

BS 5837 Trees in Relation to Design, Demolition and Construction – Recommendations Report

SUEZ

Reliance Street HWRC Extension

Report prepared by:



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1 Report Limitations

- 1.1 This report is written from an arboricultural standpoint; it does not offer specific technical engineering competence.
- 1.2 The fieldwork and analysis have been undertaken, and this report prepared, in accordance with BS 5837:2012 'Trees in Relations to Design, Demolition and Construction – Recommendations' which, according to its scope;
 - ...gives recommendations and guidance on the relationship between trees and design, demolition and construction processes
 - ...sets out the principles and procedures to be applied to achieve a harmonious and sustainable relationship between trees and structures
 - ...is applicable whether or not planning permission is required
- 1.3 In addition, the general principles of sustainable development in the National Planning Policy Framework have been considered.
- 1.4 The report is not, nor should be taken to be, a thorough assessment of the health and condition of the trees on or adjacent to the site. If such an assessment is required, then it is recommended that a separate tree inspection be carried out to comply with the landowner's overall duty of care and to satisfy health and safety requirements.
- 1.5 I confirm that I have made clear which facts and matters referred to in this report are within my own knowledge and which are not, those that are within my own knowledge I confirm to be true. The opinions I have expressed represent my true and complete professional opinions on the matters to which they refer.
- 1.6 The authority of this report ceases after two years from the date of the fieldwork or when any site conditions change, or pruning or other works unspecified in the report are carried out to, or affecting, the subject tree(s), whichever is the sooner.
- 1.7 Abbreviations used in this report:
 - Arboricultural Method Statement: AMS
 - BS 5837:2012 Trees in Relation to Design, Demolition and Construction – Recommendations: BS 5837
 - Construction Exclusion Zone: CEZ
 - National Planning Policy Framework: NPPF
 - Root Protection Area: RPA
 - Table 1 Cascade chart for tree quality assessment of BS 5837: Table 1
- 1.8 Terminology used in this report:
 - Construction Exclusion Zone is used as defined in BS 5837 at clause 3.6 as:
'...area based on the root protection area from which access is prohibited for the duration of a project.'
 - Root Protection Area is used as defined in BS 5837 at clause 3.7 as:
'layout design tool indicating the minimum area around a tree deemed to contain sufficient roots and rooting volume to maintain a tree's viability, and where the protection of the roots and soil structure is treated as a priority.'

- Site drawing is used to mean the information that has been made available concerning the proposed development
 - Site traffic is given the widest possible definition, to capture and embrace any traffic or vehicle movement associated with demolition, services, construction, delivery, storage or temporary office accommodation and so on
- 1.9 No enquires have been made with the Local Planning Authority to ascertain whether the site is within a Conservation Area or if there are any Tree Preservation Orders on or near the site.

2 The Trees

- 2.1 The fieldwork was conducted during a site visit on Friday 11th November 2022.
- 2.2 31 individual trees, one hedge-group and one tree group were identified, details of which can be found in Appendix 1.
- 2.3 The trees were visually assessed within the proposed development area. The trees within the proposed development area were labelled T6230 to T6457, the tree group as TG6452. The hedge was labelled H6458.
- 2.4 They were made up of one Apple (*Malus* sp.), 20 Aspen (*Populus tremula*), one Common Ash (*Fraxinus excelsior*), one Common Hawthorn (*Crataegus monogyna*), one Field Maple (*Acer campestre*), 17 Goat Willow (*Salix caprea*), one Pedunculate Oak (*Quercus robur*) and one Silver Birch (*Betula pendula*). The hedge-group is also Field Maple (*A. campestre*).
- 2.5 The trees were placed into one of four broad categories under Table 1, as follows:
Category A: Trees of high quality with an estimated remaining life expectancy of at least 40 years.
Category B: Trees of moderate quality with an estimated life expectancy of at least 20 years.
Category C: Trees of low quality with an estimated life expectancy of at least 10 years, or young trees with a stem diameter of below 150mm.
Category U: Those trees in such a condition that they cannot be realistically retained as living trees in the context of the current land use for longer than 10 years.
- 2.6 Of the 31 trees, one hedge and one group surveyed, 10 trees, the one hedge-group and the one tree group were placed under category B using the table in Appendix 2. 19 trees were placed under category C, with the remaining four trees being placed under category U.
- 2.7 Please see Appendix 3 for images of the trees.

3 The Development Proposal

- 3.1 It is understood that the proposal includes the extension of the existing Home Waste Recycling Centre to the north of the existing site.
- 3.2 It is understood that a new entrance and gateway will be created to the south west of the site, where currently the area is fenced.

4 The Arboricultural Impact Assessment

- 4.1 The impact to the current tree stock by the proposed development for the site will be in part significant, but also beneficial.
- 4.2 The proposed area is currently individual trees with a scrub layer, including several-hundred self-set stems of mixed deciduous species, bramble and nettles.



Fig 1: Much of the site is as above in this image: a smaller number of trees with many hundreds of self-set small diameter stems throughout the area

- 4.3 The trees' overall physiological condition is fair.
- 4.4 The trees' overall structural condition is poor, with many self-set, poor form trees that have not received any management since planting and therefore have limited remaining contributions.
- 4.5 The development will involve felling and removal of many of the surveyed trees; however given the overall structural and physiological condition of the trees, once the development has been completed there is an opportunity to plant replacement trees.
- 4.6 Those trees which are not being felled, excavations within and the construction of foundations within the Root Protection Area (RPA) may be necessary.

5 Arboricultural Method Statement

5.1 Introduction

5.1.1 BS 5837 defines the AMS at Clause 3.2 as:

methodology for the implementation of any aspect of development that is within the root protection area, or has the potential to result in loss of or damage to a tree to be retained

5.1.2 Damage to the retained trees' roots and the soil volumes they occupy may arise from:

- excavations for new roadways or paths, or foundations, or
- the need to remove or install service connections and infrastructure, or
- the passage of site traffic, or
- the siting of material stores or site buildings, or
- the installation of hard surfacing, or
- the accidental spillage of toxic substances.

5.1.3 Damage to the retained trees' stems and canopies may arise from:

- accidental collisions caused by site traffic, or
- the need to erect scaffolding outside the building line to construct the development, or
- the need to allow space for crane or jib movements, or
- the encroachment of the retained tree's canopy upon the new development.

5.1.4 The AMS is required because a tree's roots are alive and serve two distinct purposes:

- to take up the moisture and the range of nutrients from the soil (generally dissolved or in suspension) that will allow the tree to grow, and
- to securely anchor the tree in the ground.

5.1.5 Roots are found at relatively shallow depths where they can access the oxygen and water held in the voids between the soil particles, allowing the take up the moisture and nutrients to take place. In consequence, soil compaction will have a negative impact as it will deny the roots the access to the oxygen and water that they need to survive and to allow the tree to thrive. Therefore, any tree roots that are at risk from work activity will require protection from damage throughout the term of the development.

5.1.6 The site inspection incorporated the measurement of Root Protection Areas. On average these measure 2.9m to the base of the tree, with the largest being 7.1m. These RPA's must be protected through the use of a barrier fence. Prior to erection, all RPA's must be identified on the ground in order to position the fence correctly.

5.1.7 Two generic control measure exist:

- A barrier fence to create a CEZ that will prevent access for site traffic to area of soil where trees' roots may be found; a suitable specification is given in BS 5837; or
- Ground protection measures over those areas of soil where trees' roots may be found to spread the load from any site traffic and so reduce the risk of harm to the soil structure to acceptable level. Several proprietary solutions are available, from simple mats to interlocking tiles, and adopting any one of these (or similar), access can be achieved for site traffic constructed whilst no harm to retained tree's roots and the soil volumes in which those roots might be expected to be found; for specific example see:

- <http://bogmats.co.uk/hire/>
- <http://gallagherstaging.com/hexagon-ground-protection-rentals/>
- <http://www.ground-guards.co.uk/products/bog-mats/>

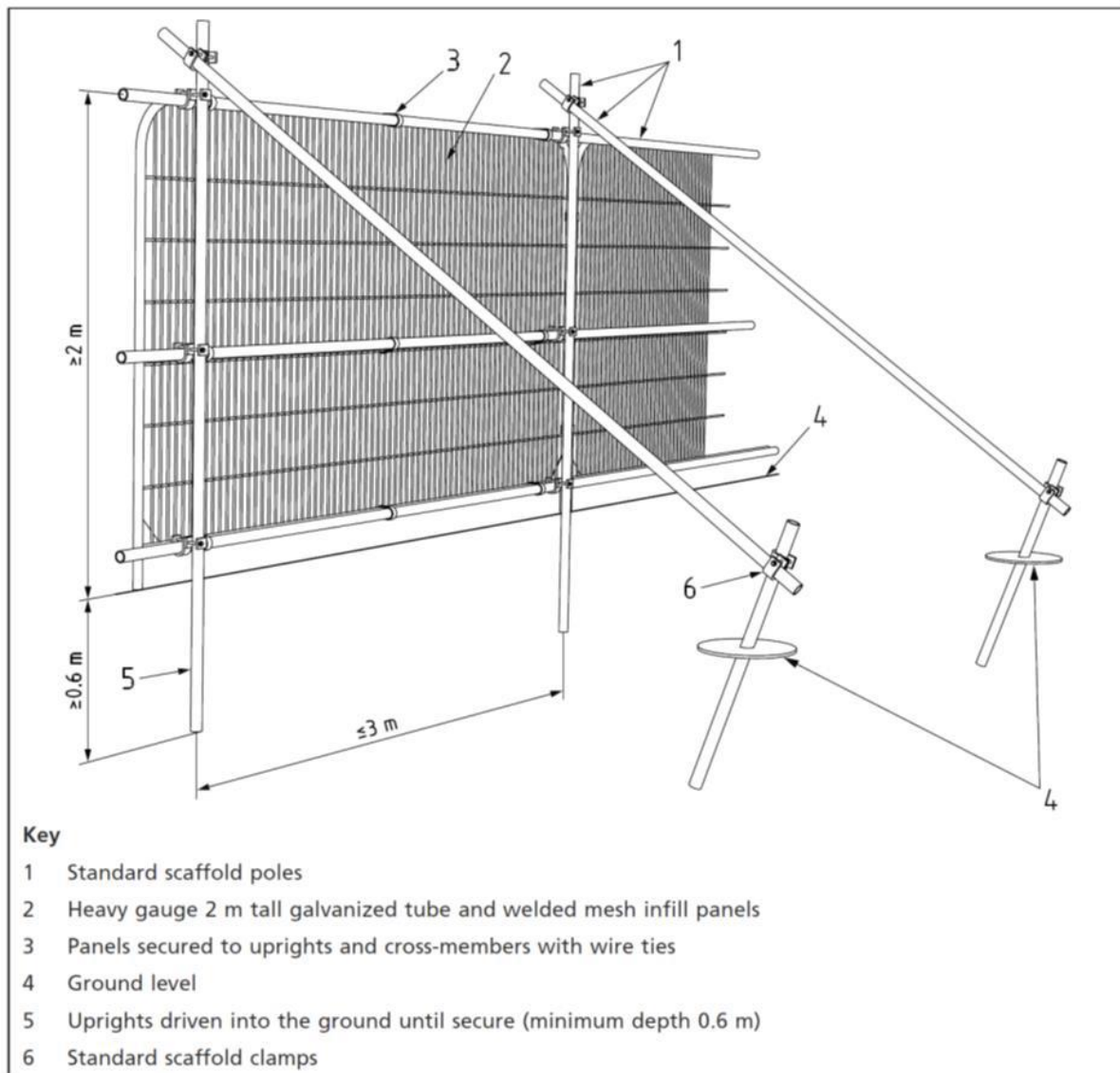


Image 3: Figure 2 from BS 5837

5.2 The Development Site

- 5.2.1 This group will be potentially influenced by the development of an extension to the existing Home Waste Recycling Centre.
- 5.2.2 The layout of the HWRC extension and the plotting of the retained trees' RPAs will help clarify the need for control measures to protect the retained trees from damage during the work activity. BS 5837 states, at clause 6.2.1.1:

Where all activity can be excluded from the RPA, vertical barriers should be erected to create a construction exclusion zone. Where, due to site constraints, construction activity cannot be fully or permanently excluded in this manner from all or part of a tree's RPA, appropriate ground protection should be installed.

- 5.2.3 The ideal control measure to protect the retained trees from damage during the work activity would be the creation of a temporary CEZ to protect their stems and crowns from accidental damage. The barrier should be to the specification from BS 5837 given above, aligned with the maximum limit of the individual tree's RPAs. The CEZ should be tied into the existing fence at either end, and the bracing should be on the inside of the CEZ.
- 5.2.4 If a number of significant roots are found that are in excess of 25 mm diameter during initial excavation, an arborist must attend site and the below needs to be followed:

Any tree roots that are exposed during the excavation of trial pits should be treated in accordance with the following details from NJUG:

- roots, whilst exposed, should be wrapped in dry, clean hessian sacking to prevent desiccation and to protect from rapid temperature changes,
- roots smaller than 25 mm diameter may be pruned back, preferably to a side branch, using a sharp proprietary cutting tool such as secateurs or handsaws,
- roots larger than 25 mm may only be severed following consultation with an arboriculturist, as they may be essential to the tree's health and stability,
- prior to backfilling, any hessian wrapping should be removed and retained roots should be surrounded with sharp sand (builders' sand should not be used because of its high salt content which is toxic to tree roots), or other loose granular fill, before soil or other material is replaced. This material should be free of contaminants and other foreign objects potentially injurious to tree roots.

- 5.2.5 Where work is to be undertaken within the RPA of a retained tree then to prevent root damage it will be necessary to adopt a no-dig construction technique, where possible i.e. the work activity is to be entirely above the existing ground level. The construction should spread the load over a larger area than would normally occur so reducing the risk of soil compaction and will also use a no-fines aggregate sub-base to allow the passage of oxygen and water from the surface of the path to the soil beneath, to be available for the tree's roots.
- 5.2.6 Pre-completion of the development it may be prudent to fell the Ash (*Fraxinus excelsior*) species growing to the north of the extension area, and outside of the proposed extension area. These trees are exhibiting signs of Ash Dieback (*Hymenoscyphus fraxineus*), have limited future viability and as they decay further will pose a further threat to users of the facility and staff alike.

- 5.2.7 Post-completion of the development it may be necessary to initiate a programme of remediation pruning, i.e. to seek to remove those limbs that may have been accidentally damaged during the work activity. As noted above it would be appropriate to engage a competent arboricultural contractor to undertake this pruning against a specification prepared by the competent arboricultural consultant.



Fig 2: this image was taken from the eastern end of the proposed development site, looking west along the current fenceline

6 The NPPF

6.1 The National Planning Policy Framework states at paragraph 7:

There are three dimensions to sustainable development: economic, social and environmental. These dimensions give rise to the need for the planning system to perform a number of roles:

- *an economic role – contributing to building a strong, responsive and competitive economy...*
- *a social role – supporting strong, vibrant and healthy communities...*
- *an environmental role – contributing to protecting and enhancing our... environment*

and paragraph 14 states:

At the heart of the NPPF is a presumption in favour of sustainable development, which should be seen as a golden thread running through both plan-making and decision-taking

and paragraph 118 states:

When determining planning applications, local planning authorities should aim to conserve and enhance biodiversity by applying the following principles:

- if significant harm resulting from a development cannot be avoided, adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;

6.2 There will be no harm to the landscape as a consequence of the implementation of the development proposal, and to conserve and enhance the biodiversity of the site the development proposal will be accompanied by additional tree planting.

7 Conclusions

7.1 This report concludes that:

- 7.1.1 The arboricultural impact of the proposed development will be of some significance, this could be softened and even negated by, replacement planting.
- 7.1.2 The trees are of limited value, offering very little by way of species diversity and future contribution.

8 Recommendations

8.1 This report recommends that:

- 8.1.1 None of the individual trees, the hedge-group, nor the single group, be considered a constraint upon the development.
- 8.1.2 Felling works to the group of Ash trees to the north of the proposed development area should be considered pre-construction, i.e. with the felling works to the trees within this report.
- 8.1.3 Once the development works have been completed, replacement planting should be planned, ensuring a diverse and more futureproof range of species is selected.

Appendix 1 – Tree Attribute Data

Tree Number	Species	Tree Height (m)	Stem diameter (mm)	Life Stage				General observations and comments				Est'd remaining contribution (yrs)				BS 5837 category	RPA radius (m)	RPA (sq. m)
				Y	SM	M	OM	Structural Condition	Physiological Condition	General Comments	Preliminary Management Recommendations	<10	10+	20+	40+			
T6230	Goat Willow	<i>Salix caprea</i>	5.0	110		Y		Poor	Fair	8 main stems, 6 minor stems. Deadwood, branches have rubbed to create wounds. See image			Y			C	1.3	2.3
T6241	Field Maple	<i>Acer campestre</i>	7.0	140				Decaying	Dead	Dead						U	3.3	5.9
T6247	Apple	<i>Malus sp.</i>	5.0	240				Poor	Fair	Likely self-set tree, poor form, crown heavily weighted to S			Y			C	2.9	5.1
T6248	Common Ash	<i>Fraxinus excelsior</i>	7.0	130				Poor	Diseased	Ash dieback clearly present, cat 4		Y				U	1.6	2.8
T6249	Common Hawthorn	<i>Crataegus monogyna</i>	5.0	120				Fair	Fair	4 stems				Y		C	1.4	2.6
T6402	Aspen	<i>Populus tremula</i>	12.0	180		Y		Fair	Fair					Y		C	2.2	3.8
T6403	Aspen	<i>Populus tremula</i>	12.0	310		Y		Poor	Fair	Poor form tree, potentially previously list crown, now top is entirely waited to S		Y				U	3.7	6.6
T6404	Aspen	<i>Populus tremula</i>	12.0	310			Y	Fair	Good					Y		B	3.7	6.6
T6405	Aspen	<i>Populus tremula</i>	12.0	310			Y	Fair	Good					Y		B	3.7	6.6
T6406	Aspen	<i>Populus tremula</i>	12.0	310			Y	Good	Good					Y		B	3.7	6.6
T6432	Goat Willow	<i>Salix caprea</i>	6.0	226.9		Y				Poor form, stems rubbing and crossing				Y		C	2.3	4.0
T6433	Goat Willow	<i>Salix caprea</i>	8.0	311.8		Y		Fair	Fair					Y		C	3.1	5.5
T6434	Goat Willow	<i>Salix caprea</i>	8.0	225			Y	Fair	Fair					Y		C	3.4	5.9
T6435	Goat Willow	<i>Salix caprea</i>	5.0	162.5		Y		Poor	Fair	Rootplate exposed to N side. One stem previously failed and is growing laterally across ground				Y		C	1.6	2.9
T6436	Goat Willow	<i>Salix caprea</i>	8.0	151			Y	Fair	Fair					Y		C	1.5	2.7
T6437	Goat Willow	<i>Salix caprea</i>	10.0	150			Y	Fair	Fair					Y		C	1.8	3.2
T6438	Goat Willow	<i>Salix caprea</i>	10.0	270			Y	Fair	Fair					Y		C	3.2	5.7
T6439	Silver Birch	<i>Betula pendula</i>		330		Y		Good	Good	Confirm location as could be retained				Y		B	4.0	7.0
T6440	Goat Willow	<i>Salix caprea</i>	8.0	160		Y		Fair	Fair	Lean to N			Y			C	1.9	3.4
T6441	Goat Willow	<i>Salix caprea</i>	6.0	120		Y				Lean to stem			Y			C	1.4	2.6
T6442	Goat Willow	<i>Salix caprea</i>	8.0	387.2			Y			Railway sleeper at 45° growing through stem. See photo.			Y			C	3.9	6.9
T6443	Goat Willow	<i>Salix caprea</i>		255			Y	Fair	Fair					Y		C	3.7	6.6
T6444	Goat Willow	<i>Salix caprea</i>	8.0	130		Y		Decaying	Poor	Heartwood exposed from ground level to 2m		Y				U	1.6	2.8
T6445	Goat Willow	<i>Salix caprea</i>	8.0	205.2		Y		Poor	Fair			Y				C	2.1	3.6
T6446	Pedunculate Oak	<i>Quercus robur</i>	12.0	360		Y		Good	Good						Y	B	4.3	7.7
T6447	Prunus	<i>Prunus sp.</i>	6.0	110		Y		Good	Good					Y		C	1.3	2.3
T6448	Aspen	<i>Populus tremula</i>	15.0	360			Y	Fair	Good	Whole stem has lean to E				Y		C	4.3	7.7
T6449	Aspen	<i>Populus tremula</i>	12.0	320			Y	Good	Good					Y		B	3.8	6.8
T6451	Aspen	<i>Populus tremula</i>	12.0	170		Y		Fair	Fair					Y		C	2.0	3.6
T6453	Goat Willow	<i>Salix caprea</i>	10.0	469.4			Y	Fair	Good					Y		B	4.7	8.3
T6457	Goat Willow	<i>Salix caprea</i>	10.0	839.3			Y	Fair	Good					Y		B	8.4	14.9
TG6452	Aspen	<i>Populus tremula</i>	8.0	200		Y		Fair	Fair	3 trees, 6 stems				Y		B	2.4	4.3
H6458	Field Maple	<i>Acer campestre</i>	5.0	-			Y	Good	Good	Hedge behind security fencing					Y	B	1.0	

Appendix 2 - BS 5837:2012 Table 1: Cascade chart for tree quality assessment

Table 1 Cascade chart for tree quality assessment

Category and definition	Criteria (including subcategories where appropriate)			Identification on plan
Trees unsuitable for retention (see Note)				
Category U Those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years	- Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse, including those that will become unviable after removal of other category U trees (e.g. 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 the health and/or safety of other trees nearby, or very low quality trees suppressing adjacent trees of better quality <i>NOTE Category U trees can have existing or potential conservation value which it might be desirable to preserve; see 4.5.7.</i>			See Table 2
	1 Mainly arboricultural qualities	2 Mainly landscape qualities	3 Mainly cultural values, including conservation	
Trees to be considered for retention				
Category A Trees of high quality with an estimated remaining life expectancy of at least 40 years	Trees that are particularly good examples of their species, especially if rare or unusual; or those that are essential components of groups or formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue)	Trees, groups or woodlands of particular visual importance as arboricultural and/or landscape features	Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture)	See Table 2
Category B Trees of moderate quality with an estimated remaining life expectancy of at least 20 years	Trees that might be included in category A, but are downgraded because of impaired condition (e.g. presence of significant though remediable defects, including unsympathetic past management and storm damage), such that they are unlikely to be suitable for retention for beyond 40 years; or trees lacking the special quality necessary to merit the category A designation	Trees present in numbers, usually growing as groups or woodlands, such that they attract a higher collective rating than they might as individuals; or trees occurring as collectives but situated so as to make little visual contribution to the wider locality	Trees with material conservation or other cultural value	See Table 2
Category C Trees of low quality with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150 mm	Unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories	Trees present in groups or woodlands, but without this conferring on them significantly greater collective landscape value; and/or trees offering low or only temporary/transient landscape benefits	Trees with no material conservation or other cultural value	See Table 2

Appendix 3 – The Trees – Images



T6250 (above): many of the trees within the proposed development area are multi-stemmed forms such as this



TG6452 (above): image to illustrate this group – 3 trees and 6 stems planted in a line



5 References

Barrell, J. (1993). PRE-PLANNING TREE SURVEYS: SAFE USEFUL LIFE EXPECTANCY (SULE) IS THE NATURAL PROGRESSION. *Arboricultural Journal*, 17(1), pp.33–46.

BS 5837:2012 Trees in Relation to Design, Demolition and Construction. (2012).