Annex 20.2

Preliminary Arboricultural Assessment

(Colin White Tree Surgery and Forestry Contractors)

Client: ABLE UK LTD

PRELIMINARY ARBORICULTURAL ASSESSMENT
ABLE MARINE ENERGY PARK
KILLINGHOLME

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PRELIMINARY ARBORICULTURAL ASSESSMENT ABLE MARINE ENERGY PARK KILLINGHOLME

1.0 SITE OVERVIEW

1.1 The Site of some 245.7Ha is located in North Lincolnshire on the Humber Estuary to the East of North Killingholme and the South East of East Halton.

1.2 The immediate environs are dominated by oil refineries and the Killingholme Power Station the structures of which dramatically dictate the skyline profile.

1.3 Adjacent to the North East corner of the Site is a dock facility for container ships and ferries.

1.4 Despite the industrialization significant areas are dedicated to agricultural tillage land principally producing wheat and oilseed rape.

1.5 The Site is low-lying and subjected to intermittent water-logging despite the presence of a network of drainage ditches.

1.6 The waterlogging and exposure to a severe maritime climate has restricted the diversity of tree and hedge species present and influenced development.

1.7 Although the presence of the redundant Immingham Docks railway divides the Site North-South generally the area is dissected by a number of hedges as field margins some of which are now incomplete. These hedges support intermittent tree cover and some scrub. Only two small woodland blocks are present although the wooded area Burkinshaws Covert borders the unclassified road linking into the A160. This road forms the Westerly boundary of the Site.

1.8 Drainage ditches parallel the majority of hedges as part of the water control system.

1.9 Almost half (approx 115Ha) of the Site on the Northerly aspect has been developed into hard-standing areas for motor vehicles involving the historic removal of some hedging with only that screening an area of reed-beds now of any significance.

2.0 SCOPE OF ASSESSMENT

2.1 Identify principal trees and hedging subjects present.

2.2 Record where appropriate species, age classification, status and development.

2.3 Comment on appropriate management where this maybe of value in determining continued presence and development.

3.0 CAVEAT

3.1 The Site is to be the subject of a proposed development submission to facilitate the construction and outloading of offshore wind turbines.

3.2 The Assessment considers trees and hedging solely from arboricultural perspectives although comment will be included on the merit of retention if a contribution to potential screening could be made. Individual trees and Woodland Blocks are allocated to one of four categories listed in the

quality cascade chart of BS 5837.2005 'Trees in Relation to Construction – Recommendations' (Appendix A)

3.3 The content of the Assessment remains valid for a period of 36 months from the date of inspection.

4.0 DATE OF INSPECTION

09 July 2010

5.0 NOMENCLATURE

Ash	FRAXINUS excelsior	AH
Black Poplar	POPULUS nigra	PO
Blackthorn	PRUNUS spinosa	BL
Cypress	CUPRESSOCYPARIS 'Castlewellan Gold'	CY
Dog rose	ROSA canina	DG
Elder	SAMBUCUS nigra	ELD
Elm	ULMUS glabra	EL
Hawthorn	CRATAEGUS monogyna	HA
Norway maple	ACER platanoides	NM
Oak	QUERCUS robur	OK
Sycamore	ACER pseudoplatanus	SY
Willow	SALIX alba	WI

6.0 AGE CLASSIFICATION

Immature	0-10 years	IMM
Semi-mature	10-50 years	SM
Mature	50-70 years	M
Overmature	70+ years	OM

7.0 TREE AND HEDGING DETAIL

To be read in conjunction with Able UK drawing K1-91126 Rev A

INDIVIDUAL TREE DETAIL				
TREES	**SPECIES**	**AGE/ CLASS**	**COND**	**DETAIL**
T01	AH	SM	Fair	Individual hedgerow tree at field gate. Leaf size and frequency normal for species. Branch systems complete. Retention category C1
T02	AH	SM	Fair-Poor	Group of 2No trees within hedging adjacent to old railway line and access road to part of refinery site. Branch systems complete. Leaf size and frequency reduced for species. Significant deadwood. Retention category C1
T03	CY AH	SM	Fair	Group of Cypress (CY) and intermittent Ash (AH) as screening around a property adjacent to a haulage contractors vehicle storage area. The property is currently for sale. Retention category C1

T04	EL	SM	Poor	Group of 3No multistem trees associated with the remains of Hawthorn (Ha) hedging. Advanced infection by Ophiostoma ulmi (Dutch Elm Disease) Category R
T05	WI	SM	Poor	Group of 4No Multistem trees on field margin and industrial compound boundary. Branch systems incomplete. Leaf size and frequency normal for species. Historic inappropriate pruning. Significant deadwood. Retention category C1
T06	AH NM SY	Early SM	Fair	Linear group of Multistem trees 11No Ash (AH) 2No Norway Maple (NM) and 1No Sycamore (SY) Planted as screen around Northerly perimeter fence of treatment plant. Branch systems complete. Leaf size and frequency normal for species. Retention category C1

Management

Some remedial pruning to T05 including deadwooding would extend their potential life span and improve their contribution to the amenity signature of the whole Site which is currently poor. T04 a group of Elm is irreversibly infected by Dutch Elm disease and should be removed. T06 which is a screening group has been historically managed by coppicing which has resulted in multi-stem regrowth. If retention as a screen is desirable some removals are necessary to re-space the group and encourage more appropriate development as individual trees. The group of trees T03 providing screening for a private dwelling is beyond the scope of this Assessment.

WOODLAND BLOCK DETAIL		
Species: AH EL OK PO SY	**Age/class**: SM-M	**Cond**: FAIR

Block A: A monoculture block of Elm. As a consequence of Dutch Elm Disease only a group of 8No multistem trees in the North-West corner still present with the remaining area colonized by scrub, principally Hawthorn including a boundary hedge of that species. Those trees remaining are all in an advanced state of decline as a consequence of the cycle of Dutch Elm Disease infestation.

Block B: Mixed broadleaf group comprising principal trees of 29No Ash 51No Black poplar 4No Elm 20No Oak and 10No Sycamore. Trees average 12.6m in height with some Poplar beyond the general canopy at 14.9m. An understorey of Hawthorn Elder and Blackthorn (BL) is present including some immature trees self-sown from the principal trees present.

A significant number of trees present are twin or multistems as a consequence of historic coppicing. There is little evidence of more recent management although some drainage has been introduced to control waterlogging and further traumatic failure. General tree condition is fair although Included Bark is present on some. The Elm is reduced as a consequence of Dutch Elm Disease and some Sycamore are infected by a butt rot POPLYPORUS squamosus.

Management: Removal of dead Elm and other traumatic failures would present an opportunity for re-planting to create an uneven-aged stand. Further thinning would reduce a potential for windthrow and some understorey clearance and replacement with evergreen subjects would enhance the amenity signature and improve the potential as a wildlife habitat. Remaining trees in Block A should be felled and replaced.

HEDGING DETAIL	
A	Incomplete Hawthorn hedging adjacent to old railway line. Some intermittent Ash present. Average 3.5-4.5m in height. Unmanaged.
B	Unmanaged Hawthorn monoculture forming the South-East boundary of the Site. Comparable to Hedge A
C	Unmanaged Hawthorn adjacent to access track completing South-East boundary
DE	Hawthorn monoculture forming field boundary and old railway screen. Currently upto 4.5m in height. Unmanaged.
F	Intermittent Hawthorn low-growing adjacent to sea-wall.
G	Double hedge on both sides of access road to haulage depot and part of refinery site. Intermittent Elm and Ash present along hedge runs. All Elm infested by Dutch Elm Disease. Mainly unmanaged with some lower flail-mower pruning to improve access to haulage depot.
H	Unmanaged Hawthorn as field margin. Poor condition
I	Unmanaged Hawthorn as field margin upto Woodland Block B from industrial compound. T05 located at Westerly termination.
J	Roadside boundary. Hawthorn monoculture with intermittent Elm. All Elm present are dead. Maintained at approximately 1.4m.
K	Continuation of Hedge J as roadside boundary. Hawthorn monoculture with intermittent Ash of a semi-mature age classification. Unlike Hedge J this continuation is unmanaged currently upto 5.3m in height.
L	Unmanaged Hawthorn bordering seaward side of old railway lime.
M	Incomplete Hawthorn hedging located on seaward side of old railway line. Unmanaged.
N	Field margin Hawthorn monoculture providing boundary between Woodland Block B and sea-wall. Although complete currently unmanaged.
O	Hawthorn and Dog Rose forming Site North boundary. Recently planted on mounding around reed-beds. Some remnants of earlier Hawthorn hedge present beyond new planting. Vigorous immature hedging.
P	Recently planted Hawthorn monoculture on reed-bed mound. Vigorous immature hedging with tree protection still in place.
Q	Unmanaged Hawthorn. Incomplete, forming boundary beyond drainage ditch which parallels metalled access road.
R	Recently planted hedging whips with tree protection. Incomplete with poor establishment forming significant part of North and North-West Site boundary.

Management: Those peripheral hedges on the North and North-West boundaries should be subjected to establishment maintenance to ensure their potential as screening to that aspect of the Site is achieved. More mature hedging which borders the unclassified road boundary connecting with the A160 although only partially managed is important as screening and an appropriate management regime needs to be implemented. Internal hedging, a significant proportion of which is suffering from

historic neglect, once no longer required as field margins could be removed without detriment to the overall tree and hedge cover present. Some mitigation could be provided by enhancing those peripheral runs to retain the integrity of their contribution as screens.
Note: Some ornamental planting adjacent to controlled Site access and egress locations is beyond the scope of this assessment.

8.0 IDENTIFIED FAULT IMPLICATIONS

8.1 Included bark Bark inclusions act like cracks in having no resistance to tensile strength and little resistance to shear stress. They can lead to the tearing apart of forks and branch crotches or to the propagation of cracks if they occur in the mainstem buttress zone. Greatly influential in the potential for failure in the crown structure and the degree of 'bending stress' on the members of the union at which included bark is identified.

8.2 Leaf size and frequency reduction Generally an indication of a poor percentage of absorptive root regeneration resulting in inadequate moisture and nutrient uptake. Eventually may lead to the loss of root/soil molecule cohesion creating instability and a potential for wind-throw. Early effects can be the traumatic loss of branches.

9.0 MECHANICAL FACTORS

9.1 Waterlogging Flooding and waterlogging over prolonged periods encourages the development of anaerobic conditions and the accumulation of deleterious volatile compounds in the soil (methane, hydrogen sulphide). Irrespective of such products the diffusion of gases in and out of soil will be impeded resulting in a decline in oxygen levels reducing the ability of roots to absorb water creating eventually chlorotic leaves that brown and fall early. Reduced root efficiency and ultimate death leads to both crown die-back and structural instability.

10.0 IDENTIFIED DISEASES

10.1 OPHIOSTOMA ulmi (Dutch Elm Disease) A disruption of the metabolism and moisture transporting system of the tree promulgated by the carriage of fungal spores by young beetle vectors (SCOLYTUS spp) which grow into the water-filled xylem vessels through which the tree transports water and nutrients eventually cutting off the supply as the resulting tyloses develop. Leads to total defoliation and tree death. Controls have proved generally ineffective.

10.2 POPLYPORUS squamosus Slow progressing White rot where the fungal infection usually first appears at the site of a wound or old pruning cut. Maybe present on dead trees or old stumps. Localized cavities may form near where the fruiting body develops usually in the middle to upper portions of the tree. Not too significant in woodland situations where hazards are of lower consequence.

11.0 MECHANISM OF DECAY ORGANISMS

11.1 Wood decaying fungi degrade the internal cellular structure of the tissue of mainstem branches and root systems according to their particular method of spread. There may not always be external signs to aid detection. The fungi maybe parasitic or saprophytic.

11.2 Three types of wood decay can be distinguished:

a. Brown rot In the early stages of brown rot there is a rapid break down of cell walls leading to a great reduction in the tensile strength of the wood, in the final stage the wood crumbles to a brown powder with little or no tensile strength.

b. White rot The fungi causing white rot generally create a progressive degradation with pockets of rot associated with patches of healthy wood. As a consequence the wood first becomes brittle (danger of brittle fracture) before it finally becomes fibrous and ductile (danger of ductile fractures)

c. Soft rot The fungi causing soft-rot initially degrade the cell contents leaving a framework between cells. This greatly reduces wood strength leading to shrinkage and cracking; in the final stages the remaining wood becomes brittle producing a likelihood of traumatic failure.

12.0 HABITAT INTERPRETATION

12.1 No rare or notable species were observed on the occasion of inspection.

12.2 Wild bird habitats were restricted principally to the scrub cover and hedging.

12.3 Following a data search a visual inspection and disturbance risk assessment for the presence of bat roosts was carried out. No visible signs of bat colonization were observed.

13.0 SUMMARY

13.1 The Site is, overall, dedicated to intensive industrialization and the opportunity for alteration and improvement arboriculturally is limited and likely, if too extensive internally, to degrade the potential to relieve the industrial stagnation similar to that present in other locations in the immediate environs.

13.2 The current decline in agriculture and the limitation for diversity which the low-lying topography influences, compounds the restrictive parameters for improvement.

13.3 Within the Site boundaries tree cover is sparse and exposure to unsympathetic climatic conditions and the widespread presence of Dutch Elm Disease has resulted in decline, early senescence and death, offering no alternative to removal.

13.4 Hedging runs present accommodate a historic agricultural use now in decline with a number of internal hedges neglected and incomplete.

13.5 Management proposals which incorporate hedge and tree removals present an opportunity for the introduction of species diversity which will quickly, if sympathetic to any development, and significantly improve the present poor amenity signature and limited habitat potential.

13.6 Tree and hedgerow retention on the peripheries will assist the propagation of an intermediate screen to any development and off-set internal loss where condition is suspect. Augmentation with replacement hedgerow trees, where appropriate, will assist this process.

14.0 REFERENCE SOURCES

- D LONSDALE – Principles of Tree Hazard Assessment and Management
- RG STROUTS – Diagnosis of Ill Health in Trees
- BS 5837.2005 Trees in Relation to Construction – Recommendations

15.0 RELEVANT DRAWINGS

- Site Location Plan 0rdnance Survey Extraction K1-92000A
- Existing Conditions Able UK Ltd drawing K1-91126 Rev A
- 2009 Aerial Photograph Able UK Ltd drawing K1-92025 Rev A

KEY

Rev	Date	Description	By	Chk	App
A	04/06/10	Preliminary Issue	RK	RC	RC

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Project: ABLE

Client: ABLE UK Ltd

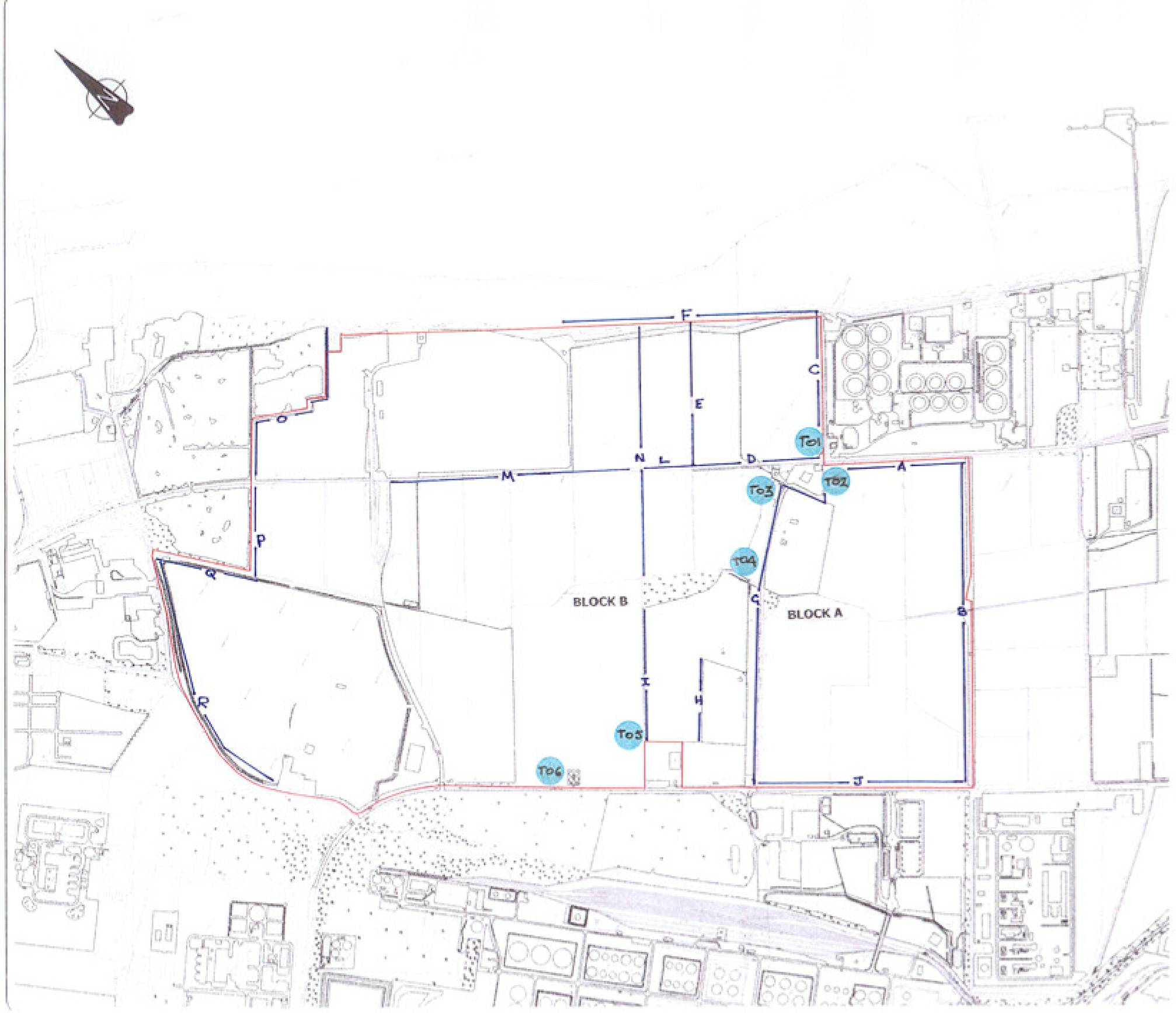
Title: 2009 Aerial Photograph

PRELIMNARY

Scale:	Drawn By	Checked By	Approved By
1:5,000@A1	R Keirl	R Cram	R Cram
Date:	04/06/2010	04/06/2010	04/06/2010

Drawing No. KI - 92025

Revision: A



KEY

- SITE BOUNDARY
- INDIVIDUAL TREES
- —A— HEDGING

Rev	Date	Description	By	Chk	App
A	16/06/10	Preliminary Issue	PP	GD	GD

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Project: ABLE Marine Energy Park

Client: ABLE UK Ltd

Title: Existing Conditions

PRELIMINARY

Scale:	Drawn By	Checked By	Approved By
1:10,000@A3	P Parsley	G Doubleday	G Doubleday
Date	16/06/2010	16/06/2010	16/06/2010

Drawing No. KI - 91126

Revision: A

APPENDIX A Tree Retention Categories

A.1 BS5837, the British Standards document for trees in relation to construction, gives guidelines for ensuring that trees on development sites are retained or removed according to their future potential to become an asset in harmony with the development or an object of resentment and a potential threat to public safety.

A.2 The early assessment of a site can ensure that trees to be retained can be afforded adequate protection from the onset of construction right through to completion and long into the future.

A.3 Planning conditions and the Town and Country Planning Act 1990 can be used following a survey to enforce the adequate protection for these trees in accordance with BS5387.

A.4 Care should be exercised over misplaced tree preservation. Attempts to retain too many or unsuitable trees on a site are liable to result in excessive pressure on the trees during development work and subsequent demands for their removal. The end result is usually fewer and less suitable trees that would be the case if proper planting, selection and conservation had been applied from the outset.

A.5 Particular caution is needed over retention of large old trees which become enclosed in the new development. Such trees may be less resilient and more likely to die as a result of the development, and even if they survive in the short term, they may die long before the new buildings are obsolete and in this situation the felling and disposal of trees can be very difficult and extremely costly.

A.6 Although existing trees should be retained wherever reasonable, unless such trees are well suited for incorporating within the new development, it may be preferable to favour new planting. New plantings can then be selected which are ideal for the situation and landscape.

A.7 The tree survey carried out has assessed and given particular attention to:

7.1 the health, vigour and condition of each tree
7.2 the structural defects in each tree and its life expectancy
7.3 the size and form of each tree and its suitability within the context of the site development
7.4 the location of each tree relative to existing site features, e.g. its value as a screen or as a skyline feature

A.8 On the basis of this assessment, trees are divided into one of the following categories:

TREES TO BE CONSIDERED FOR RETENTION

Category A	**Those of high quality and value**: in such a condition as to be able to make a substantial contribution (a minimum of 40years is suggested).	
Criteria Subcategories		
1 Mainly arboricultural values	**2** Mainly landscape values	**3** Mainly cultural values, including conservation
Trees that are particularly good examples of their species, especially if rare or unusual, or essential components of groups, or of formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue)	Trees, groups or woodlands which provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance (e.g. avenues of other arboricultural features assessed as groups)	Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture).
Indication on Plan: Light Green		

Category B	**Those of moderate quality and value**: those in such a condition as to make a significant contribution (a minimum of 20 years is suggested).	
Criteria Subcategories		
1 Mainly arboricultural values	**2** Mainly landscape values	**3** Mainly cultural values, including conservation
Trees that might be included in the high category but are downgraded because of impaired condition (e.g. presence of remediable defects including unsympathetic past management and minor storm damage).	Trees present in large number, usually as groups or woodlands, such that they form distinct landscape features, thereby attracting a higher collective rating than they might as individuals but which are not, individually, essential components of formal or semi-formal arboricultural features (e.g. trees of moderate quality within an avenue that includes better A category specimens), or trees situated mainly internally to the site, therefore individually having little visual impact on the wider locality.	Trees with clearly identifiable conservation or other cultural benefits.
Indication on Plan: Mid Blue		

TREES TO BE CONSIDERED FOR RETENTION (continued)

Category C	**Those of low quality and value**: currently in adequate condition to remain until new planting could be established (a minimum of 10 years is suggested), or young trees with a stem diameter below 150mm.	
Criteria Subcategories		
1 Mainly arboricultural values	**2** Mainly landscape values	**3** Mainly cultural values, including conservation
Trees not qualifying in higher categories.	Trees present in groups or woodlands, but without this conferring on them significantly greater landscape value, and/or trees offering low or only temporary screening benefit.	Trees with very limited conservation or other cultural benefits.
Note: Whilst C category trees will usually no be retained where they would impose a significant constraint on development, young trees with a stem diameter of less than 150mm should be considered for relocation.		
Indication on Plan: Grey		

TREES FOR REMOVAL

Category R	Those in such a condition that any existing value would be lost within 10 years and which should, in the current context, be removed for reasons of sound arboricultural management.
Criteria	
Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse, including those that will become inviable after removal of other R category trees (i.e. where, for whatever reason, the loss of companion shelter cannot be mitigated by pruning).	
Trees that are dead or are showing signs of significant, immediate and irreversible overall decline.	
Trees infected with pathogens of significance to health and/or safety of other trees nearby (e.g. Dutch Elm Disease), or very low quality trees suppressing adjacent trees of better quality.	
Note: Habitat reinstatement may be appropriate (e.g. R category tree used as a bat roost: installation of bat box in nearby tree).	
Indication on Plan: Dark Red	