber deck pontoon / lake observation terrace
- Timber bird screen / wall
- Existing hard standing path (concrete)
- Existing vehicle track way retained for maintenance access
- Unsurfaced path

Crushed limestone unbound paths - 2.4m wide

Existing heritage track way (concrete) to be retained / upgraded where required - to be used for public access

Indicative: Timber decking and balustrades to viewing points

Indicative: Timber decking pontoon / observation terrace

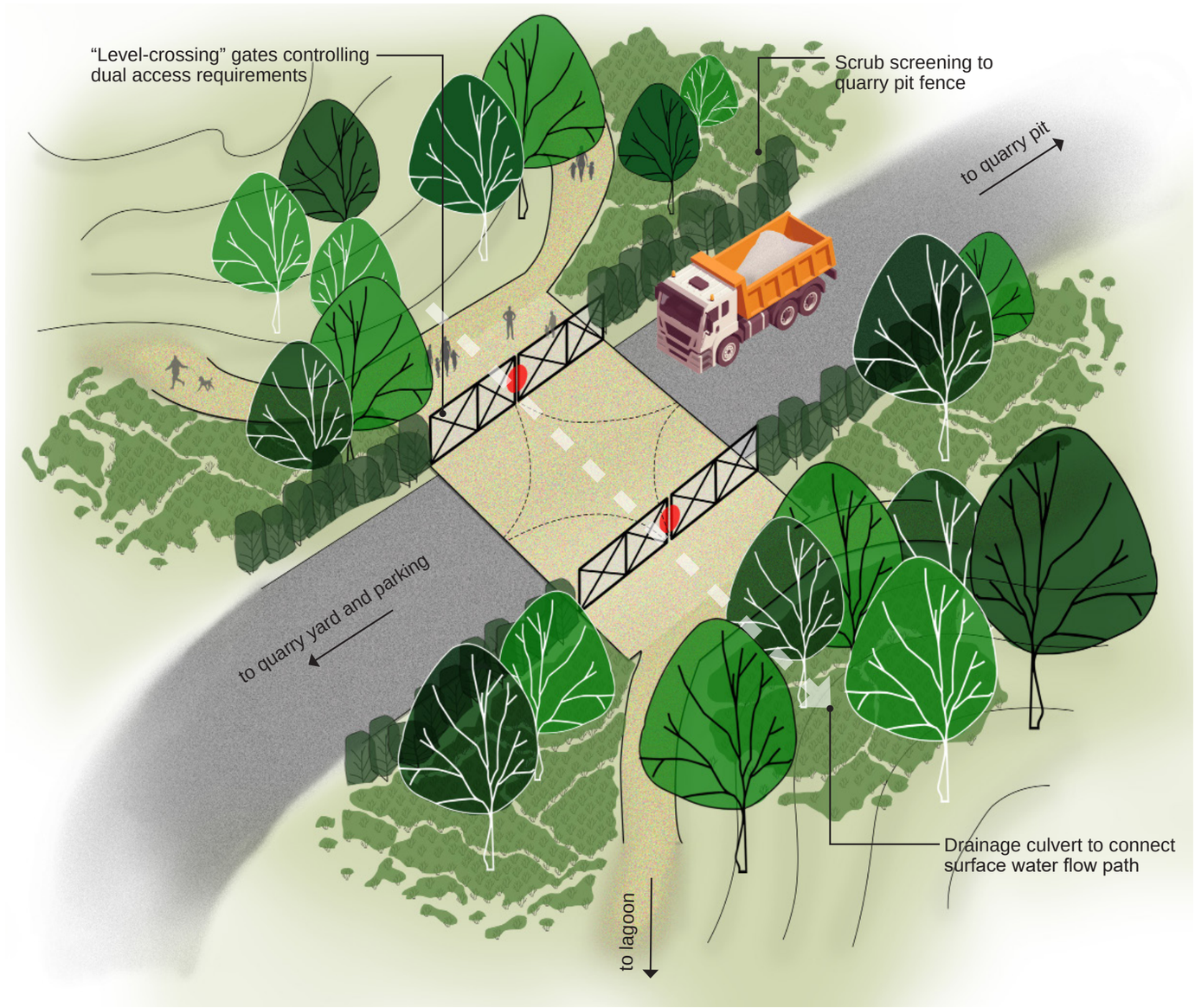
1.2m parapets with incorporated bird hide screens.

Indicative: Timber bird hide screen/wall built into sloped bank to lake foreshore, nested within existing scrub planting

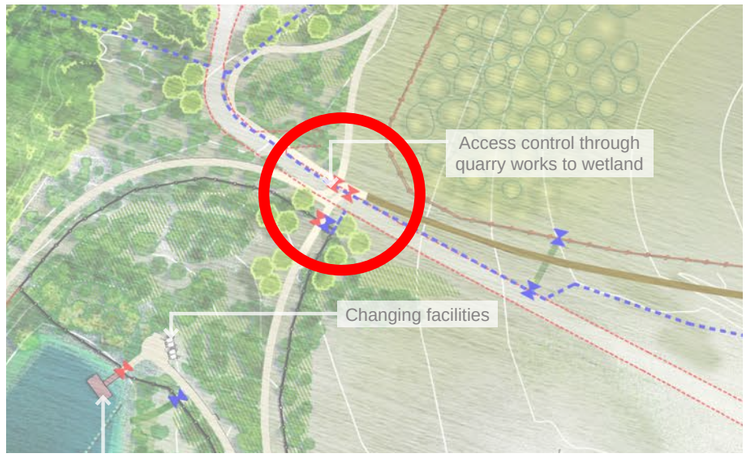
Landscape access
Interim Access Control (Phase 2)

During Phase 2 active quarry works the site will operate with an access control point for visitor safety:

- A level crossroad feature managing weekday quarry access / traffic running east-west and recreational access north-south (to wetland) will be in place for duration of Phase 2.
- On completion of Phase 2 - the western section of the access track will be retained for future use, in Phase 2 onwards, by the National Trust for park maintenance vehicle access.



Indicative sketch: Phase 2 Access Control point for quarry traffic / park visitors



Location: Control access point (adjacent access to swimming area)

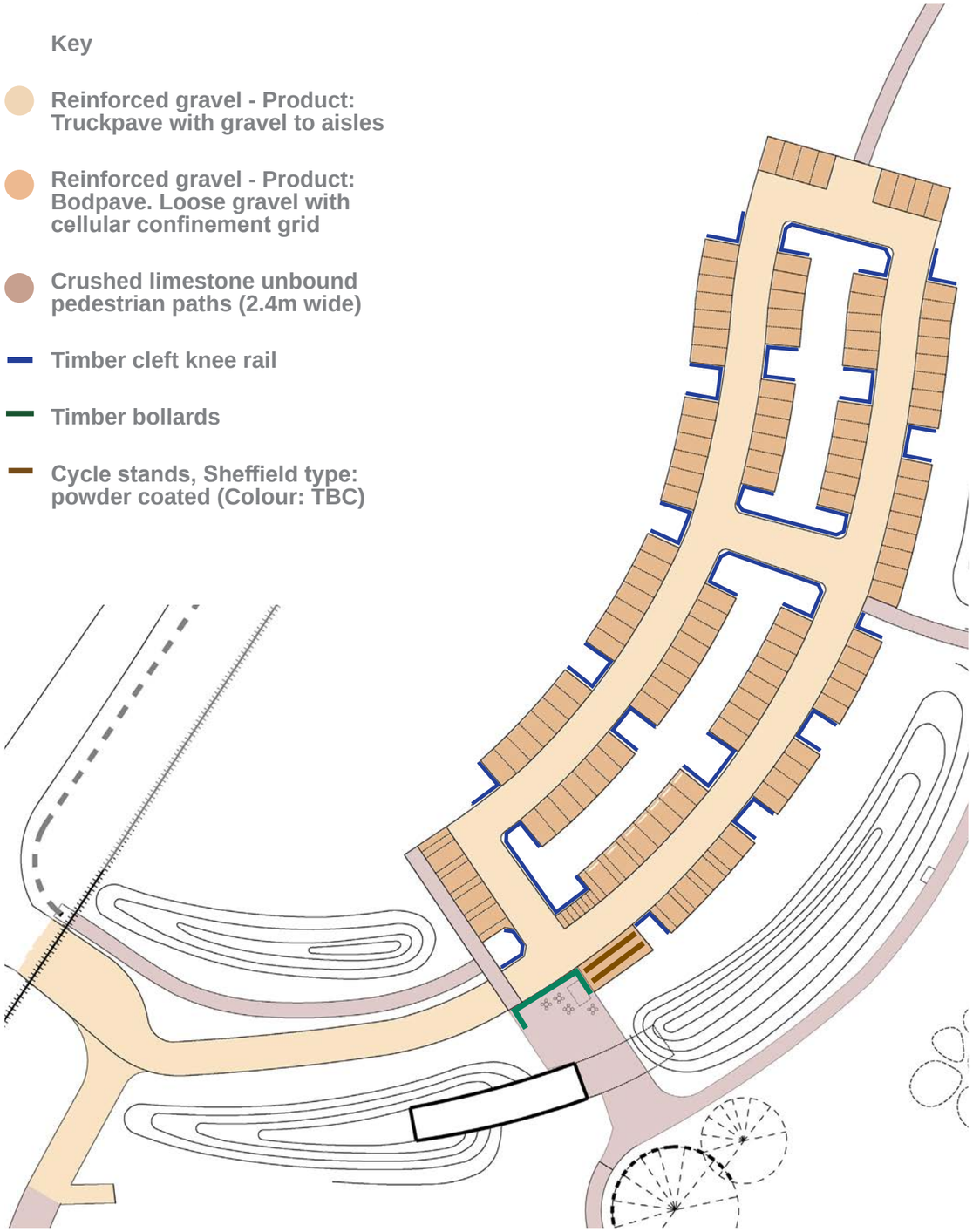
Indicative: Control access point - with gated control to vehicle track during Phase 1

Indicative: Location of control access point on-site (current condition)

Landscape materiality
Hard surfacing and furniture - Visitor car park

Key

- Reinforced gravel - Product: Truckpave with gravel to aisles
- Reinforced gravel - Product: Bodpave. Loose gravel with cellular confinement grid
- Crushed limestone unbound pedestrian paths (2.4m wide)
- Timber cleft knee rail
- Timber bollards
- Cycle stands, Sheffield type: powder coated (Colour: TBC)



Truckpave with gravel to aisles

Bodpave - Loose shingle within cellular confinement grid for parking bays.

Timber knee rails to protect ground flora

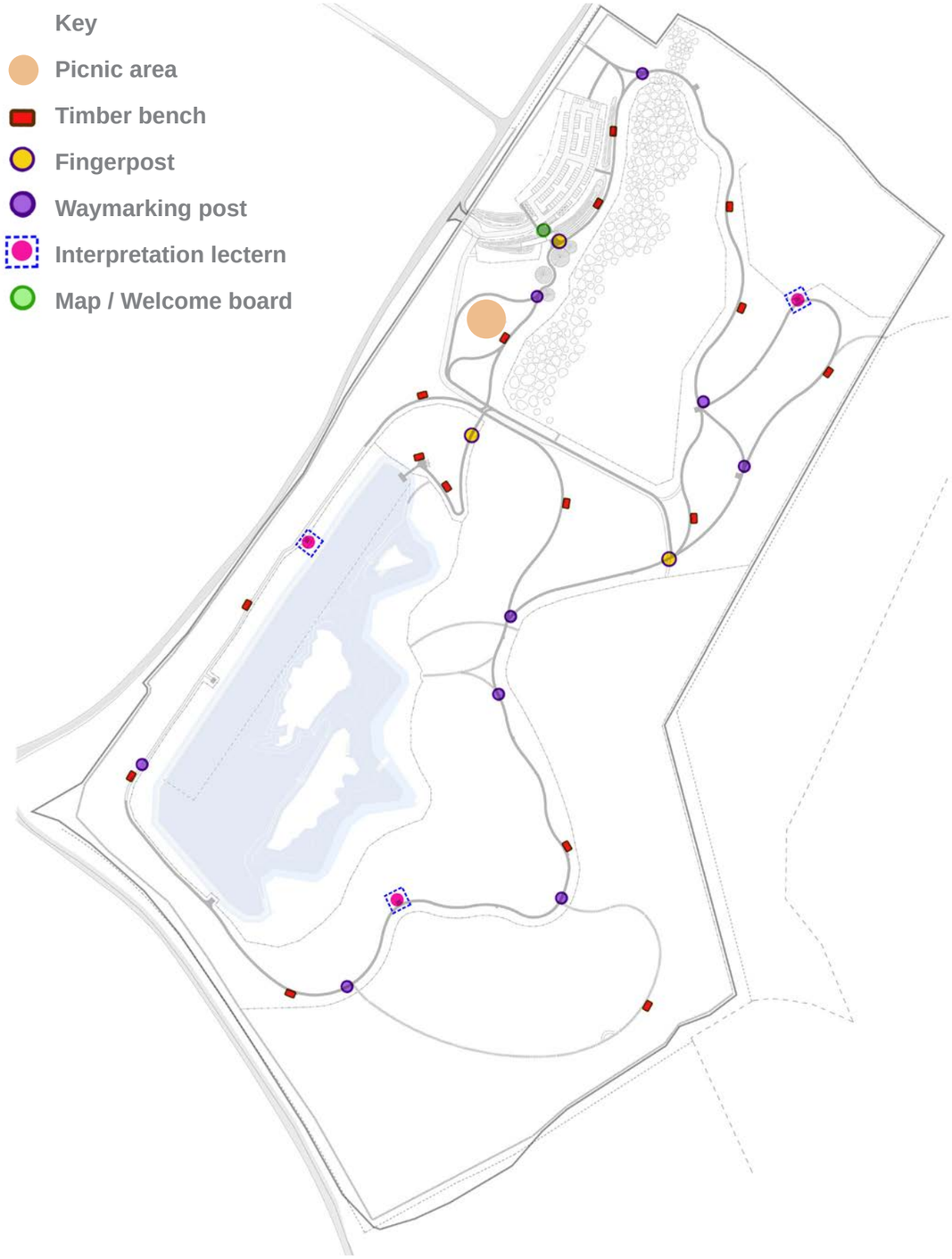
Timber bollards boundary to parkland gateway

Cycle stand, Sheffield style, dark green coating (TBC), root fixed. Located adjacent to welfare facilities.

Landscape materiality
Site furniture and signage: Site-wide

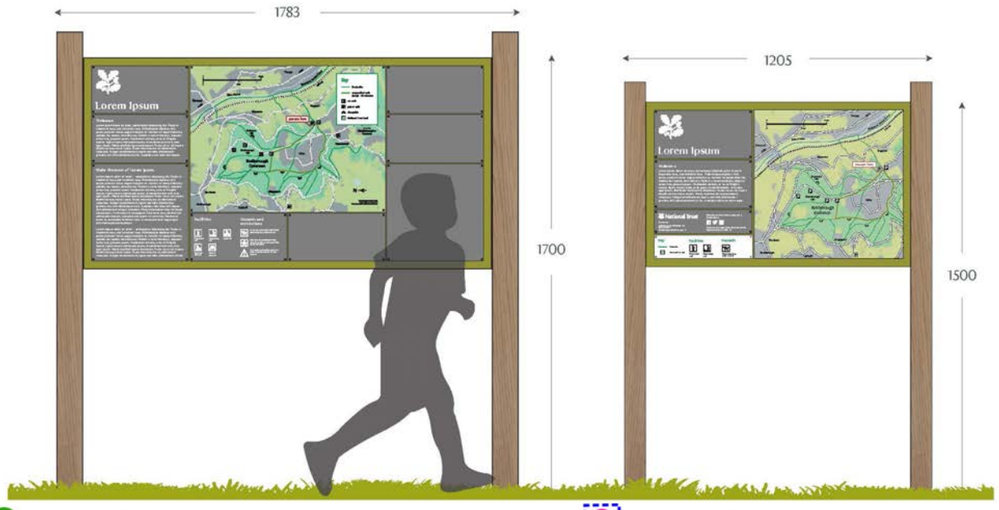
Key

- Picnic area
- Timber bench
- Fingerpost
- Waymarking post
- Interpretation lectern
- Map / Welcome board



Accessible timber picnic tables

Site-wide timber benches



Indicative: Timber welcome / entrance board

Indicative: Timber Interpretation lectern to viewing terraces (3No)

National Trust way marker signage

Indicative: Timber waymarking post

Indicative: Timber fingerpost

Landscape materiality
Fencing extents and type - Site wide

Key

Fencing:

- Post and wire stock fence - 1m height.
- Timber cleft fence - 1m height
- Timber cleft fence with wire mesh
- Boundary line - security fence

Gates:

- Timber swing gate - pedestrian access
- 5 bar timber swing gate - vehicle access
- Double leaf metal mesh - vehicle access
- Timber stile

Timber post and wire stock fence - 1m height.

2m high anti-climb security fencing, with double leaf vehicle gate to road entrance, (product: Zaun HiSec 358or similar approved)

Traditional timber Cleft fence

Timber Cleft fence with wire mesh panels where supporting grazing

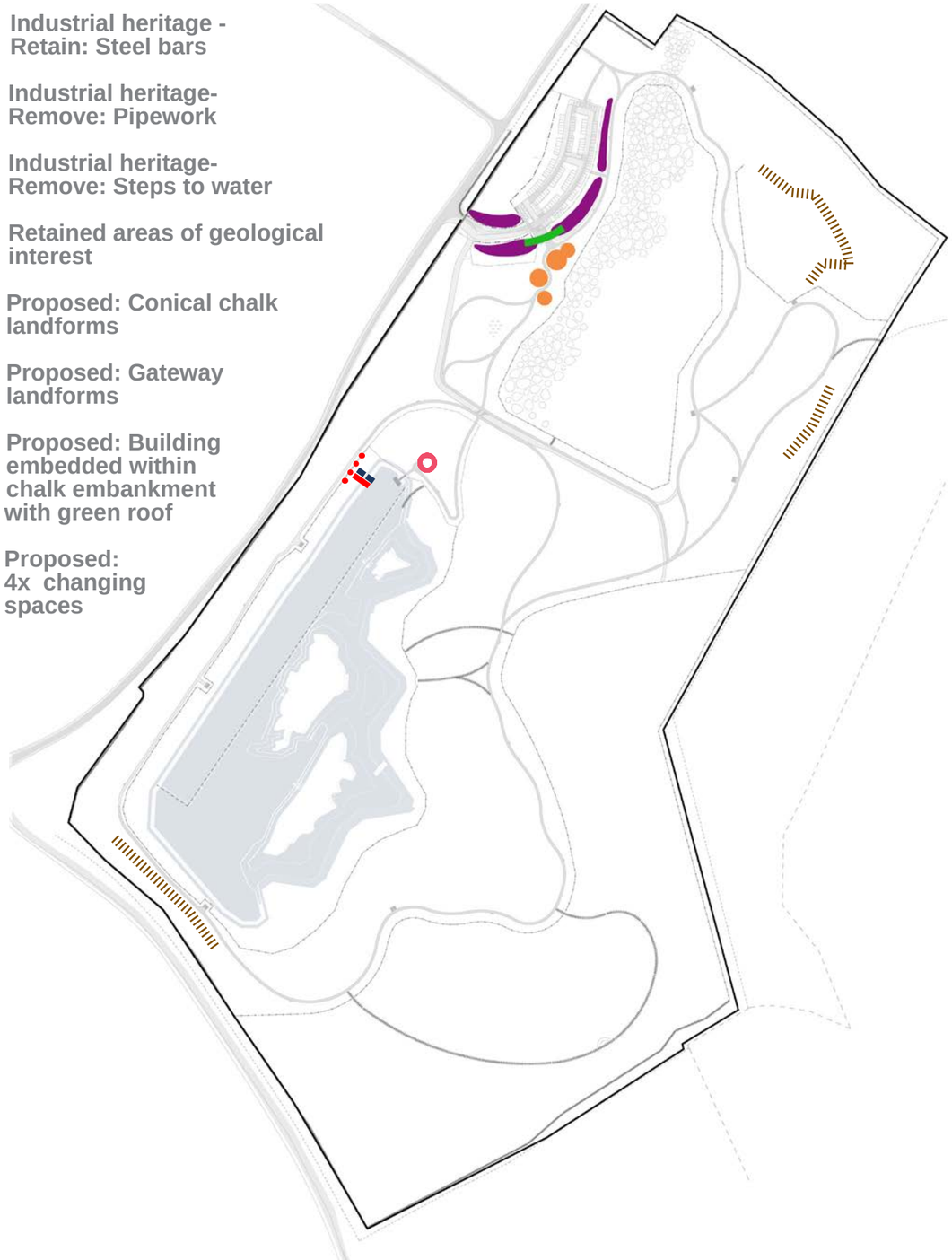
Timber pedestrian gate - 2 way self closing (product: Centrewire - or similar approved)

Timber pedestrian gate - 2 way self closing (product: Centrewire - or similar approved)

Landscape features
Key landscape and built elements - Site wide

Key

- Industrial heritage - Retain: Steel bars
- Industrial heritage- Remove: Pipework
- Industrial heritage- Remove: Steps to water
- Retained areas of geological interest
- Proposed: Conical chalk landforms
- Proposed: Gateway landforms
- Proposed: Building embedded within chalk embankment with green roof
- Proposed: 4x changing spaces



Existing: H-bar posts retained along path as industrial heritage features

Proposed: Indicative - building embedded within chalk embankment with green roof for site welfare

Existing: Chalk Cliff - feature of geological interest

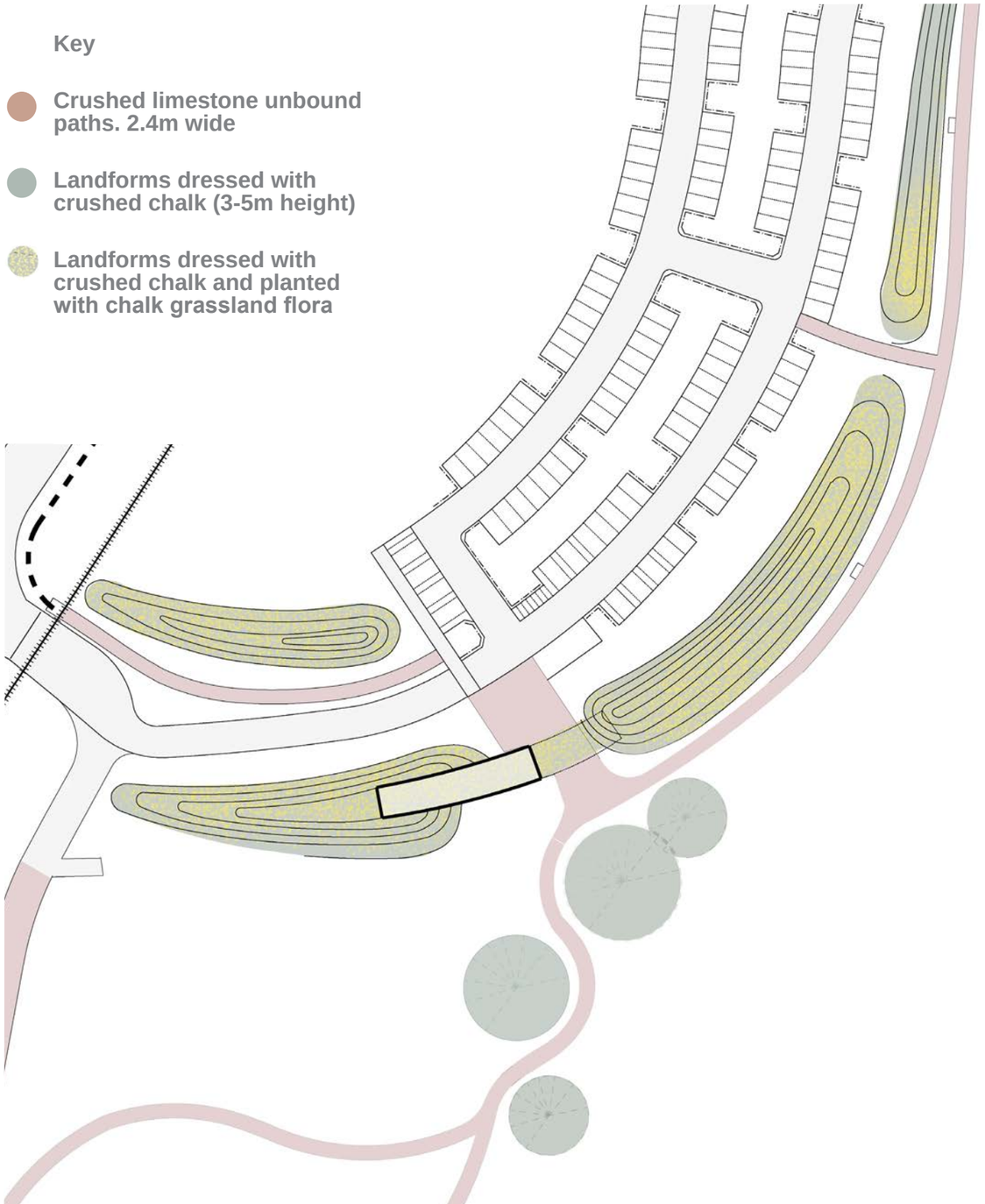
Proposed: Indicative - ‘off grid’ changing units / pods

Proposed: new chalk conical land forms at main entrance to celebrate the site history and use a chalk quarry

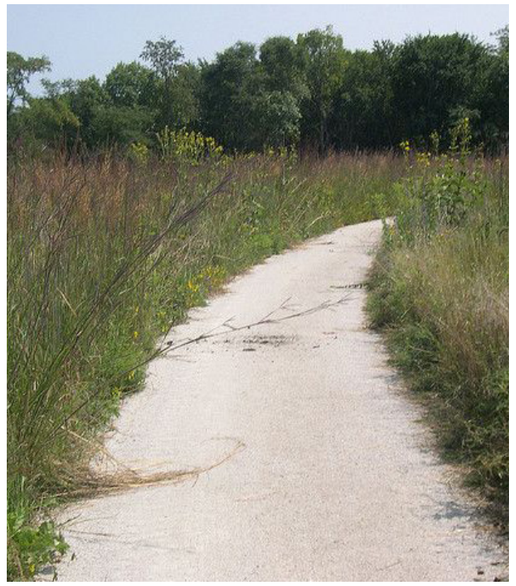
Landscape materiality
Hard landscape features - Parkland arrival

Key

- Crushed limestone unbound paths. 2.4m wide
- Landforms dressed with crushed chalk (3-5m height)
- Landforms dressed with crushed chalk and planted with chalk grassland flora



Entrance feature: New landforms dressed with crushed chalk to both sides of the entrance road creating new site arrival and visibility screen to car park area



Site wide path routes: limestone paths through planting and through conical chalk landform feature

Landmark: Conical landforms dressed with crushed chalk. Feature echoing the historical quarry processes

Habitat Creation
Site wide seeding and planting strategy

Habitat Creation

In order for there to be successful habitat creation the site will recognise the existing site conditions, A long-term vision and landscape character will be achieved through establishment and maintenance best practise guidelines.

The majority of the site is to be managed grazed chalk grassland. Chalk grassland species will be allowed to regenerated naturally on the site over time supported by management and grazing regimes.

The vision for the site falls into four broad habitat types:

- Chalk Grassland regeneration
- Woodland Tree Planting
- Woodland Pasture / Scrub / Hedgerows
- Open water

Woodland / Tree Planting

The site has a number of existing trees and the proposals aim to replicate this native palette with the potential to add additional species found within the local landscape. Tree planting will be focused around the new proposed visitor car park and entrance area.

Trees will be selected from the below list.

Trees:

Quercus robur (English Oak)
Fagus sylvatica (Common Beech)
Salix alba (White Willow)
Acer campestre (Field Maple)

Wood Pasture / Scrub / Hedgerows

Native scrub, hedgerows and wood pasture provide the site with a range of habitat features. Utilising a native palette the vegetated areas will be managed to allow for the creation of rich wildlife habitats:

Scrub: managed in areas to create defensive thickets to control animal and people movement where not desired

Hedgerows: native species (excluding Blackthorn) planted to fence line boundaries and pedestrian areas to denote boundary lines and provide green corridors.

Wood pasture: mosaic habitat predominately found in areas that are subject to grazing regimes / browsing by large herbivores. Wood pasture landscape will be managed through grazing at edge of the chalk grasslands.

The site is largely enclosed by existing trees, and site wide includes scattered trees and scrub growth throughout that will be retained where feasible and managed to ensure a range of habitat opportunities are achieved, site security, and landscape legibility

Small trees and shrubs:

Corylus avelanna (Hazel)
Crataegus monogyna (Hawthorn)
Prunus spinosa (Blackthorn)
Euonymus europaeus (Spindle)
Ilex aquifolium (Holly)
Ligustrum vulgare (Common Privet)
Ulex europaeus (Gorse)
Rosa canina (Dog Rose)
Sorbus acuparia (Rowan)
Viburnum opulus (Guelder Rose)


Chalk grassland regeneration - managed through grazing


Crataegus monogyna (Hawthorn)


Euonymus europaeus (Spindle)


Fence lined with native hedgerow to publicly accessible areas


Corylus avelanna (Hazel)


Prunus spinosa (Blackthorn)

Habitat Creation
Site wide seeding and planting strategy

Chalk Grassland

The main open areas of land at the quarry post works will be allowed to naturally regenerate into a chalk grassland character over time.

Proposals will allow natural regeneration of grassland/meadow through seed colonisation from the local soil seed bank and seeds blown in. This will be controlled through annual maintenance regimes and grazing processes to create a diverse sward bespoke to the Chilterns AONB. Alongside natural regeneration, grassland areas may be supplemented with localised improvement techniques such as:

Harvesting and seeding from local chalk grassland - Utilising the Ashridge Estate to lift cuttings from the adjacent/neighbouring grassland, spreading the cuttings on the proposed area for enhancement and allowing the seed population to distribute whilst the hay is drying. This could be undertaken on future phased areas once an established grassland meadow is achieved during the initial landscape restoration stages.

Imported Seed - (e.g. to the entrance mounds) to promote the establishment of standard chalk grassland seed mixes. Seed import to be from approved and certified suppliers. Seed bed prepared as per supplier guidelines.

Should seed be imported to supplement regeneration there are several suppliers within 100km radius of Pitstone. The below is an indicative seed-mix composition of a typical Chalk Grassland from a commercial supplier.

Grasses

- Agrostis capillaris – Common Bent
- Anthoxanthum odoratum – Sweet Vernal-grass
- Briza media – Quaking Grass (w)
- Bromopsis erecta – Upright Brome
- Cynosurus cristatus – Crested Dogstail
- Festuca ovina – Sheep's Fescue
- Festuca rubra – Slender-creeping Red Fescue
- Trisetum flavescens – Yellow Oat-grass (w)

Habitat enhancement - Chalk topography for habitat variety, climate resilience and heritage interpretation: Located within grazed grassland, localised peaks and troughs within the landscape 'hills and holes' will celebrate the heritage of quarrying on the site whilst providing varied habitat opportunities through micro-climate changes and mounding to promote a wider range of species and climatic conditions at the micro level.

Wildflowers (e.g. to entrance land form features)

- Poterium sanguisorba – Salad Burnet
- Plantago lanceolata – Ribwort Plantain
- Centaurea nigra – Common Knapweed
- Leucanthemum vulgare – Oxeye Daisy
- Malva moschata – Musk Mallow
- Silene vulgars – Bladder Campion
- Achillea millefolium – Yarrow
- Knautia arvensis – Field Scabious
- Ranunculus acris – Meadow Buttercup
- Galium verum – Lady's Bedstraw
- Centaurea scabiosa – Greater Knapweed
- Filipendula vulgaris – Dropwort
- Galium album – Hedge Bedstraw
- Primula veris – Cowslip
- Hippocrepis comosa – Horseshoe Vetch
- Lotus corniculatus – Birdsfoot Trefoil
- Linum catharticum – Fairy Flax
- Rumex acetosa – Common Sorrel
- Plantago media – Hoary Plantain
- Rhinanthus minor – Yellow Rattle
- Daucus carota – Wild Carrot
- Ranunculus bulbosus – Bulbous Buttercup
- Anthyllis vulneraria – Kidney Vetch

Marginal and Aquatic Planting

Natural regeneration of marginal and aquatic species to the waters edge will be the preferred process, allowing wetland species to colonise over time. Should planting be required to supplement the natural colonisation in the margins, species could include the following:

Wetlands

- Caltha palustris - Marsh Marigold
- Iris pseudacorus - Flag Iris
- Lysimachia vulgaris - Yellow Loosestrife
- Phragmites communis - Common Reed
- Typha angustifolia - Lesser Reedmace

Chalk grassland

Grass topography: Grimes Graves neolithic mining landscape

Chalk meadow grassland mix

Marginal wetland planting - Loosestrife

Plant Schedule
Proposed Site Plant Mixes

The adjacent schedule details the proposed plant palette mixes for each core soft work planting type proposed:

- Trees
- Hedges
- Scrub
- Meadow

Exact plant percentage mixes and numbers will be confirmed at detailed design.

Natural and managed regeneration is proposed for the site wide grasslands and any areas of marginal and aquatic planting to the existing water body.

Project: Pitstone Quarry - Landscape Restoration

Doc.no.: **LUC-12372-SCH-800_Planting schedule**
Title: PLANTING SCHEDULE

Total no. / quantity	Name	Specification	Tech.	Density
	Trees (Car Park / Entrance)			
38	Acer campestre (Field Maple)	Standard Nursery Stock; 2.0-2.5m height; 8-10cm Girth; breaks; min. 1.0m clear stem; Rootballed	A	Specimen
39	Fagus sylvatica (Common Beech)		A	Specimen
39	Quercus robur (English Oak)		A	Specimen
38	Salix alba (White Willow)		A	Specimen
	Hedges (Informal - 1m wide)			
900	Corylus avelana (Hazel)	Whip Nursery Stock; 60-80cm Height; Bare Root	B	4 pm
900	Crataegus monogyna (Hawthorn)		B	4 pm
900	Ligustrum vulgare (Common Privet)		B	4 pm
900	Rosa canina (Dog Rose)		B	4 pm
900	Viburnum opulus (Guelder Rose)		B	4 pm
	Scrub (Car park)			
210	Corylus avelana (Hazel)	Whip Nursery Stock; 60-80cm Height; Bare Root	B	0.75 psm
210	Crataegus monogyna (Hawthorn)		B	0.75 psm
210	Euonymous europaeus (Spindle)		B	0.75 psm
210	Ilex aquifolium (Common Holly)		B	0.75 psm
210	Rosa canina (Dog Rose)		B	0.75 psm
210	Ulex europaeus (Gorse)		B	0.75 psm
210	Viburnum opulus (Guelder Rose)		B	0.75 psm
	Scrub (Site Wide)			
5,875	Corylus avelana (Hazel)	Whip Nursery Stock; 60-80cm Height; Bare Root	B	0.75 psm
5,875	Crataegus monogyna (Hawthorn)		B	0.75 psm
5,875	Euonymous europaeus (Spindle)		B	0.75 psm
5,875	Ilex aquifolium (Common Holly)		B	0.75 psm
5,875	Ligustrum vulgare (Common Privet)		B	0.75 psm
5,875	Prunus spinosa (Blackthorn)		B	0.75 psm
5,875	Rosa canina (Dog Rose)		B	0.75 psm
5,875	Sorbus acuparia (Rowan)		B	0.75 psm
5,875	Ulex europaeus (Gorse)		B	0.75 psm
5,875	Viburnum opulus (Guelder Rose)		B	0.75 psm
	Meadow Seed Mix (Carpark / Entrance)			
2,560 sqm	EM6 Meadow Mixture for Chalk and Limestone Soils; Supplier: Emorsgate Seeds		40kg/ha - 16kg/acre - 4g/m2	
	Site Wide Natural Regeneratin			
	Note: Natural (managed) regeneration (i.e. no specified species to plant) for: - chalk grassland - marginal / aquatics to water body			na

Key:

Tech. A Tree staking method - 50mm dia. single stake (angled 45). Allow for 50Litres of clean imported soil per tree pit

Tech. B Single cane and rabbit guard

Note: Contractor to suggest availability of species and specification at tender stage and suggest alternatives were required.