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Trees impact on the demolition & site clearance - final report



Hanover & Princess Court, Cambridge, CB2 1HG

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1. Instructions and purpose of this document

Instructions

1. Wayne Bagnall Ltd (WBL) has been engaged by Matthew Browne of Henry Riley on 26/06/23 to provide an URGENT, independent report on the impact of trees on the demolition and site clearance for the planned redevelopment of the 8 and 5 storey flats.
2. The site address; see also appendix 4. Plate 1:
 - 2.1. Hanover and Princess Court
Bounded by 4 highways:
Union Road, George IV Street, Coronation Street & Bentinick Street
Cambridge CB2 1HG.
3. This report is based current codes, guidance, and good industry practice inter alia:
 - 3.1. The Construction (Design and Management) Regulations 2015
 - 3.2. HSE Asbestos & Demolition Regulations, ACOPs and guidance
 - 3.3. BS 5975: 2019 Code of practice for temporary works procedures etc.
 - 3.4. BS 6187: 2011 Code of practice for full and partial demolition

Site visit, information, drawings, and photos extracts are in the appendices

4. I had the benefit of a site visit on 28/06/23 accompanied by Matthew Browne – Henry Riley, Ross Jones and Golzar Zandi both from Cambridge City Council.
5. Following my visit I received these documents, reviewed them and used the relevant information in these, inter alia:
 - 5.1. Hayden's Arboricultural Consultants GA Drawing 9132-D-CP 14/01/22
 - 5.2. 2022-08-19 - Hanover and Princess Court - Pre App 03-P01-compressed
 - 5.3. 2021.11 - Hanover & Princess Topographical Survey Rev-
 - 5.4. 700037 76 Princess and Hanover Draft Report V7Dr - Feb 2020
 - 5.5. Garages, Hanover, Princess Cond. Report (3)
 - 5.6. H&P Disproportionate Collapse Calculation Report
 - 5.7. Hanover Elevation TA
 - 5.8. MA11229 - P&H Court - Review of Previous Works and Structural Assessment
 - 5.9. Princess Court Elevation TA
 - 5.10. Tree Constraints Plan

Purpose of this document

4. To provide an initial report to consider the effect of retaining or removing the principal trees whilst undertaking the demolition/dismantling and site clearance of the Hanover & Princess Court and multi-storey car park/garage buildings.
5. This information is to be used by the client to determine the effects (cost verses benefits) of attempting to retain the principal trees on the demolition and subsequent redevelopment options.

Qualifications and Experience

6. An overview of my qualifications and experience demonstrating suitability to act as an expert Demolition Advisor to Henry Riley (Employers Agents), Cambridge Investment Partnership (CIP) and Cambridge City Council is in Appendix 6.

2. Executive Summary

1. This executive summary provides a precis of each section in the report and will give the reader an overview, however, to ensure a full understanding please read the report with all 6 appendices in full.

Section 3: Existing buildings, trees, and proximity to highways & neighbours

2. This section identifies considers the age & condition of the existing structures, past repairs and strengthening and my observations in relation to the proximity of the principal trees and their effect on the demolition works to proceed safely and effectively if retained.
3. Having reviewed the existing reports and my site visit observations on the structures, proximity to sensitive neighbours Schools etc I conclude that the best course of action would be to remove the affected principal trees and demolish these dilapidated structures by:

3.1. Remote mechanical demolition (High Reach Excavators)

- 3.2. If partial highway closures are refused there would be a need for fully sheeted access scaffolded protection to the Princess and Hanover elevations fronting Coronation Street.

4. The alternative 'top down, floor by floor' demolition (Mini machines & hand demolition) although would likely protect the principal trees, it requires significant temporary works and places greater risks on the demolition personnel.
5. The preferred 'remote mechanical' demolition requires the use of large machines working within exclusion zones that will receive the arisings/debris from the structures that would severely impact the principal tree canopies and root systems which are likely to extend well beyond the canopy radius, see appendices 1, 2 & 3.

Section 4: Demolition and site clearance considerations

6. This section covers the expectations on the client to ensure the works are properly planned and adequately managed, it includes the statutory duties to comply with The Construction (Design & Management) Regulations 2015 (CDM 2015) and formal appointments of Principal Designer and Principal Contractor
7. I am not designing the demolition works as this must be assessed and determined by the appointed demolition contractor, however, I have provided my opinion below.
8. It identifies the enabling works that need to be actioned to allow the asbestos removal and demolition works to proceed safely and effectively with conclusions on the likely best methodology for the demolition.
9. It is an 'aid-memoire' providing the heads to be addressed as part of the planning for the demolition works.

Section 5: Summary & conclusions

10. This section summarises the requirements to undertake the safe demolitions and site clearance.
11. I conclude that trying to retain the principal trees is outweighed by the potential and real risks to personnel by having to undertake 'top down, floor by floor' demolitions exposing personnel to unnecessary work at height.
12. In addition, this method is slower and is likely required to install temporary works in back propping floors to support mini machines and arisings etc and fully enveloping the flats in sheeted access scaffolding.
13. Therefore, the best course of action would be to remove the principal trees affected and demolish these dilapidated structures by:
 - 13.1. Remote mechanical demolition (High Reach Excavators).
 - 13.2. If partial highway closures are refused there would be a need for fully sheeted access scaffolded protection to the Princess and Hanover elevations fronting Coronation Street.

Appendices x 6

3. Existing building, trees, and proximity to highways & neighbours

1. This section identifies considers the age & condition of the existing structures, past repairs and strengthening in conjunction with my observations and in relation to the proximity of the principal trees and their potential effect on the demolition works to proceed safely and effectively if retained.
2. The buildings comprise of 3 main structures; 8 storey Hanover Court (78 flats), 5 storey Princess Court (49 flats), 3 level multi-storey car park with garages (basement approx -1.5m below the existing highway) all built circa mid 1960's before & without the benefit of learning outcomes following the disproportionate collapse of Ronan Point in 1968 in relation to designing structural stability between the walls and floors to prevent a similar recurrence.
3. There are secondary prefab type structures, e.g. single storey community hub etc, however, these are not significant.

700037 76 Princess and Hanover Draft Report V7Dr - Feb 2020

4. A 72 page report by MLTS Limited.
5. The report has been prepared at the request of our Client following the identification of apparent cracking within the external walls of the property in particular in the region of the gable end, flank and internal communal areas wall, identified by the contractors namely, Initially Kier and then Fosters Ltd and SJW Ltd while carrying out various planned works on the buildings.
6. Page 67 of the MLTS report provides useful guidance of the existing trees, viz;
 - 1) *The trees located immediately around the property are managed to prevent tree root damage to the formation supporting the foundations by the City Council Tree Officers in order to monitor, minimise or abate any impact on the stability of the property.*
 - 2) *We recommend the excavation of trial holes to ascertain the depth of foundation and any tree root activity in the clay and under the foundations.*
 - 3) *Trial holes should be excavated carefully by hand after determining the exact routes of the electricity gas and water services in order to make an assessment of the state of the formation and foundation stability risk, in accordance with NHBC 4.2 guidelines, for example.*
 - 4) *The drainage investigations and any repairs should be completed following CCTV camera surveys.*
 - 5) *We recommend monitoring the properties every year to ascertain if the mature trees have an adverse effect upon foundation stability.*
 - 6) *Maintenance of the rainwater gutters, gullies, drains, should be maintained to ensure that the rainwater does not overtop the gutters and escape down to the formation under the foundations causing foundation movement.*

- 7) Keeping any trees self-seeded and or otherwise, away from the property as ascertained by the NHBC and BRE guidance regarding trees and buildings chapter 4.2 see <http://www.nhbc.co.uk/builders/productsandservices/techzone/nhbcstandards/technicalguidance/documents/>*
- 8) If tree roots from the trees in the public areas or the gardens are ever identified as pervading under or near the footings of the property in the future, then we recommend such the investigations of the foundations and use the LTA Joint Mitigation Protocol to have the tree managed or felled by the owners of the tree / trees.*

7. The contents have been noted and considered for the demolition options.

MA11229 - P&H Court - Review of Previous Works and Structural Assessment PLUS H&P Disproportionate Collapse Calculation Report

8. These 2 documents record the recent history, condition, repairs etc of the structures Hanover & Princess Court structures.
9. Year 0 (2014/15) - Provides a review of previous works and structural condition notes masonry repairs and restraints to the multi-storey car park.
10. Year 1 (2016/17) - Roof finishes, roof lights and safety handrailing. During the works various defects were noted primarily from carbonisation corrosion causing concrete spalling etc.
11. Year 2 (2018/19) - Repair works were undertaken to the concrete aprons removing the defective concrete and repairing with Sika cementitious products plus a protective anti-carbonation coating. During these works numerous cracks were noted in the external walls.
12. This resulted in a full survey of the buildings identifying numerous defects with recommendations and repairs undertaken.
13. Year 3 (2021/22?) – During 2021 as part of Millward's commission we have inspected the building to determine what repairs have been completed, what items are remaining off the original defect lists and where there were any new areas requiring remedial work.
14. All the previous remedial works that could be viewed from the ground and communal floor areas were in good condition with no signs of movement or distress indicating that the remedial works have been successful.

Garages, Hanover, Princess Cond. Report (3)

15. This 8 page report was issued 17.12.20
16. Potter Raper has been instructed by Cambridge City Council to assess existing data, carry out supporting surveys and to prepare a regeneration options appraisal – including assessment of suitability for redevelopment/densification.
17. The contents have been noted and considered for the demolition options.

Wayne Bagnall Ltd site visit observations 28.06.23

18. We walked the perimeter highways (anticlockwise) from the SE to the E, N, W & S elevations bounding the site and observed and noted the following, inter alia.
 - 18.1. **The East elevation**, George IV Street elevation is set well back from the Street and is opposite predominantly commercial buildings.
 - 18.2. There was good space for provision of welfare facilities and machine access etc.
 - 18.3. In the SE corner of the site the principal 'Chinese Scholar' trees G002 is in close proximity of the existing sub-station with the canopies reaching this structure, see appendix 4 plate 4.
 - 18.4. **The North elevation**, Union Road is a one-way road (running W to E) with occupied parking bays adjacent the multi-storey car park.
 - 18.5. Opposite the site is St Albans RC School with their main access and egress off Union Road.
 - 18.6. There are various other commercial buildings including a solicitor's office.
 - 18.7. **The West elevation**, Bentinick Street is a 2-way highway and is the main access into the multi-storey car park (corner of Union Rd and Bentinick St).
 - 18.8. The access ramp to the multi-storey car park have been strengthened and is covered with climbing plants (Ivy?).
 - 18.9. There is private residential 2-storey terraced housing opposite the site.
 - 18.10. **The South elevation**, Coronation Street is a one-way highway (running E to W) with double yellow lines on both sides of the road.
 - 18.11. There are various commercial buildings opposite the site including St Paul's (CE) Primary School and the 'Stephen Perse Foundation'.
 - 18.12. Another principal tree T010 is centrally situated between Princess and Hanover Court with a large canopy oversailing the highway and onto the buildings opposite, see appendix 4.
 - 18.13. The footpaths on Coronation Street were approx 2.75m wide with many services serving the property.

External areas

19. We accessed the central open spaces surrounded by the 2 No. multi-storey flats and 3 storey garages; my focus was on the 7 (Category A) principal trees in general as identified in green on the Hayden's drawing in appendix 1.
20. I noted to the North of the site the proximity of the 3 principal (London Plane) large established trees, G005 close to the 3 storey garages with the main trunks circa 4.5m away from the 3 storey garages structure.
21. The established primary tree roots were lifting the tarmac and concrete walkway between them and the 3 storey garages structure with the canopies over sailing these and the 2 No. blocks of flats.
22. The single principal tree situated centrally off Coronation Street (in the South), T010 is bending out toward the street with the canopy oversailing the highway and properties opposite the site, I noted the canopy was circa 5m from the 8 storey Hanover Court structure.
23. The 2 (Chinese Scholar) trees, G002 situated on the SE corner of the site have the trunks circa 5m from the sub-station with the canopy oversailing this and reaching part of the 8 storey Hanover Court structure.
24. The 2 (Chinese Scholar) trees, T003 & T004 situated on the E elevation of the site with the closest trunk circa 10m from the 8 storey Hanover Court structure with the canopy almost reaching the 8 storey Hanover Court structure.

Structures and hard standings

25. I accessed the public areas of the 3 mail buildings and noted many defects within the structure where past repairs and strengthening were visible as identified in reports by others, see section 1.
26. Many of the hardstanding's were showing damage by heave from the primary roots systems, particularly from the Category A trees.
27. In the absence of as built drawings, I have estimated the heights of the 2 main blocks of flats as follows.

27.1.	Princess Court (5 storey) x 2.5m/floor	=	12.5m high
27.2.	Hanover Court (8 storey) x 2.5m/floor	=	20.0m high
28. I also noted the construction type and potential working space required to demolish these structures safely and effectively.
29. For **guidance only** the old BS6187: 1982 (superseded in 2000/2011) provided a prescriptive safe distance from the structure when undertaking conventional demolition was calculated as:

29.1.	$\frac{1}{2} \times \text{Bldg Height}$	=	exclusion zone (or 6m whichever was greater)
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Conclusions from the information & my observations

30. I am aware that there are 2 proposed redevelopment schemes, i.e.,
- 30.1. With the trees retained and working round them (reduced housing units)
 - 30.2. Removing these trees (greater housing units)
31. I have looked at these 2 schemes, however, I have based my opinions merely on the methodology & safety for the demolition and site clearance enabling works.
32. The general demolition options normally considered are as follows:
- 32.1. Top-down floor by floor, reverse to construction (Mini-machines & hand)
 - 32.2. Remote mechanical demolition (High Reach Excavators)
 - 32.3. Explosives demolition (not suitable for this site)
33. NB. I am not designing the demolition works as this must be assessed and determined by the appointed demolition contractor, however, I have provided my opinion below.
34. Having reviewed the existing reports and my site visit observations on the structures, proximity to sensitive neighbours Schools etc I conclude that the best course of action would be to remove the affected principal trees, undertake the enabling works and demolish these dilapidated structures by:
- 34.1. Remote mechanical demolition (High Reach Excavators)
 - 34.2. If partial highway closures are refused there would be a need for fully sheeted access scaffolded protection to the Princess and Hanover elevations fronting Coronation Street.
35. The alternative 'top down, floor by floor' demolition (Mini machines & hand demolition) although would likely protect the principal trees, it requires significant temporary works and places greater risks on the demolition personnel from potential partial and disproportionate collapse of the structure¹.
36. The preferred 'remote mechanical' demolition requires the use of large machines working within exclusion zones that will receive the arisings/debris from the structures that would severely impact the affected principal tree canopies and root systems which are likely to extend well beyond the canopy radius, see appendices 1, 2, 3 & 4.

¹ Similar to Ronan Point disproportionate collapse from a gas explosion in 1968

37. The following principal (Category A) trees are likely be adversely affected by this.

37.1. G005 x 3

37.2. G002 x 2

37.3. T003 x 1

38. Although the other principal (Category A) trees may impact on the proposed re-build schemes these would not in my opinion constrain the demolition activities.

39. It should be noted that these other trees may be affected by the works i.e., there's no guarantee they would survive/flourish given the potential damage from falling debris, ground compaction from moving equipment, vehicles, and nutrient deficiency from the planned works.

4. Demolition and site clearance considerations

1. This section provides the reader with an aid-memoire that identifies the enabling works that need to be actioned to allow the asbestos removal and demolition works to proceed safely and effectively with conclusions on the likely best methodology for the demolition.
2. As a reminder I am not designing the demolition works as this must be assessed and determined by the appointed demolition contractor.
3. This project is defined as construction and therefore falls within the requirements of the Construction (Design & Management) Regulations 2015 (CDM 2015).

The Construction (Design & Management) Regs 2015 – appointments & roles

4. As this project is likely to have more than 1 contractor engaged on the work the client must appoint a Principal Designer and Principal Contractor in writing, otherwise the client will deem to be undertaking these roles.
5. The client expects the work to be carried out in accordance with CDM 2015.
6. The 2 principal CDM 2015 regulations that are of most relevance when determining the appropriate methodology for the demolition and site clearance are as follows.

Reg 19 Stability of structures, viz

7. *(1) All practicable steps must be taken, where necessary to prevent danger to any person, to ensure that any new or existing structure does not collapse if, due to the carrying out of construction work, it—*
 - 7.1. *(a) may become unstable; or*
 - 7.2. *(b) is in a temporary state of weakness or instability.*
 - 7.3. *(2) Any buttress, temporary support or temporary structure must—*
 - 7.4. *(a) be of such design and installed and maintained so as to withstand any foreseeable loads which may be imposed on it; and*
 - 7.5. *(b) only be used for the purposes for which it was designed, installed, and is maintained.*
 - 7.6. *(3) A structure must not be so loaded as to render it unsafe to any person.*

Reg 20 Demolition or dismantling, viz

8. *(1) The demolition or dismantling of a structure must be planned and carried out in such a manner as to prevent danger or, where it is not practicable to prevent it, to reduce danger to as low a level as is reasonably practicable.*

8.1. *(2) The arrangements for carrying out such demolition or dismantling must be recorded in writing before the demolition or dismantling work begins*

9. To ensure this specific demolition CDM Regulations 19. & 20. are followed it is essential that a competent Demolition contractor should be selected and appointed with suitable skill, knowledge, training, and experience (SKTE) and capacity to undertake the works safely and effectively.

The Control of Asbestos Regulations 2012 (CAR 2012) - Principles

10. The client must undertake an Asbestos (Refurbishment & Demolition) Surveys in all the buildings in accordance with HSG 264 Asbestos: The survey guide.

11. Licensed work requires a 14-day notification to the enforcing authority HSE, ASB5.

12. CAR 2012 has a specific requirement² in relation to Demolition, viz.

12.1. *Paragraph 190*

In the case of demolition or major refurbishment, the plan of work must specify that all asbestos is removed before any other major work begins, where this is reasonably practicable and does not cause a greater risk to employees than if the asbestos had been left in place.

13. To enable this to be followed there will have to be some demolition works required e.g., soft-strip to facilitate access for removal and some remote mechanical work.

14. The asbestos removal must be undertaken to a high standard to give the client confidence in the works, this should include, inter alia,

14.1. Statements of Cleanliness for non-licensed work

14.2. Independent UKAS Analysts for licensed work

BS6187: 2011 Code of practice for full and partial demolition

15. This code of practice contains 20 clauses and sets out clearly the steps to follow to achieve successful, safe and effective demolition projects, inter alia.

15.1. Clause 5. Planning and managing projects

15.2. Clause 14. Structural demolition

15.3. Clause 13. Safe working spaces & exclusion zones

² ACOP under Reg 7, Plans of work

- 15.4. Clause 17. Demolition Techniques
 - 15.5. Clause 19. Typical demolition methods for various types of structures
 - 15.6. Clause 20. Completion of the works
16. The demolition contractor must pay particular attention to the demarcation, controls and monitoring of 'Safe working spaces and exclusion zones', see appendix 3.
17. Clause 14.1 in BS 6187: 2011 provides useful guidance when determining the methodology, viz;

The basic principles of structural demolition, i.e. progressive, deliberate collapse or deliberate removal, should be applied as appropriate, whether full or partial demolition or structural alterations are to be carried out, such as in structural refurbishment projects (see also 4.6).

Whenever practically possible, a remote mechanical process should be used to minimize the risk to workers.

Town and Country Planning Act 1990

18. Before any demolition >1750 cu ft is undertaken it is a requirement to seek planning permission for 'prior approval to demolish' from the Local Authority planning department with at least 6 weeks' notice.
19. This can be undertaken by the client, assisted by the PD in advance of the works being undertaken.

Local Authority Environmental Health

20. Notification to Cambridge Environmental Health would be prudent to ensure they have the necessary heads up of the likely impact of these works and potential complaints on potential nuisance.
21. There would need to be liaison with the adjacent buildings and any other potentially affected 3rd parties to explain the planned works, programme, intended working hours etc.
22. In the unlikely event that a mutually acceptable agreement cannot be reached with these 3rd parties a Section 61 notice can be applied for to enable the works to go ahead within agreed boundaries e.g. noisy operations working hours etc.

The Building Act 1984

23. Before any demolition >1750 cu ft is undertaken it is a requirement to send a notice of intended demolition (Section 80) to Cambridge City Council; the Local Authority Building Control (LABC) providing at least 6 weeks' notice together with an administration fee, dates, outline methodology and is typically completed online.

24. The Local Authority Building Control will want proof that all statutory undertakers (services) have been informed and services disconnected along with evidence of liaisons with any 3rd parties that may be affected by the works.
25. Once satisfied the LABC will issue a consent (Section 81) along with any specific conditions they require (Section 82) e.g. working hours, noise & vibration levels and no burning of materials on site etc.

Health & Safety Executive (HSE)

26. As these works come under CDM 2015 the project will be notifiable to the HSE in accordance with Reg 6 and Schedule 1 of the CDM 2015 Regs, viz.
- 26.1. *(1) A project is notifiable if the construction work on a construction site is scheduled to—*
- 26.2. *(a) last longer than 30 working days and have more than 20 workers working simultaneously at any point in the project; or*
- 26.3. *(b) exceed 500 person days.*
- 26.4. *(2) Where a project is notifiable, the client must give notice in writing to the Executive as soon as is practicable before the construction phase begins.*
27. The client should be made aware immediately if there is a site visit or any enforcement action issued by the HSE.
28. The licensed asbestos removal work as defined requires a 14-day notification to the enforcing authority (HSE) on an ASB5.

Highways

29. As the buildings are close to adopted roads the Local Authority Highways Department (LAHD) must be informed of any works that may affect or obstruct the highway, although this will be determined by the appointed contractors to confirm and assess.
30. It is likely that partial road closures for short periods would be beneficial to enable the demolition to proceed where structures are close to the highways i.e., Union Road and Coronation Street.

Dilapidation of structures

31. It is important to record the condition of the highway (including footpaths) before any work begins and good practice to share this with the LA Highways to avoid any potential claim for existing damage (dilapidation survey).
32. The client should identify all services that must be maintained e.g. foul and surface water drains etc that would need to be protected or sealed in accordance with good industry practice.

Service disconnections

33. At the appropriate time arrange for all services to be disconnected from the buildings in readiness for the works, including.

- 33.1. Electricity.
- 33.2. Gas.
- 33.3. Water.
- 33.4. Telephones.
- 33.5. Data cabling.
- 33.6. Alarms including (fire) detection equipment.

34. Identify any services that cannot be disconnected therefore would need to be protected.

Drawings

35. Compile the PCI to include all available drawings for the various buildings.

- 35.1. General Arrangements
- 35.2. Floor layouts (basement to roof)
- 35.3. Elevation drawings
- 35.4. Any known or potential hazards within the ground (e.g. obstacles or contamination found on previous projects?)
- 35.5. Service drawings

Drainage systems

36. The client should provide drawings on foul and surface drains that will need to be maintained and capped off using agreed good industry standard methods.

37. Water arising from the works must be clean SFARP e.g. controlling silt from runoff to prevent blocking drains e.g. minimising the use of damping water by light sprays and using silt traps etc.

Biological hazards e.g. Zoonoses etc

38. The Principal Contractor shall be aware of the risks which are likely to be present in and under the buildings from, inter alia.

- 38.1. Leptospirosis (Weil's disease) associated with the presence of rats.
- 38.2. Tetanus and Histoplasmosis and /or Cryptococcosis a fungal disease associated with bird droppings.
- 38.3. Legionella is common in many environments, including soil and aquatic systems etc.

Asbestos, toxic materials and other potential contaminants

- 39. The client already has lots of information on asbestos from past surveys, it is critical this is all considered and supplemented with an intrusive Asbestos R&D Survey in accordance with HSG 264 Asbestos: The survey guide, see appendix 9.
- 40. There could well be discarded consumables e.g. syringes etc and vigilance must be exercised at all times, particularly during the asbestos removal and soft-strip operations.
- 41. Given the age of these buildings it is likely that some of the paintwork particularly protecting metal surfaces is likely to contain significant levels of lead in the paint and this should be assumed³ to be the case.
- 42. The Principal Contractor is expected to maintain vigilance and if any suspicious materials are encountered, the Principal Contractor shall ensure these matters are reported to the client at the earliest opportunity.
- 43. Respirable Crystalline Silica (RCS) from the breaking of concrete and other materials with a high silica content.

Ecological / environment / nuisance emissions

- 44. The Principal Contractor should ensure a mitigation plan is developed and put in place for the monitoring and protection of all fauna and flora.
- 45. There may be Bats and nesting birds which are always protected whilst sitting on nests with eggs, there needs to be liaison with the client and Natural England.
- 46. The PC must be sensitive to the existing environment by ensuring the works are planned and managed to minimise the environmental impact on the neighbours.
- 47. Working hours and in particular noisy operations must be reasonable and agreed with the client in advance.

Site access, audits, and environmental monitoring

- 48. The client should reserve the right to access the site at any time and undertake unannounced site audits / visits.
- 49. All visitors MUST report to the PC to sign in, receive a site induction⁴, wear appropriate PPE and follow the site rules.
- 50. The PC must comply with the requirements and conditions of the Demolition Notice (Section 81) as issued by the LABC.

³ Unless lead has already been identified or will be tested as part of the PCI

⁴ Unless they are constantly accompanied by site personnel

51. Where dusty, noisy or vibration inducing (e.g. percussive) operations are being implemented the PC must allow for supply, installation and maintaining active monitoring systems inter alia.

51.1. Fugitive dust

51.2. Noise

51.3. Vibration for peak particle velocity (PPV) & frequency (Hz)

52. Levels for amber or red alerts must be agreed and communicated with the client and comply with any conditions as set out by the regulator e.g. Building Control section 82.

Document control and regular progress meetings

53. The PC is to allow for ensuring all documents are adequately controlled, communicated to the client as directed and must include, inter alia.

53.1. Construction (Asbestos & Demolition) Phase Plan

53.2. Site rules

53.3. Specific RA/MS for all activities

53.4. Programme

53.5. Organogram

54. Weekly progress meetings will be held to discuss health & safety matters, progress, any issues raised etc.

Liaison with affected parties

55. It is essential to provide early advance notice of the works to all 3rd party adjacent buildings that may be affected directly or indirectly by restrictions on traffic movements etc.

Deciding on timing and programme

56. Consider the timing to identify and procure competent contractors together with the safety benefits of working over the summer period with longer daylight hours and normally better weather determine when these works should ideally go ahead.

57. Allow sufficient time for the contractor(s) to maximise the re-use, up-cycling and recycling potential from these structures that are to be demolished.

57.1. Removal of asbestos and other hazardous substances

57.2. Recovery of fixtures and fittings that may be re-used or recycled

57.3. Soft-strip removal of non-inert materials e.g. plasterboard, timber

57.4. Recovery of ferrous and non-ferrous metals for recycling

57.5. Crushing of concrete & masonry for re-use as back fill and for re-sale

Specification, end use and final finishes

- 58. Consider how the completed building footprints should be left and what these areas might be used for in the future e.g. temporary storage or lay down areas etc.
- 59. Confirm if any crushing can or cannot take place safely on site.
- 60. Decide if you want all the sub-structures including the basements and foundations⁵ to be removed?
- 61. Decide on what backfill is required after excavating and removing the sub structures e.g. secondary aggregate to type 1 or 6F2 and if there is likely to be a gap between the demolition and new build as the site must be left safe and secure at all times.
- 62. If hard backfill material is required decide if this should be stockpiled, or simply laid and tracked in or whether it should be compacted in layers to a specific strength to withstand any future loadings e.g., car parking etc.

⁵ With the age and height of the buildings these are likely to have substantial slabs and foundations

5. Summary & conclusions

1. Due to the existing condition of the buildings, their location and considering the (safety) risks v (tree) benefits' of retaining the principal trees and the effects on the demolition methodology leads me to prefer a remote mechanical demolition approach.
2. I have considered the principal trees, the expectations set out in the CDM Regulations 2015, and the guidance set out in BS 6187: 2011 to provide my opinion.
3. I conclude that trying to retain the principal trees is outweighed by the potential and real risks to personnel by having to undertake 'top down, floor by floor' demolitions exposing personnel to unnecessary work at height.
4. In addition, this method is slower and would likely require considerable temporary works, including back propping floors to support mini machines and arisings etc and fully enveloping the flats in sheeted access scaffolding.
5. Therefore, the best course of action would be to remove the principal trees affected and demolish these dilapidated structures by:
 - 5.1. Remote mechanical demolition (High Reach Excavators).
 - 5.2. If partial highway closures are refused there would be a need for fully sheeted access scaffolded protection to the Princess and Hanover elevations fronting Coronation Street
 - 5.3. If a partial highways closure is not agreed with highways then there would be an element of hand demolitions required to the elevations in 5.2 above.
6. I trust this final report proves useful, however, if you require any additional explanation, interpretation etc please contact me.

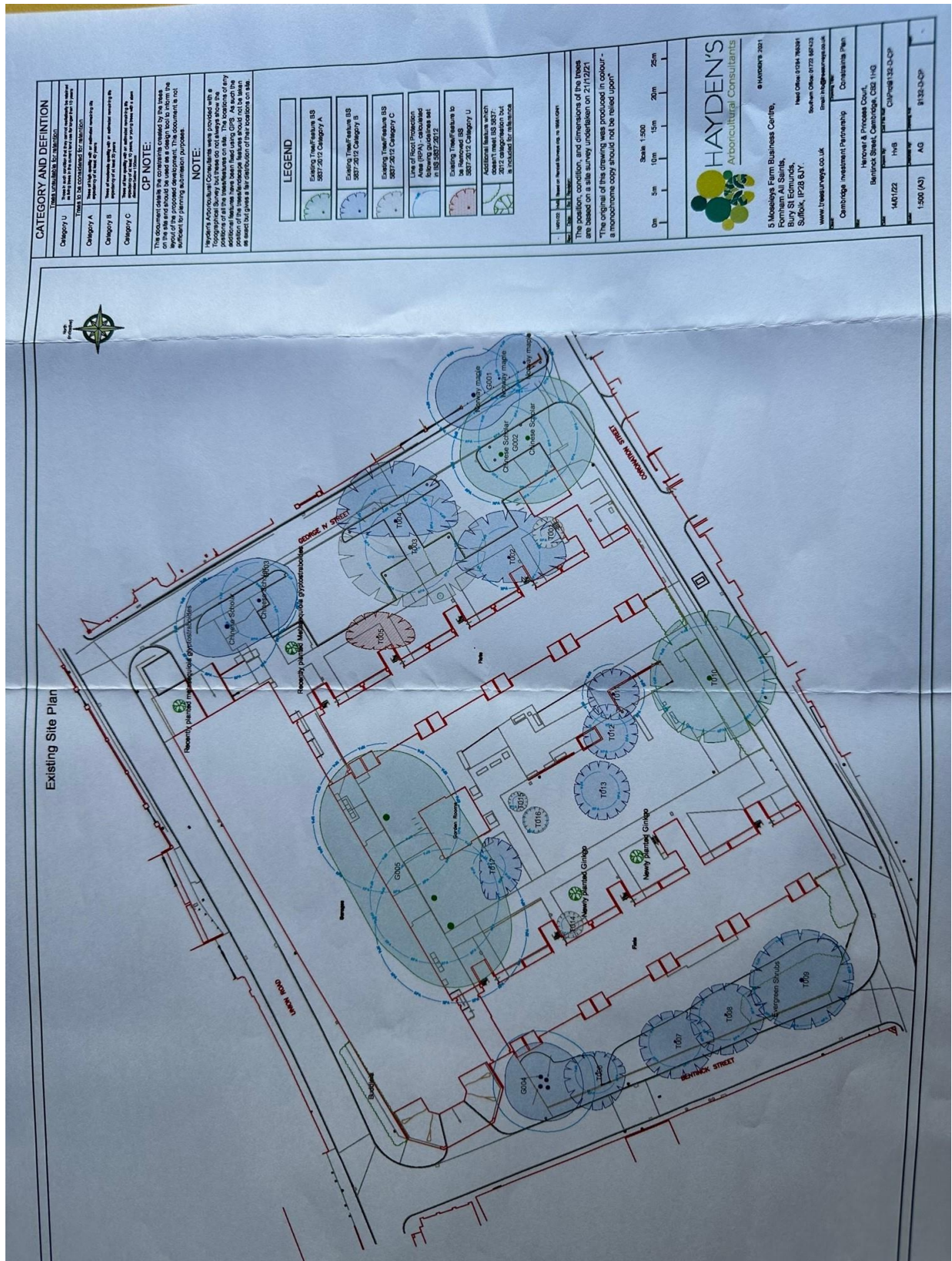
Kind regards



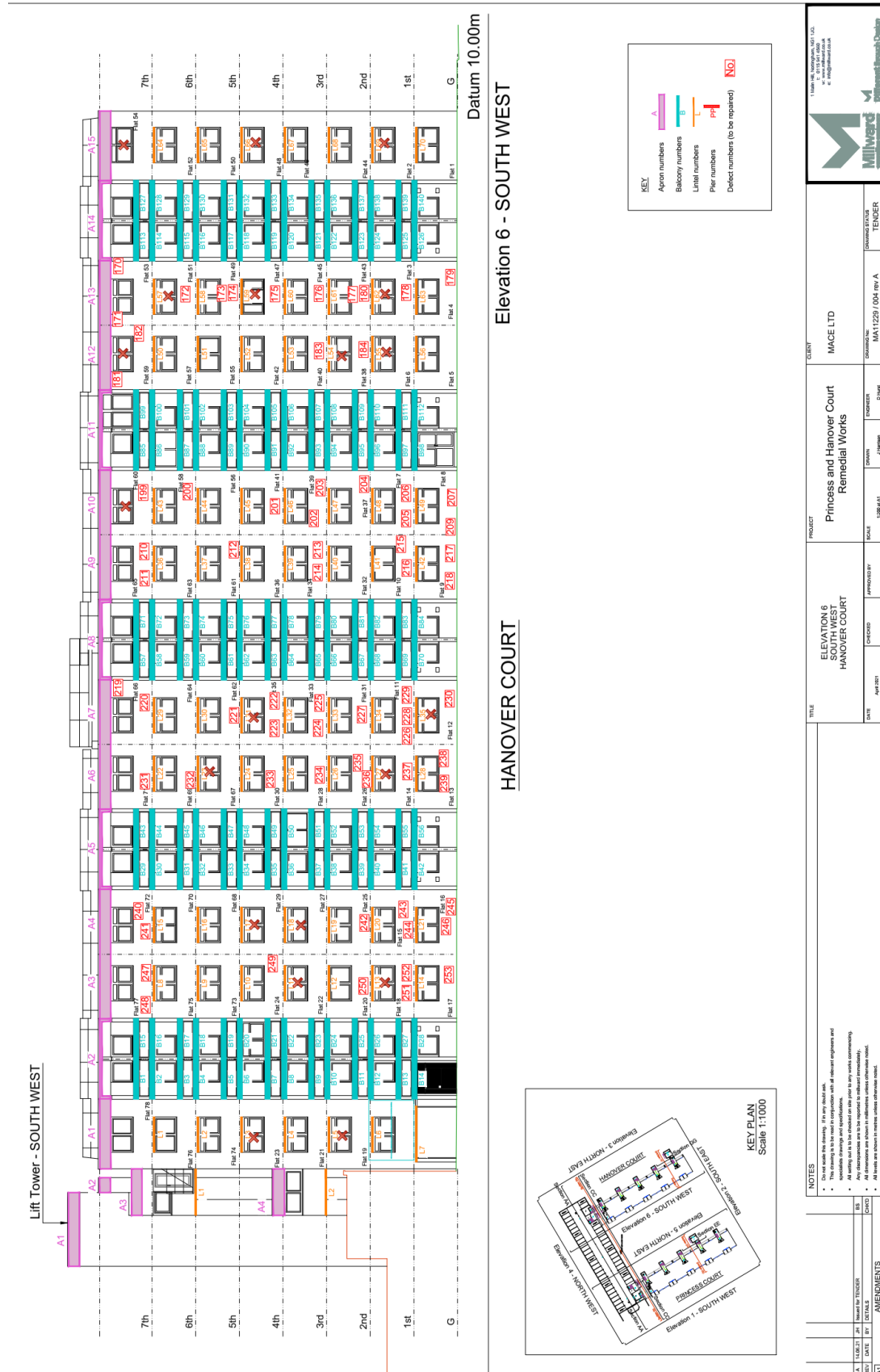
Wayne Bagnall MBE MSc CMIOSH Hon-FIDE MCMI
Director

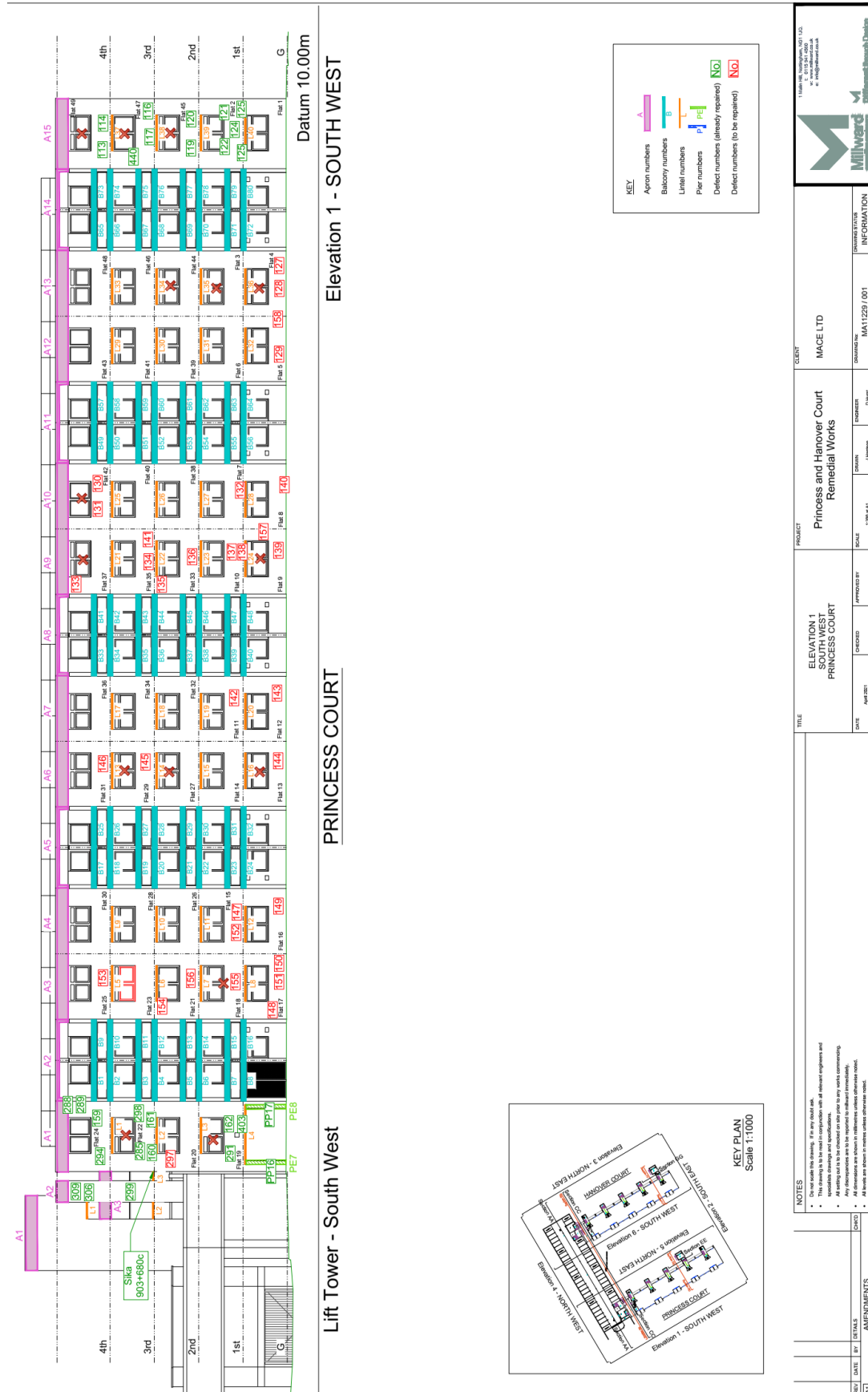
18 July 2023

6. Appendix 1: Existing site plan drawing with trees No. 9132-D-CP



7. Appendix 2: Elevation drawings of Hanover and Princess Court





8. Appendix 3: Extract from BS6187: 2011 Clause 13

BS 6187:2011

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13.2 Safe working spaces and exclusion zones as part of the safety regime

Exclusion zones should be part of an overall managed health and safety regime and should be included in the method statements. The location of the boundaries of any exclusion zones should be determined after assessing a number of parameters (see 13.4, 13.5 and the examples given in Figures 12 to 16).

13.3 Exclusion zones around site vehicles and plant

The work activity on site should be designed so that pedestrians and machines on site can move around without risk of collision. Safe operating spaces should be provided for all machines. The use of plant and machinery such as excavators and cranes should be planned so that their operation does not present a risk to those nearby.

In addition, the extent and location of the exclusion zone around a machine should take account of, for example, any crushing hazard between part of the machine and stationary objects or structures, or inadvertent movement of the machinery.

Pedestrian and machine movements on site should be controlled by designed and clearly delineated traffic routes that segregate their movements.

13.4 Application of safe working spaces and exclusion zones

An appropriate exclusion zone should be instigated when any person could be at risk from, or as a result of, any demolition activity. Exclusion zones should be assessed and established for all types of collapse, irrespective of the method of demolition and size of the planned collapse. Each demolition activity should be individually assessed and new assessments should be made and used for different demolition activities and differing types of situation (see 13.5.3 and Table 6). Exclusion zones should be applied when a whole structure or part of a structure is being demolished and should include areas where demolition machines are operating, and where arisings from the demolition can be deposited or otherwise handled, including controlled areas for soft strip materials (see 19.2.2).

Table 6 Areas of an exclusion zone

Area ^{A)}	Description
Plan area	The area of the structure or part of the structure that is to be demolished and is the subject of the assessment
Designed drop area	The immediate hazard area where the principal mass of the collapsing structure is planned to drop. Also included in this area is the plan area.
Predicted debris area	The perimeter of this second hazard area is the predicted limit or extent to which any debris from, or secondary material resulting from, the structure being demolished will travel and come to rest.
Buffer area	A hazard area that is planned to allow for any unpredictable events. People beyond the external perimeter of this area (the theoretical boundary of the exclusion zone) are safe from the effects of the demolition activity.

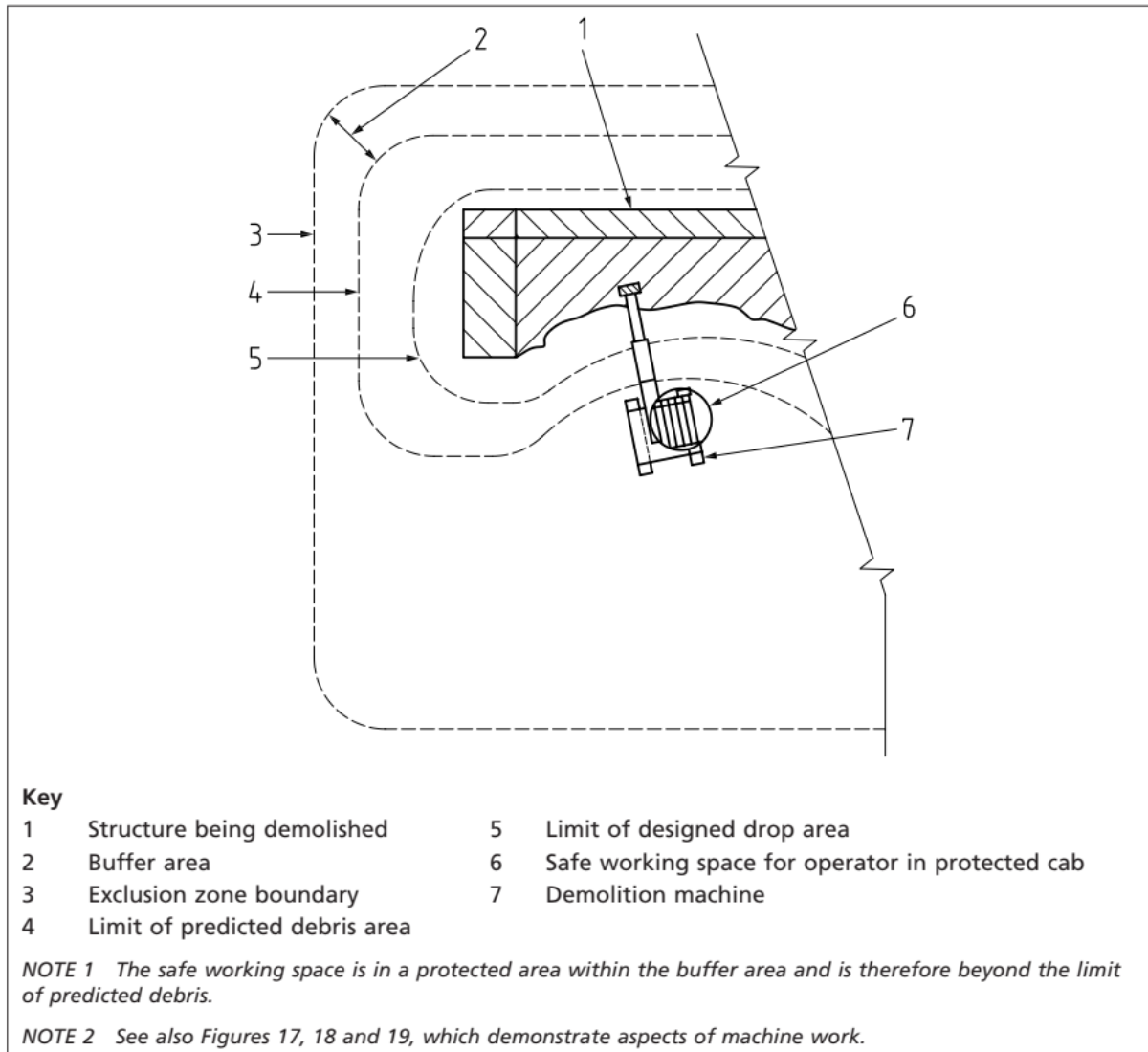
^{A)} Examples of these areas are shown in Figures 12 to 16.

NOTE The term "structure" also means part of a structure, where applicable.

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BS 6187:2011

Figure 16 Example of safe working space within an exclusion zone (typical for mechanical reduction or top-down demolition employing mechanical plant, etc.)



9. Appendix 4: Selection of photos from the site visit 28.06.23

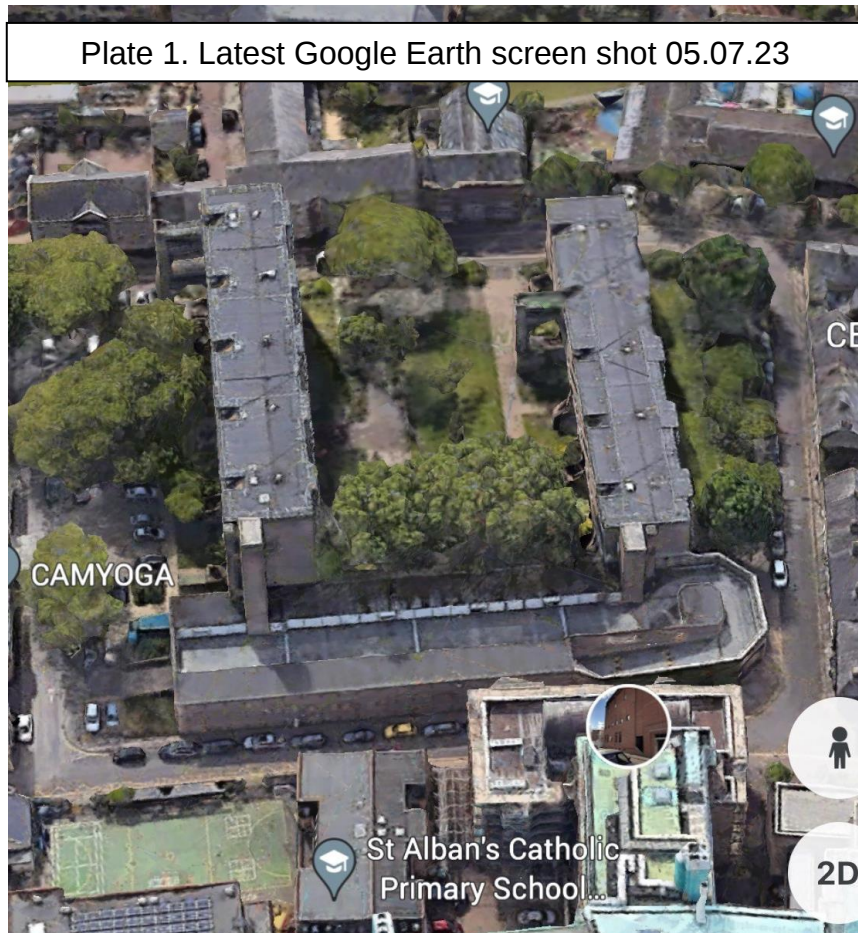




Plate 2. T010 Principal Tree Coronation Street



Plate 4. G002 Principal Trees adj Sub Station

10. Appendix 5: Asbestos information, legislation & guidance

The Health and Safety at Work etc. Act 1974
 The Construction (Design & Management) Regulations 2015
 The Control of Asbestos Regulations 2012⁶
 The Hazardous Waste Regulations 2005.
 The Reporting of Industrial Diseases and Dangerous Occurrences Regulations 2013
 Plus many approved codes of practice L127, L143 (2nd edition 2013) etc
 Asbestos Guidance; HSG 189/1 & 2, HSG 210, HSG 213 & HSG 227, HSG 247,
 HSG 248 & HSG 264 Asbestos: the survey guide; 2nd edition 2012
 BS6187: 2011 Code of practice for full and partial demolition
 BS5975: 2019 Code of practice for temporary works procedures and the permissible
 stress design of falsework

The Construction (Design & Management) Regulations 2015:

These regulations apply to all construction activities irrespective of duration that came into force on the 6/4/15; all clients are required to appoint a Principal Designer and Principal Contractor when more than one Contractor is required for the works. The requirement to notify the project and is a standalone when a project takes longer than 30 days AND 20 persons on site OR 500 persons days are likely to be exceeded triggering "Notifiable work" in accordance with Reg 6 and Schedule 1.

The word Competence has been replaced with the following requirements when appointing individuals and organisations; "SKTE" & Organisational Capability:

- **S** = Skill
- **K** = Knowledge
- **(T)** = (Training)
- **E** = Experience

Regulation 19: Stability of structures

All practicable steps to prevent danger to any person from any structure which may become unstable or in temp state of weakness due to construction work does not collapse.

Any temporary supports must be designed, installed & maintained to withstand any foreseeable loads which may be imposed

Regulation 20: Demolition or dismantling

The demolition or dismantling of a structure, or part of a structure, shall be planned and carried out to prevent danger

Or, where it is not practicable to prevent it, to reduce the danger to ALARP (as low as reasonably practicable).

The arrangements shall be recorded in writing before the work begins

⁶ The current Asbestos Regulations came into force on 6/4/12 replacing CAR 2006

BS6187: 2011 Code of practice for full and partial demolition

This current code of practice contains 20 clauses, various annexes and figures which all demolition contractors should follow, the following 2 clauses are particularly relevant, albeit these should be read in conjunction with the whole document.

Clause 14: Structural demolition

- 14.1 General, where possible remote mechanical demolition*
- 14.2 Structural demolition, progressive, collapse & partial*
- 14.3 Inherent hazards load bearing structures & members*
- 14.4 Inherent hazards of structural materials*
Cast iron, columns & beams, wrought iron, RC, timber, brick etc.

Clause 15: Avoidance of unplanned collapses

- 15.1 General, identify premature & unintentional collapse*
- 15.2 Achieving residual structural stability during works*
- 15.3 Designing safe deliberate collapse mechanisms*
- 15.4 Temporary structural support for stability*
- 15.5 Planned partial demolition*
Façade retention & shoring
- 15.6 Weather (particularly where structure is weak)*

GE 700/12 CITB Construction Site Safety (Module E7 – Safety in Demolition)**BS5975: 2019 Code of practice for temporary works procedures and the permissible stress design of falsework**

This current code of practice gives recommendations and guidance on the procedural controls to be applied to all aspects of temporary works in the construction industry.

The Control of Asbestos Regulations 2012 (CAR 12):

CAR 12 Applies to all persons who work with any types of asbestos & employers must:

Regulation (11) Prevention or reduction of exposure to asbestos

Viz:

Every employer shall –

- prevent the exposure to his employees to asbestos so far as is reasonably practicable;
- where it is not reasonably practicable to prevent such exposure –
- reduce the exposure of his employees to asbestos to the lowest level reasonably practicable by measures other than the use of respiratory protective equipment,
- And
- ensure that the number of his employees who are exposed to asbestos is as low as is reasonably practicable.

Regulation (16) *Duty to prevent or reduce the spread of asbestos*

Viz:

Every employer shall –

prevent or, where this is not practicable, reduce to the lowest level reasonably practicable, the spread of asbestos from any place where work under his control is carried out.

Control limit (maximum permissible exposure):

The control limit is defined in CAR 12 and mean the following concentration if asbestos in the atmosphere when measured under phased contrast microscopy (PCM) using an organisation conforming to ISO 17025 (UKAS accreditation in the UK).

The control limit (CL) & short term exposure limit (STEL) for asbestos are:.

CL	=	0.1 fibres per centimetre ³ of air averaged over a continuous period of 4 hours
STEL	=	0.6 fibres per centimetre ³ of air averaged over a continuous period of 10 mins

These levels (CL & STEL) are the maximum permissible exposure levels for asbestos, above which suitable and sufficient respiratory protective equipment must be provided and worn and the area designated a “respirator zone”.

PPE & RPE must be worn unless an assessment of the likely maximum exposure indicates that the control limits will not be exceeded, where there is potential for exposure to asbestos it is prudent to carry out personal & background air monitoring.

Asbestos information

Asbestos is the name given to a group of naturally occurring minerals that are contained within rock. These minerals appear as masses of strong, flexible fibres that can be separated & woven into threads, having been mined for thousands of years.

Heat or chemicals do not affect asbestos fibres, and they do not conduct electricity. They are also stronger than steel and quite resilient. For these reasons asbestos has been widely used in industry for a range of applications.

There are two varieties of asbestos with three main types:

Chrysotile, with its curly fibres, belongs to the “serpentine” family of minerals, whereas Crocidolite and Amosite belong to the family of asbestos known as “amphiboles”.

They have needle-like fibres,

- | | | |
|---------------------|---------|---|
| • Chrysotile | (white) | curly, flexible white fibres |
| • Amosite/Grunerite | (brown) | straight brittle fibres light grey/pale brown |
| • Crocidolite | (blue) | straight blue fibres |

Chrysotile differs significantly in texture, composition and behaviour from other forms of the mineral. Its structure is snakelike (hence the alternative name “serpentine”). It is noticeably softer and more flexible than the other kinds of asbestos, for this reason Chrysotile once accounted for more than 95% of the asbestos used worldwide.

Health effects:

Asbestos fibres tend to break easily into a dust composed of tiny particles that can float in the air and stick to clothes. These fibres are easily inhaled or swallowed and can cause serious health problems. All asbestos fibres are hazardous however very small fibres <3 microns diameter (1mm = 1000 microns) are known to be Respirable, can penetrate body tissues, particularly the lungs, eventually causing permanent damage to the lungs and other organs.

All asbestos has the potential to cause pleural plaques, asbestosis, lung cancer and, or Mesothelioma illnesses; currently ~5,073 people every year are dying in the UK from asbestos related diseases, however, the current annual UK death rate is flattening until 2030⁷ when it is expected to fall.

Health risks & RIDDOR 2013:

All asbestos is hazardous as it has the potential to cause serious harm however it is not necessarily a risk if undisturbed and or adequately controlled to prevent unnecessary asbestos exposure.

The following text is extracted from OC 265/48 version 3 for employees

The following are examples of uncontrolled work activities likely to create a significant Concentration of fibres in the air, thereby adding to the risk of developing an asbestos related disease:

- ☐ Use of power tools (to drill, cut etc) on most ACMs;
- ☐ Physical disturbance, such as knocking, breaking, smashing of a licensable ACM e.g. sprayed coating, lagging, asbestos insulating board (AIB);
- ☐ Manually cutting or drilling AIB;
- ☐ Aggressive physical disturbance of asbestos cement (AC), e.g. breaking or smashing.

⁷ HSE 6.7.23 update: <https://www.hse.gov.uk/statistics/causdis/asbestos-related-disease.pdf>

Any of the work activities listed above could be regarded as Dangerous Occurrences. They should be reported to HSE's Incident Contact Centre (tel: 0845 3009923) where they take place, or are repeated (without effective controls), for more than the periods of time outlined below:

- | | |
|---|---------|
| ☐ Sprayed coatings or loose lagging (excl text decorative coatings): | 15 mins |
| ☐ Insulation: | 30 mins |
| ☐ Asbestos insulating board: | 60 mins |
| ☐ Asbestos cement: | 8 hours |

The above is a short extract of the HSE document. It is recommended that reference is made to the source document, OC 265/48, on the HSE website;

<http://www.hse.gov.uk/asbestos/research.htm>

The Hazardous Waste Regulations 2005:

Asbestos appears on the European Waste List as a hazardous material. Generally all products that contain asbestos are classified as Hazardous Waste by virtue of the hazardous property of asbestos as "carcinogenic" when in a concentration equal to or greater than 0.1% w/w (by weight).

The National Federation of Demolition Contractors (NFDC), CITB & CIP publications

1. The NFDC with assistance from me and others have written and published useful industry guidance including:
 - 1.1. Deconstruction of tower blocks floor by floor piecemeal
 - 1.2. High Reach Demolition Rig Guidance Notes
 - 1.3. Safe use of mobile crushers
 - 1.4. Industry guidance for non-licensed work with asbestos
 - 1.5. Waste permitting and recycling
 - 1.6. WRA Waste Wood Assessment Guidance for the Construction & Demolition Sectors – 7.2021
2. The CITB (Construction Industry Training Board) have practical publications for all aspects of construction including asbestos and demolition modules (GE 700), I authored the original Demolition module for the CITB back in 1988 and carried out updates.
3. Finally, the Construction Industries Publications (CIP) has engaged me to update their Demolition Module which is widely available.

11. Appendix 6: M W Bagnall experience and qualifications

1. My name is Wayne Bagnall MBE MSc CMIOSH Hon-FIDE MCMI. In the 1970's I studied Chemistry & Biochemistry for five years attaining a City & Guilds Full Technological Certificate (Part 111) equivalent to degree level. I continued with my education in management and safety gaining Membership with the Chartered Institute of Management (MCMI), a Certificate of Professional Competence in transport safety with the RSA, a qualified Demolition Engineer with the Institute of Demolition Engineers (MIDE), corporate membership with the Chartered Institution of Occupational Safety and Health (CMIOSH). In 2000 I was one of the first four people to be awarded a 'Master's Degree in Construction (Health & Safety) Management' at John Moores University Liverpool.
2. I worked in the family business in Asbestos Removal and Demolition as a Director of the Bagnall Group Ltd. During my time with the company I continued to develop my personal expertise by various training, writing papers on asbestos and demolition safety issues and delivering presentations around the country at national conferences (IOSH, NFDC, ICE) etc. In 1997 I was awarded the MBE for Services to the Building Industry.
3. In 1999 I set up an independent consultancy, Wayne Bagnall Ltd t/a Wayne Bagnall Consulting, providing specialist safety advice and training in asbestos and demolition to private industry and government. I was a team member on the original BS6187: 2011 Code of practice for full & partial demolition, have authored new demolition guidance notes for the Health and Safety Executive (HSE) and regularly provide training to the HSE on their 4-day Refurb & Demolition courses.
4. I advised British Nuclear Group on asbestos issues on the Windscale Advanced Gas Cooled Reactor (WAGR) and the Calder Hall Cooling Towers providing advice, training and support on these and other asbestos / demolition and taken the role as an expert witness on various projects around the UK.
5. I have advised, supervised and, or managed major demolitions including the following types of work; Nuclear installations, petrochemicals, chemical plants, food factories, City Centre Office blocks and high structures (up to 138m) etc.
6. I continue to act as an independent expert, providing training recognised & accredited by British Occupational Health and Safety (BOHS), Institution of Occupational Safety & Health (IOSH), Construction Industry Training Board (CITB), UK Asbestos Trainers Association (UKATA) and on the HSE's list of Occupational Safety & Health Consultant Register (OSHCR) as a Registered Consultant.
7. Delivered a paper at the Demolition World Summit, Vienna 11.22, to give a paper EAF, Brussels 12.23 & won an 'Excellence in Innovation' at UKATA awards 7.23.
8. I am considered by my peers to be a leading authority in my field.
9. For further information please see my website www.waynebagnall.co.uk