Sustainability: *Demolition vs. Retrofit*

The officer put the following question:

"The development will result in the demolition of an existing Victorian terraced house. Policies prioritise the reuse of existing buildings over demolition and rebuild, due to the embodied carbon impacts.

Although the development is recycling demolition materials, the applicant should provide justification for the demolition of the existing building over retrofit. SWMP proposed.".

While the officers comment is restricted to embodied carbon we understand that sustainability more broadly, or the perception of it, is an important issue. Some of the consultation respondents have remarked that the current building looks to be perfectly good, and that it seems a shame to have it demolished; and in 2004, when we started looking at options for re-developing the site, which is so clearly underutilised in terms of the amount and quality of accommodation it provides; so did we.

The following pages and accompany report address the key issues that we have considered when looking at retaining the existing building in some way vs. demolition.

1. Embodied Energy and Carbon:
A look at how much Embodied Energy and Carbon is at issue given the circumstances.
See pages 2, 3 & 4.

2. Historic Value:
Contribution to the Street Scene. ***See Page 5***

3. Financial Issues & Construction Impact:
We first started looking at redeveloping the property in 2004. At that time we very much believed that retaining the existing building would be the most practical and cost-effective way to proceed with the development. Unfortunately, as it transpired, we were mistaken.

From 2004 to 2007, we looked at a variety of options, from just building on the car park alone, retaining the existing building and wrapping a new build around it, through to designs that fully incorporated the main structural walls of the extant building. ***See sample drawings on pages 6-9.*** There is hardly a option we didn't look at.

In spite of the considerable constraints that the extent building constantly imposed on the new design, we persisted, for far longer than we should have, in trying to incorporate the extant building into the application design. The end result was viable, but far from ideal. The extant building forced many design decisions on us that we would not have otherwise taken.

Over time however, it became increasingly clear to us from discussions with our architect, quantity surveyor and prospective contractors that to working round, underpinning and propping the existing walls would cause a host of additional problems, would slow down and constantly hamper construction and end up costing quiet a lot more than if we just demolished them in the first place and started with a clean slate; which is exactly the conclusion we eventually came to.

The irony is that because we'd already gone so far down the road, the outline of the extant building is still clearly visible in the 2007 application drawings ***(See Page 9 Fig.B),*** and still dictating the floor plan, in spite of the fact that we already decided to completely demolish the building anyway. This new application design is largely informed by mistakes made in 2007.

5. Building Retention vs Replacement Statement:
Accompanying this document is supplementary report commissioned from NDM Heath Ltd a company familiar with the issues being raised.

6. SWMP: We're happy to accept a condition with respect to a SWMP.

1. Retrofit/ Refurbishment: *Embodied Energy and Carbon.*

While the standard of accommodation provided by existing house is typical of any reasonably well kept Victorian House in the area - the idea has been put forward in some or the consultation responses that the extant building perhaps *just* needs refurbishment and it will be fine. However, in my view it would be disingenuous to pretend that giving the extant house a quick makeover would bring up to the standard of a new-build. Much of the argument comes down to one of equivalence.

What follows is what the house need in terms of refurbishment - if it is to be brought up to anything like a new build standard.

Aside from some rockwool in the pitched and flat roofs, the existing house has no insulation in the Victorian brick walls - given the enormous area of exposed outside wall, it will need around 280m² - all to be dot n dabbed on to bare brick.

There is secondary glazing but only two windows in the house are double glazed. All need replacing. The central heating system, radiators and pipe work are at least 35 years old and run all over the place due to numerous past "improvements". The boilers are tested and fine at the moment, but are not condensing and will need replacing soon. The damp course in the party wall to 21 is 6" above the floor slab of 23A; it was treated, but it need re-addressing.

The floor boards are mostly original but in-poor condition having been moved repeatedly as pipe work have been repeatedly moved about over time. They leak air quit a bit, which is evident when the carpet is pulled up, and they will need replacing. The wiring and electrical tests are fine at the moment, but being from the 70's it will need rewiring anyway.

Kitchens and bathrooms are 25 years old, and need replacing soon. The flat felt roofs are OK with repairs but will need replacing in the next few years. Flashing and guttering all need attention but aren't critical. The back wall to the property is cracked in a few places and will defiantly need rebuilding at some point soon. Garden fences could really do with replacing.

The list of works starts to look more like this:

- *Striping all plaster work in the entire house back to the bare brick.*
- *Lining all external walls with approx 280m² Celotex Insulation Plasterboard, re-plaster and paint.*
- *Strip ceilings back to joists, strip floorboards - replace with acoustic chip board floating insulate, sound proof, 2 x layers plaster board, skim and re-paint.*
- *Strip underside of pitched and flat roofs, insulate, plaster board, skim and paint.*
- *Prop and remove brickwork to replace deteriorated damp course along length of party wall with No.21. Install additional damp proofing measures.*
- *Some renovation of floor slab.*
- *Various works to make good external envelope, front elevation stonework, patching holes, small fixes to tile/ flashing etc. Re-pointing in quite a few places.*
- *New EPDM to flat roofs / possibly new flat roof ply depending on condition.*
- *Most possibly rebuild 2 x Roof Dormers.*
- *Completely rewire, new consumer units, new light fittings, switches, sockets.*
- *New Heat recovery system.*
- *Re-plumbing from scratch, new heating system and boilers*
- *New cornice, skirting boards, door jambs/ heads and architrave.*
- *New internal doors, 2 front doors and 1 x patio door.*
- *New shelves, chimney alcove cupboards.*

Response to Officers Comments 01: Proposed Redevelopment of 23 Ravenshaw Street, London, NW6 1NP

- *Redecorate whole house. New flooring, tiling.*
- *2 x new kitchens, low water use toilets, taps and 2 x new bathrooms new A++ appliances.*
- *Possible new covered cycle storage facility*
- *Possible new waste and bin storage facility.*
- *Rebuild brick wall to entire rear of site.*
- *Replace garden fences with new.*
- *Ideally, replace the front fence with a brick wall and gate, return the front yard to a more traditional front garden.*

On top of that, as with any refurbishment, you only get a full picture of what's needed when the building been stripped back, so there very well may be other hidden issues.

Additionally, a new build benefits from:

- *The new-build will have Graphite Polystyrene (GPS) insulation that retains it u-values over time instead of having to use thinner PIR internal insulation which loses a lot of its u-value in just a few years.*
- *Far superior air tightness.*
- *Increase efficiencies from the extra housing density / not suffering from such a large expanse of external exposed wall.*
- *Much larger windows; benefits of natural light and Passive Solar Gain.*
- *Insulation on the inside of walls – no internal thermal mass to store and release heat.*
- *20% (or more) on site renewable energy*
- *Energy Management System*
- *Disable Access / Lifetime Homes features*
- *Green Roof*
- *Rainwater harvesting system*
- *Possible retention of the crossover*
- *Retention of 2 x parking permits.*

In fact, a great deal of the buildings fabric needs to be replaced anyway; just in a refurbishment - with none of the additional benefits of the new build.

Of the material that remains, much of it is either recyclable, or in the case of the wood, widely regarded as carbon neutral.

- *The brick envelope: It's difficult to know exactly how much, but most of it can probably cleaned and sold as reclaimed. we'll try an use as much as possible in the new back wall.*
- *Concrete floor slab: would be rubble, well use what we can on site.*
- *Floor joists - Wood*
- *Front façade bay window stone work: to be sold as salvage if in good condition.*
- *Roof rafters - Wood*
- *Roof Slates; most will be reclaimable.*
- *Carbon / Energy cost of labour involved.*

Without doubt, may applications will come forward where the case for retaining much of an existing building, due to it's embodied carbon, is a strong one; perhaps in the case of a substantial, concrete frame office building where the structure is sound and there is little to be gained from a radical new layout, where retrofit would be the most carbon neutral option.

However, for No.23 Ravenshaw Street, where the extant property comprises less that 20% of the proposed building, where most its materials can be reused, recycled of re-purposed in some way; when properly balancing the alternatives - it is difficult to see that a strong argument can be made, in terms of embodied carbon and energy, for retaining any of the extant brick wall - especially when set against the practical problems that retaining them will involve.

If it's really necessary, it is possible to estimate all the embodied Carbon and Energy in the extant building, take the predicted values in the new build - then compare Energy Use and Savings over the lifetime of the two options etc. But it would be a laborious job, and to be frank, I'm not sure it will tell us anything that useful.

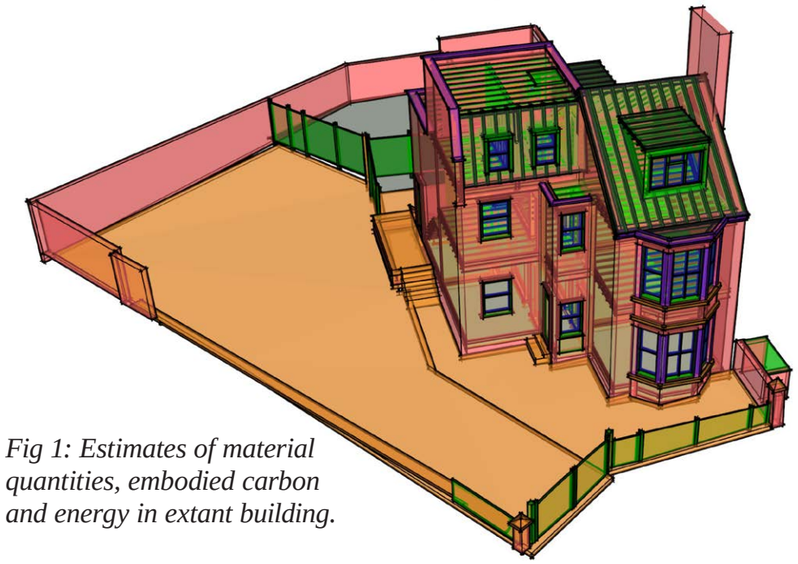
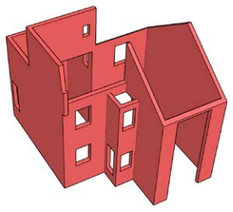


Fig 1: Estimates of material quantities, embodied carbon and energy in extant building.

External Brick Walls

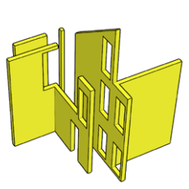


Total Wall Volume: 66.83 m³
Brick 72.24% = 48.28 m³
Mortar 19.25% = 12.86 m³
Plaster 8.51 % = 5.69 m³

Ref: https://www.simetric.co.uk/si_materials.htm

Bricks @ 1,922kg/m³ = **92,794kg**
Mortar @ 2,162 kg/m³ = **27,803kg**
Plaster @ 849 kg/m³ = **4,831kg**

Internal Brick Walls



Total Wall Volume: 24.82 m³
Brick 66.58% = 16.55 m³
Mortar 17.70% = 4.39 m³
Plaster 15.69% = 3.89 m³

Bricks @ 1,922kg/m³ = **31,809kg**
Mortar @ 2,162 kg/m³ = **9,491kg**
Plaster @ 849 kg/m³ = **3,303kg**

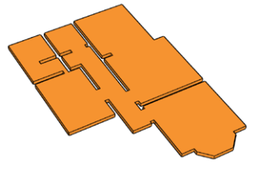
Ref: Embodied energy and carbon in construction materials:
G. P. Hammond and C. I. Jones

	Embodied energy: MJ/kg	Embodied carbon: kgC/kg
Total Bricks = 124,603kg	**373,809 MJ**	**7,476 kgC**
Total Mortar = 37,294kg	**52,212 MJ**	**2,163 kgC**

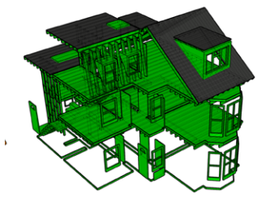
Ground Floor Slab 200mm: 14.14 m³ @ 2371 kg/ m³ = 33,526 kg
General (1: 2:4 as used in construction of buildings under three storeys)

Embodied energy: MJ/kg
31,850 MJ

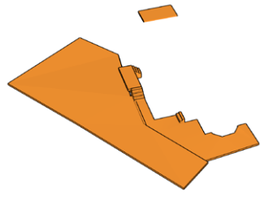
Embodied carbon: kgC/kg
1,173 kgC



Total Timber: 12.530 m³



External Concrete: 47.196 m³



Material	m³	m²
Brick - House External Walls		
Total Wall Volume	66.83	
Brick	48.28	
Mortar	12.86	
Plaster	5.69	
Brick - House Internal Walls		
Total Wall Volume	24.82	
Brick	16.55	
Mortar	4.39	
Plaster	3.89	
CONCRETE - Ground Floor Slab 200mm:	**14.14**	
Brick - Landscaping Elements		
BRICK FRONT PILLARS LOW & WALLS 1	1.31	
BRICK FRONT PILLARS LOW & WALLS 2	0.19	
BRICK FRONT PILLARS LOW & WALLS 3	0.11	
BRICK LOW WALL	0.36	
BRICK LOW WALL TO 21A	2.05	
BRICK PILLARS TO 21A GARDEN	2.48	
BRICK PLATFORM TO 23B	0.61	
BRICK SITE BACK WALL	15.58	
BRICK SITE WALL REAR TO 21A	5.19	
BRICK SITE WALL TO 25	0.84	
BRICK STEP WALL	0.19	
Total:	**28.91**	
CONCRETE - External		
CONCRETE 23A SHED SLAB	2.13	
CONCRETE CAR PARK HARD STANDING	32.72	
CONCRETE FRONT YARD HARD STANDING	6.95	
CONCRETE PLATFOM TO 23B	3.55	
CONCRETE STEPS 1	0.19	
CONCRETE STEPS 2	0.99	
CONCRETE STEPS 3	0.67	
Total	**47.20**	
CONCRETE - Internal Ground Floor Slab	**14.14**	
TIMBER - In House		
TIMBER MISC.	0.15	
TIMBER MISC. 1	0.08	
TIMBER MISC. 2	0.01	
TIMBER MISC. 3	0.20	
TIMBER DOOR 1	0.09	
TIMBER DOOR 2	0.09	
TIMBER DORMER FRONT	0.41	
TIMBER DORMER REAR	0.19	
TIMBER FLAT ROOF	0.24	
TIMBER FLAT ROOF 1	0.24	
TIMBER FLAT ROOF 2	0.06	
TIMBER FLAT ROOF 3	0.10	
TIMBER FLAT ROOF 4	0.26	
TIMBER FLOOR BOARDS 1	1.00	
TIMBER FLOOR BOARDS 2	1.20	
TIMBER FLOOR JOISTS 1	1.53	
TIMBER FLOOR JOISTS 2	1.34	
TIMBER GF SKIRTING	0.13	
TIMBER INTERNAL DOORS	0.70	
TIMBER MISC 3	0.17	
TIMBER PITCHED ROOF 1	0.35	
TIMBER PITCHED ROOF 2	0.36	
TIMBER ROOF RAFTERS	0.22	
TIMBER ROOF RAFTERS 1	0.40	
TIMBER ROOF RAFTERS 2	0.41	
TIMBER ROOF RAFTERS 3	0.38	
TIMBER ROOF RAFTERS 4	0.32	
TIMBER ROOF RAFTERS 5	0.06	
TIMBER STAIR 3	0.44	
TIMBER STAIRCASE 1	0.18	
TIMBER STAIRCASE 2	0.45	
TIMBER STUD WALL	0.11	
TIMBER STUD WALL 1	0.08	
TIMBER STUD WALL 2	0.08	
TIMBER WINDOW FRAME 1	0.03	
TIMBER WINDOW FRAME 10	0.01	
TIMBER WINDOW FRAME 11	0.02	
TIMBER WINDOW FRAME 12	0.02	
TIMBER WINDOW FRAME 13	0.03	
TIMBER WINDOW FRAME 14	0.01	
TIMBER WINDOW FRAME 14 1	0.03	
TIMBER WINDOW FRAME 14 2	0.03	
TIMBER WINDOW FRAME 15	0.03	
TIMBER WINDOW FRAME 16	0.03	
TIMBER WINDOW FRAME 17	0.03	
TIMBER WINDOW FRAME 18	0.03	
TIMBER WINDOW FRAME 19	0.03	
TIMBER WINDOW FRAME 2	0.01	
TIMBER WINDOW FRAME 3	0.01	
TIMBER WINDOW FRAME 4	0.01	
TIMBER WINDOW FRAME 5	0.01	
TIMBER WINDOW FRAME 6	0.03	
TIMBER WINDOW FRAME 7	0.03	
TIMBER WINDOW FRAME 9	0.03	
TIMBER PATIO DOORS	0.03	
TIMBER RAFTERS 5	0.04	
Total:	**12.53**	
Timber - Garden		
FENCE POSTS	0.37	
TIMBER FENCE TO 21A	0.04	
TIMBER FENCE TO 25A	0.12	
TIMBER FRONT FENCE	0.10	
TIMBER FRONT GATES 1	0.12	
TIMBER FRONT GATES 2	0.12	
TIMBER FRONT GATES SMALL	0.05	
TIMBER MIC	0.08	
TIMBER REAR FENCES	3.02	
Total:	**4.02**	
Plaster Board	**3.94**	
Stone Work	**1.88**	
Glazed Area		**21.37**
Floor Coverings Ground		70.71
Floor Coverings First		54.22
Floor Coverings Second		45.84
Total		**170.76**
Pitched Roof Area Slates		35.01
Flat Roof Area Roof Felt		44.80
Internal wall area that would need insulating		**281.58**
Roof area to insulate		**79.82**
Internal Floors to insulate & Sound Proof		**100.05**

2. Historic Value / Contribution to the Street Scene

The original Victorian building at No. 23 was actually quite small, a basic two up and two down, comprising of just 60m² of habitable floor space; the 1950's, 60's and 70's extensions around it now form around 64% of the extant building. From its first occupation the property was described together as a house and stone yard.

It seems quite apparent, that 23 was somewhat tacked on to the rest of the parade as something of an afterthought. It was almost certainly built as a more utilitarian, live/work property as distinct from the purely residential, and somewhat more highly decorated properties in the adjacent parades. There is also no evidence of it ever having an original rear extension.

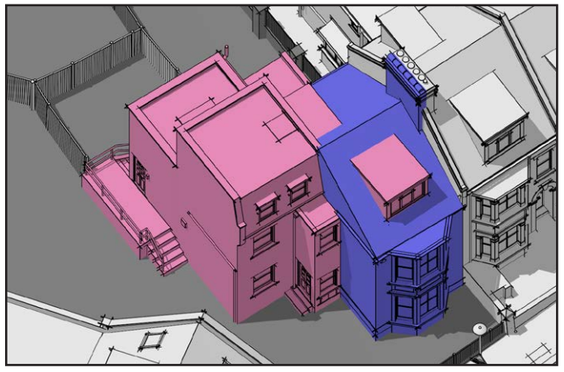


Fig 1: 64% of the building is ad-hoc later extensions - shown in pink.

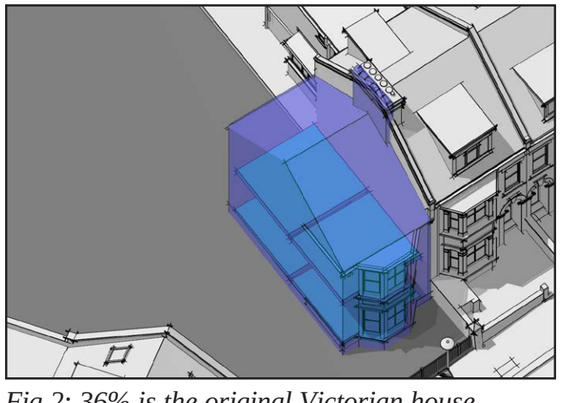


Fig 2: 36% is the original Victorian house, shown in blue; showing 60m² of floor space.

Fig 4: Front facade shows no evidence of decorative features having been removed.

Fig 5: The bulky 20thC side extension.

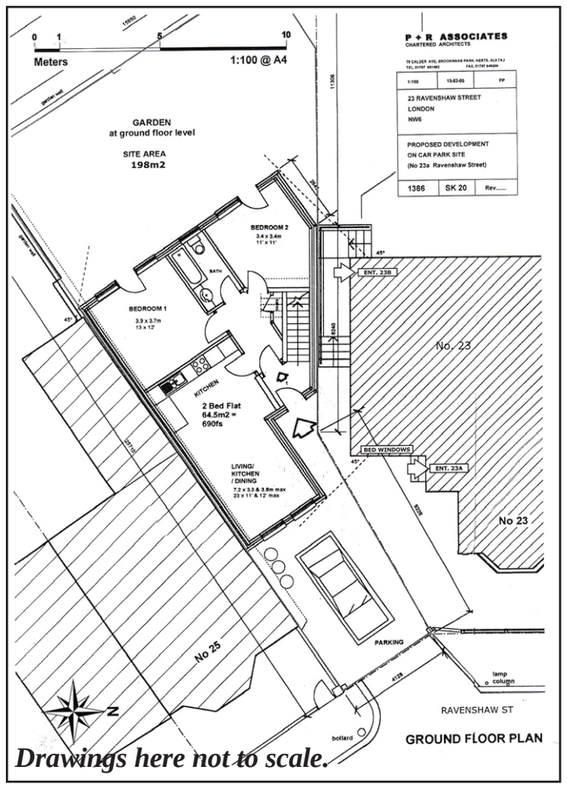
There are quiet a number of end of parade sites, often triangular, in many areas dominated by Victorian terraces. They seem to have presented Victorian developers with such particular problems that they just left them, or sold them off for light industrial use. Presumably it was difficult for them to build on them cost effectively, or find a ready market for what would have been comparatively odd ball properties, if they had. Today of course, we view these sites rather differently.

Unquestionably, many Victorian buildings make an important heritage contribution to the built environment; but, we'd argue that No.23 Ravenshaw Street really is not one of them.

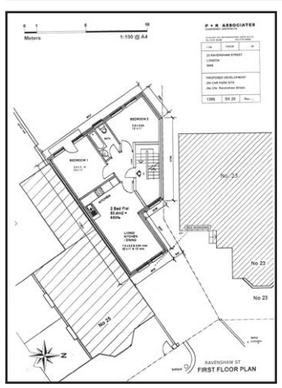
We hope officers will be persuaded that, on balance, replacing what is really a very mediocre building, along with all its compromises and hindrances, is the preferable route to fully utilising the site and providing all its future occupants with superior levels of accommodation long into the future.

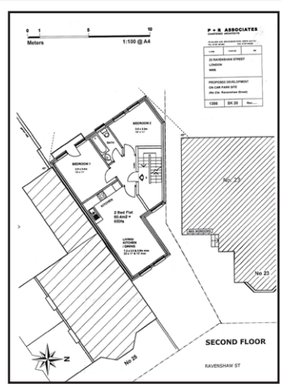
Figure 2: 2005 Exploratory Drawing. ►
Abandoned plans looking at working a new build round the extant house; tying the two buildings together, along with extending and refurbishment of the extant building.

Figure 1: 2005 Exploratory Drawing.
Abandoned plan, just 3 simple flats on the car
▼

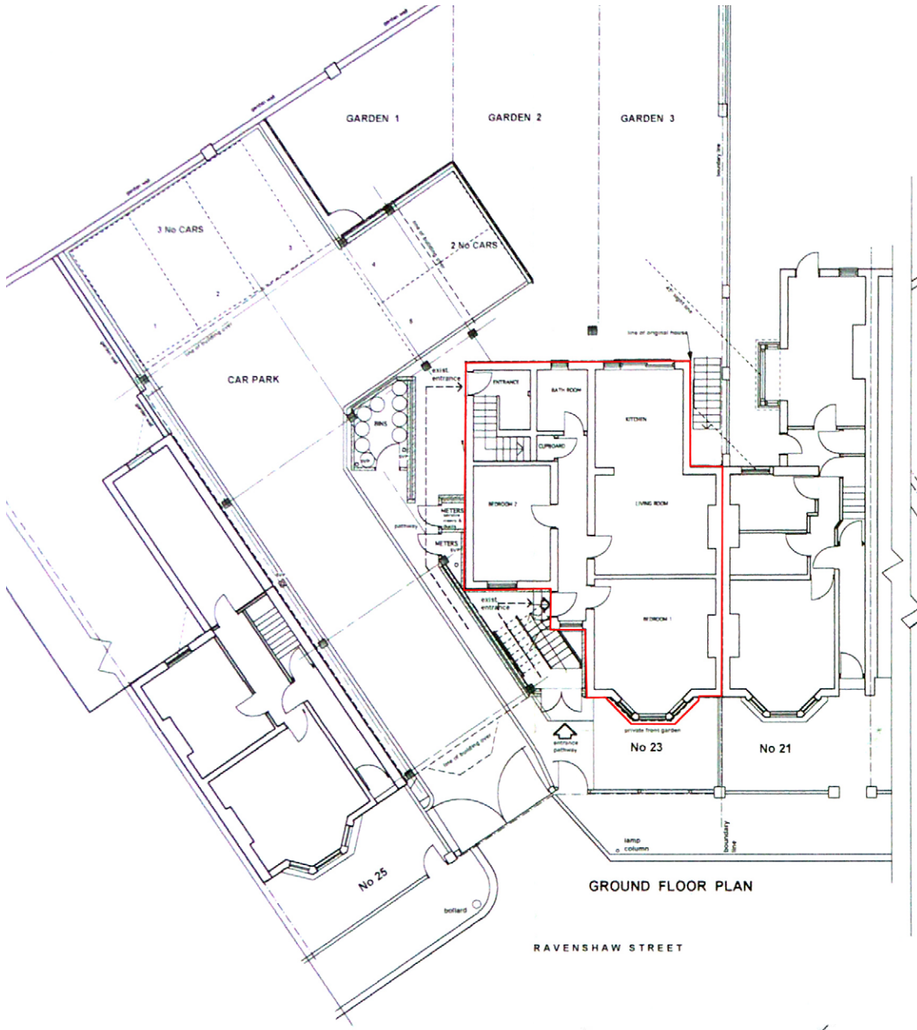


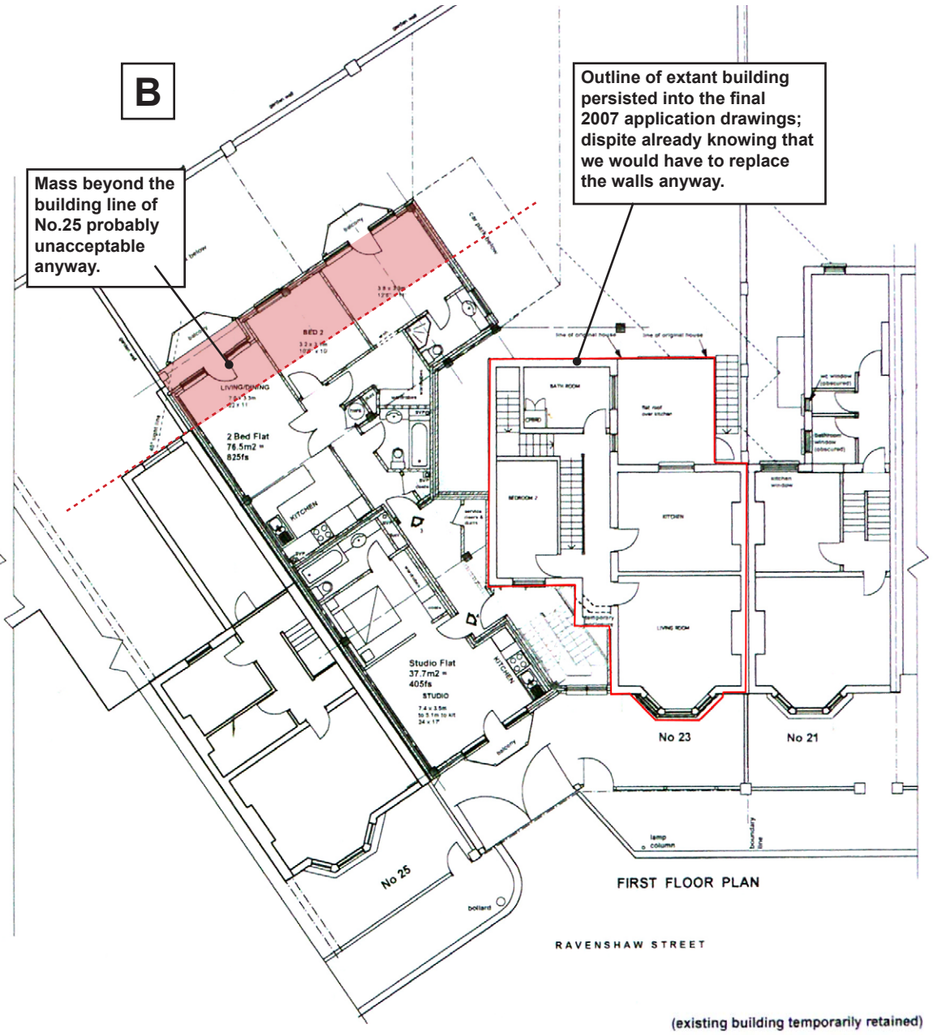
Drawings here not to scale.

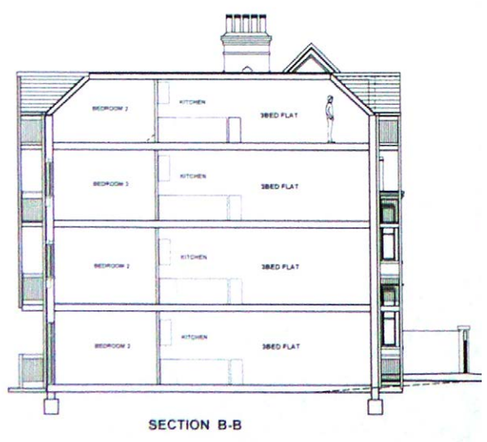


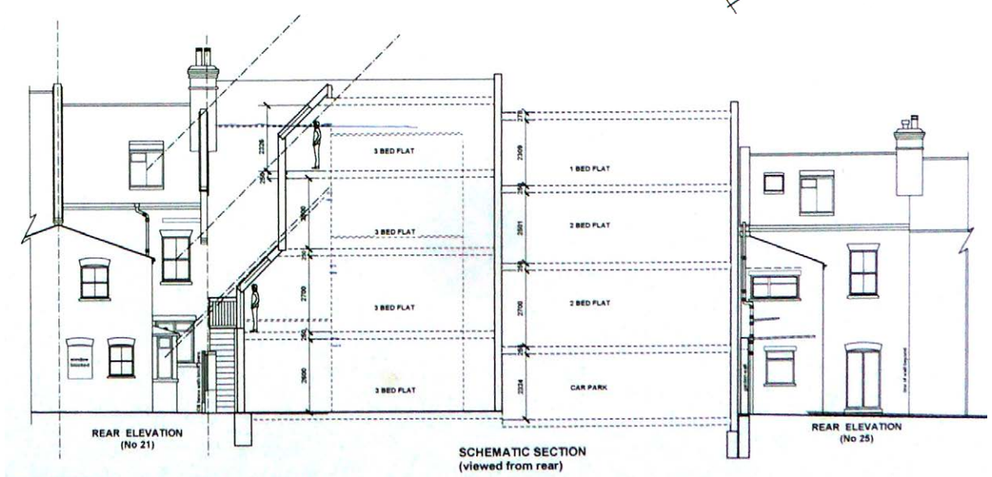


Response to Officers Comments 01: Proposed Redevelopment of 23 Ravenshaw Street, London, NW6 1NP









(existing building temporarily retained)

PRELIMINARY
14-01-05

P + R ASSOCIATES
CHARTERED ARCHITECTS

79 CALDER AVE. BROOKMANS PARK. HERTS. AL9 7AJ
TEL. 01707 661482 FAX. 01707 648206

1:100	09-04-04	PP

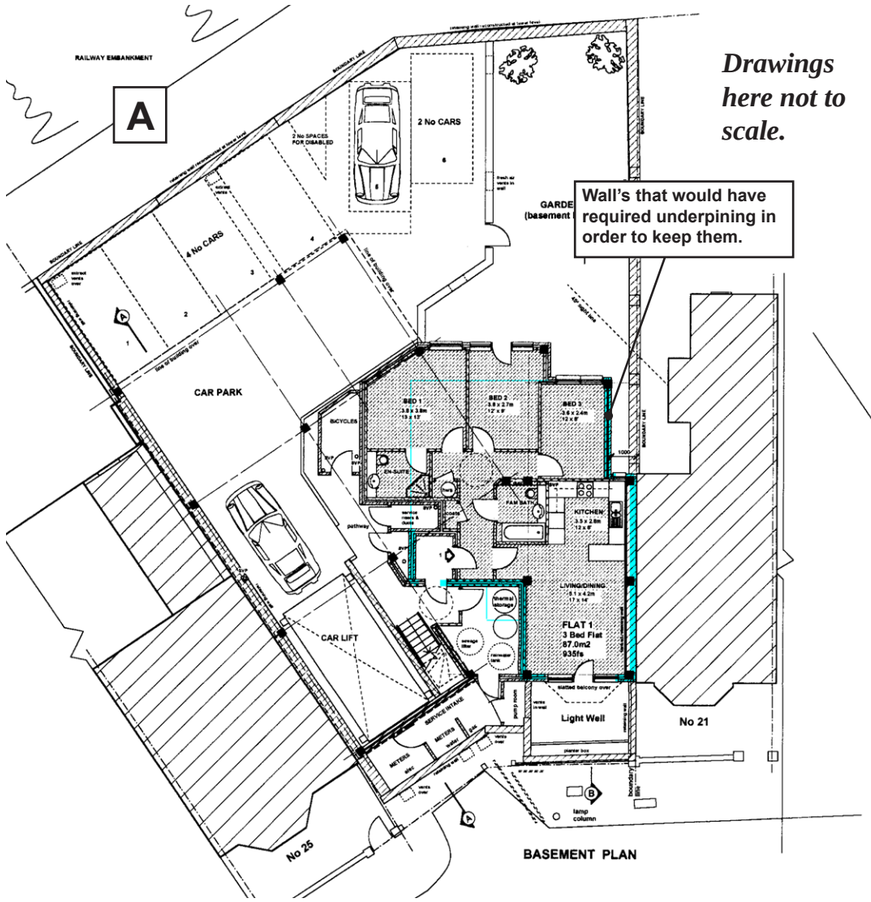
23 RAVENSHAW STREET
LONDON
NW6

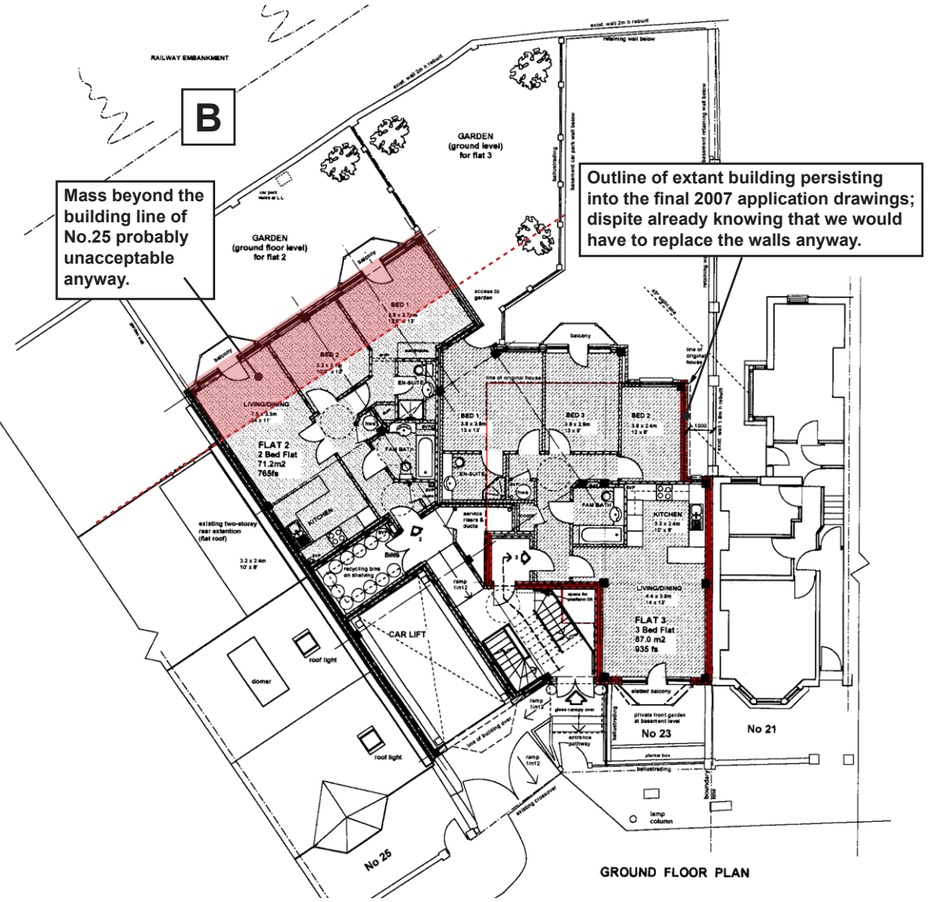
PLANS AND ELEVATIONS
AS PROPOSED
SCHEME 6a -
PHASE I SHEET 1

1386	08	Rev.

Figure 3: Withdrawn 2007 Final Application Drawing. Having originated from plans designed to retain the original building shell, the final plan retains vestages of the old buildings layout (and the restriuctions that go with it) - despite, by this time, it being 100% new build.

▼





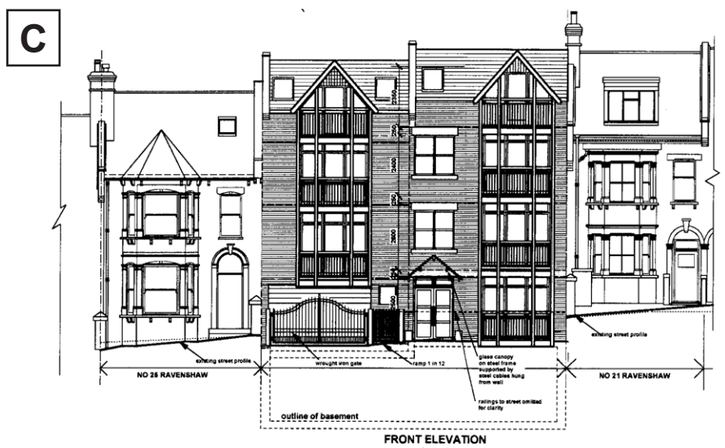


Figure 4: ▶
2007 Final Application CGI's

NOTES:

SCHEDULE OF AREAS

BASEMENT

FLAT 1 - 3 BED = 87.0 m2 = 935FS

GROUND

FLAT 2 - 2 BED = 71.2 m2 = 765FS

FLAT 3 -3 BED = 87.0 m2 = 935FS

FIRST

FLAT 4 - 2 BED = 71.2 m2 = 765FS

FLAT 5 - 3 BED = 82.6 m2 = 890FS

FLAT 6 - STUDIO = 33.3 m2 = 360FS

SECOND

FLAT 7 - 2 BED = 71.2 m2 = 765FS

FLAT 8 - 2 BED = 78.5 m2 = 940FS

FLAT 9 - STUDIO = 33.3 m2 = 360FS

THIRD

FLAT 10 - 1 BED = 49.5 m2 = 550FS

FLAT 11 - 2 BED = 78.5 m2 = 845FS

FLAT 12 - STUDIO = 33.3 m2 = 360FS

GROSS INT. TOTAL = 776.6 m2 = 8,360FS

SITE AREA = 473.7 m2.

CAR PARKING SPACES = 6 No

AMENITY SPACE = 189 m2

BALCONIES = 1.8 x 24 No = 43 m2

FLATS = 12 No

RECEIVED
- 5 APR 2007

25-09-06 BMENT & GROUND FLOOR FLATS MADE DISABLED ACCESSIBLE
20-06-06 ELEVATIONS REVISED & UPDATED
20-05-06 DRAWING REDRAWN RENUMBERED & FINALISED

P + R ASSOCIATES
CHARTERED ARCHITECTS

79 CALDER AVE. BROOKMANS PARK. HERTS. AL9 7AJ
TEL. 01707 651492 FAX. 01707 649209

1:100	09-04-04	PP

23 RAVENSHAW STREET
LONDON
NW6

BASEMENT & GROUND FLOOR PLANS AND ELEVATIONS AS PROPOSED (sheet 1)

1386	10	Rev. 'C'