ALLFORD
HALL
MONAGHAN
MORRIS

Raines Court
Information Pack

RAINES COURT
15-21 Northwold Road
London N16

Contract Value:
£8.9m

Contract Form:
ACA Project Partnering Contract 2000 (PPC 2000)

Practical Completion Date:
02/10/2003

Areas:
Gross Extenal Area:
NIA: 4690sqm
GIA: 5120sqm

Accommodation & Tenure:
Shared owner ship: 1no. 53sqm one bed Flat, 41no. 73sqm two bed flats, 11 no. 88.5sqm three bed flats

Private sale:
8 no. 85.5sqm one bed live/work units

Project Team:

Client:	Peabody Trust The Peabody Trust is a registered social landlord with significant and comprehensive experience in the design, construction and management of housing schemes within Hackney and thoughout London
Architects	Allford Hall Monaghan Morris
Constructor	Wates Construction
Module Manufacturer	Yorkon Ltd
Cost Consultant:	Walker Management
Planning Supervisor	Walker Management
Structural Engineer	Whitby Bird
Mechanical and Electrical Engineer:	Engineering Design Partnership
Landscape Architect:	Watkins Dally
Colour Consultant:	Sound Solutions
Partnering Advisor:	Towers & Hamlins

Allford Hall Monaghan Morris team members:
Simon Allford, Jonathan Hall, Paul Monaghan, Peter Morris, Karen Scurlock, Will Lee, Frank Strathern, Philip Levack, Ben Adams

Specifications:
Structural steelwork by Graham Wood Structural
Architectural Metalwork by Graham Wood Architectural
Precast concrete by Evans Concrete
Lifts by Kone
Paving by Marshalls
Brickwork by Ibstock
Zinc cladding system by Rheinzink
Paint-finished cladding Pyroc by Cape CalsilSystems
Core roofing by Sarnafil
Structural glass assembly by Reglit
Main entrance door and fanlight by Jansen
Module windows by Technal
Core lighting by Marlin & Bega
Other communal lighting by Light Distribution Ltd
Rubber flooring to entrance courts by Altro
Timber laminate floors by Tarkett Sommer
Carpet by Tarkett Sommer
Ironmongery by Laidlaw
Kitchens by Magnet
Sanitaryware by Armitage Shanks
Lino flooring Walton by Forbo-Nairn

Project History

Key Dates

March 1999	Commission from Peabody
Nov 1999	Planning application
Aug 2000	Revised planning application
Oct 2000	Planning Approval
Nov 2001	Work commenced on site
July 2002	First modules arrive
Oct 2003	Practical completion
Dec 2003	New residents move in

Awards

Housing Forum Demonstration Project, 2001

Housing Design Awards, 2001

RIBA Award for Architecture, 2004

British Construction Industry Awards (BCIA) - Best Practice, 2004

Housing Design Awards, 2004

Hackney Design Award, 2004

RIBA Client of the Year Award 2004 - Peabody for 'pioneering work in off-site construction, the realisation of truly sustainable housing, and in particular commissioning this year's RIBA Award-winning Raines Court by Allford Hall Monaghan Morris'

Finalist for the Prime Minister's Better Public Building Award.

RIBA Project Award (Housing Design category)

Introduction

Raines Court is an £8.9m building that investigates the potential of off-site volumetric construction. The client, Peabody Trust's aim was to create desirable high quality flats for sale under a shared ownership scheme (these are the first mortgageable volumetric residential units in the UK,) to push the lessons learnt from their previous work utilising this form of construction, and following the completion of the project to outline how to take matters forward. All three aims were achieved: the flats were all sold on a shared and full ownership basis within weeks of being offered, the scheme increased the extent of works done off-site and incorporated into the modules (which were increased in size and reduced in number), and the successes and difficulties of the process were openly discussed. The latter point is particularly important as in the case of Raines Court since the determination of all involved was to identify where volumetric projects are currently and indeed where they need to go.

Peabody's long term ambition was to create product certainty in terms of both quality and delivery time. It was therefore hoped that the project would deliver parameters in terms of time and quality which are significantly better than that obtained through the D&B procurement path and its concomitant ' similar or approved' culture

Background

Prefabricated construction was proposed as one of the answers to the UK housing crisis at the turn of the century with benefits of quantity, speed and cost over traditional construction. In other parts of the world, from Sweden to Japan, prefabricated buildings account for more than half of new homes, whereas in the UK, such systems are used predominantly for hotels, offices and fast food restaurants.

The Peabody Trust had previous experience of volumetric construction from a 30 unit scheme for rental at Murray Grove in London with the same module manufacturer, Yorkon. At Raines Court, Yorkon were initially appointed as the Main Contractor (or Constructor under PPC2000 contract terminology,) to provide the client with a single point of procurement and careful supply chain management from the outset.

Raines Court was the first Housing Corporation funded modular housing scheme in the country and as such was at the forefront of recommendations made by the Egan Report of 1998, which aimed to improve the performance of the construction industry. The project team, main contractor and specialist sub-contractors worked under a partnering agreement utilising the innovative PPC 2000 form of contract, which was also developed in direct response to the report which promoted a more efficient production of architecture integrated with the method of communication. Raines Court was selected as a Housing Forum Demonstration Project with systems established to record ambition against achievement to facilitate a rigorous consideration of the reality of the UK

Brief

The brief evolved at planning stage to adhere to relevant council Planning Policy guidelines, with 41no. 2-beds, 11no. 3-beds, 1no. 1-bed, and 8no. 1-bed Live/Work units to account for the loss of the former employment use of the site. All the units are designed to 'Lifetime Homes' criteria. The internal specification of the units was appropriate for affordable private sale by shared ownership.

The architecture develops a language expressive of its volumetric construction: the modules are clearly distinguishable with their horizontally lapped zinc rain screens contained within a grid of zinc panels covering the joints between the modules, the verticals of which protrude slightly to break down the overall mass of the building into smaller sections. The zinc was selected both for its appropriateness to the form of lightweight metal construction, and for its durability and minimal maintenance in the long term. Each module carries a services riser allowing the rooms modules containing bedrooms and living rooms respectively to be staggered vertically to create a chequerboard pattern in relief with the shadow of recessed balconies and flush bedrooms. The façade is capped by a zinc cornice which terminates the stack of modules.

The tough framework that this creates has been consciously designed as a sculptural surface which acts as a foil to the inhabitation and delight of the occupants. A unique colour identity applied to the reveals of each dwelling generates playful individuality, which will accommodate change over time as the owners re-decorate their own flats to their taste.

The modules are placed on a raised masonry base which serves to anchor them to the street, sets the datum across the sloping rear of the site, and increases the privacy of the ground floor units. At street level the building line is set back from the rear edge of the public pavement to create a defensible zone for the residents at this level. Bollards follow the gentle curve of Northwold Road and define a 'buffer' zone inhabited by a layer of trees and benches. Vertically projecting timber screens and projecting entry steps act as a marker for each live/work unit and give a rhythm the base of the building.

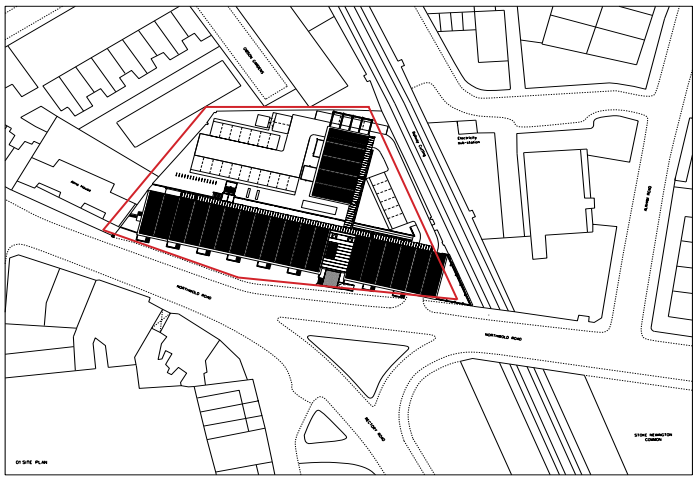
The main entrance is located two thirds of the way along the street elevation, responding to the axis of Rectory Road to the south. A projecting canopy signals access to the circulation core which sits at the meeting point of the three blocks, enclosed in cast glass allowing light to filter through into the interior.

The main circulation core is an unheated internal space with durable finishes: painted cement fibreboard, galvanised steel structure and pre-cast concrete units with exposed aggregate underfoot which extend out to the rear façade to form the walkways at each level. Here, the lapped zinc rainscreen to the modules is replaced by vertical Larch weatherboarding and the recessed entrance courts painted to match the colours of the balconies to the street side. These softer finishes are complemented by the fine sandy vaulted soffits of the concrete walkways above, supported off a galvanised steel support structure that is sized to retain its strength in the event of a fire without protection.

The landscaping to the rear courtyards has been conceived as a series of semi-enclosed screen 'courtyards' bounded with low maintenance shrubs and planted with a line of cherry trees which becomes effectively the fifth elevation of the scheme as viewed from the flats both within the development and adjacent.
Internally, the flats are dominated by the single open plan space of a module, 12 long by 3.6m wide, which extends from the kitchen at the walkway side, through dining and living to the recessed balcony at the front.

The Site

The site is that of a former Court, situated on the north side of Northwold Road to the west of the existing railway cutting. With 61 units on this 0.3-hectare site a planning density of 594 habitable rooms per hectare is achieved. The UDP guideline was 250 rooms per hectare.



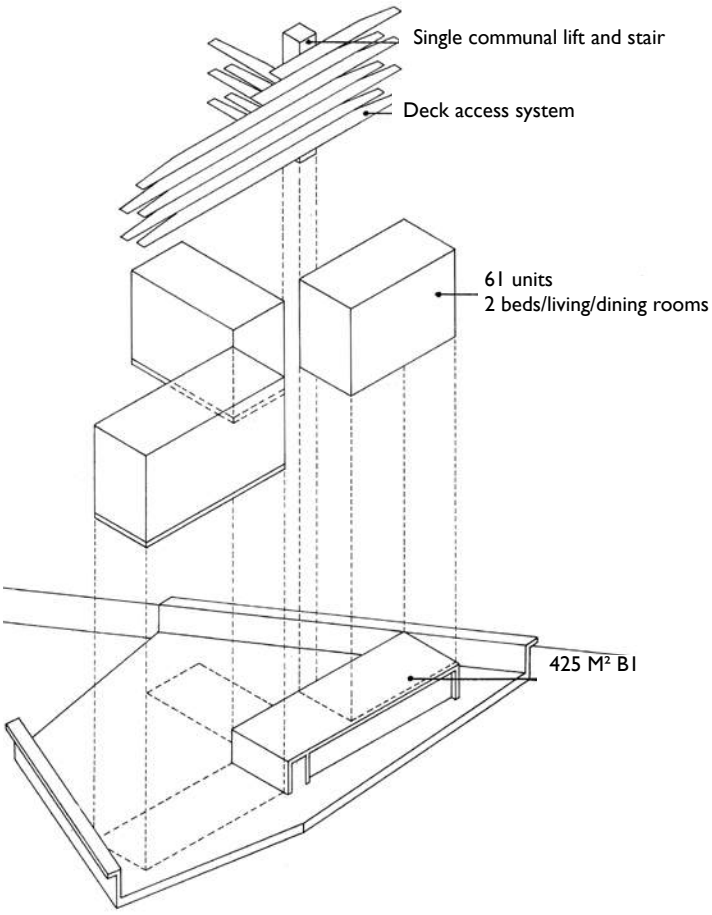
Site Plan

View of site from the East

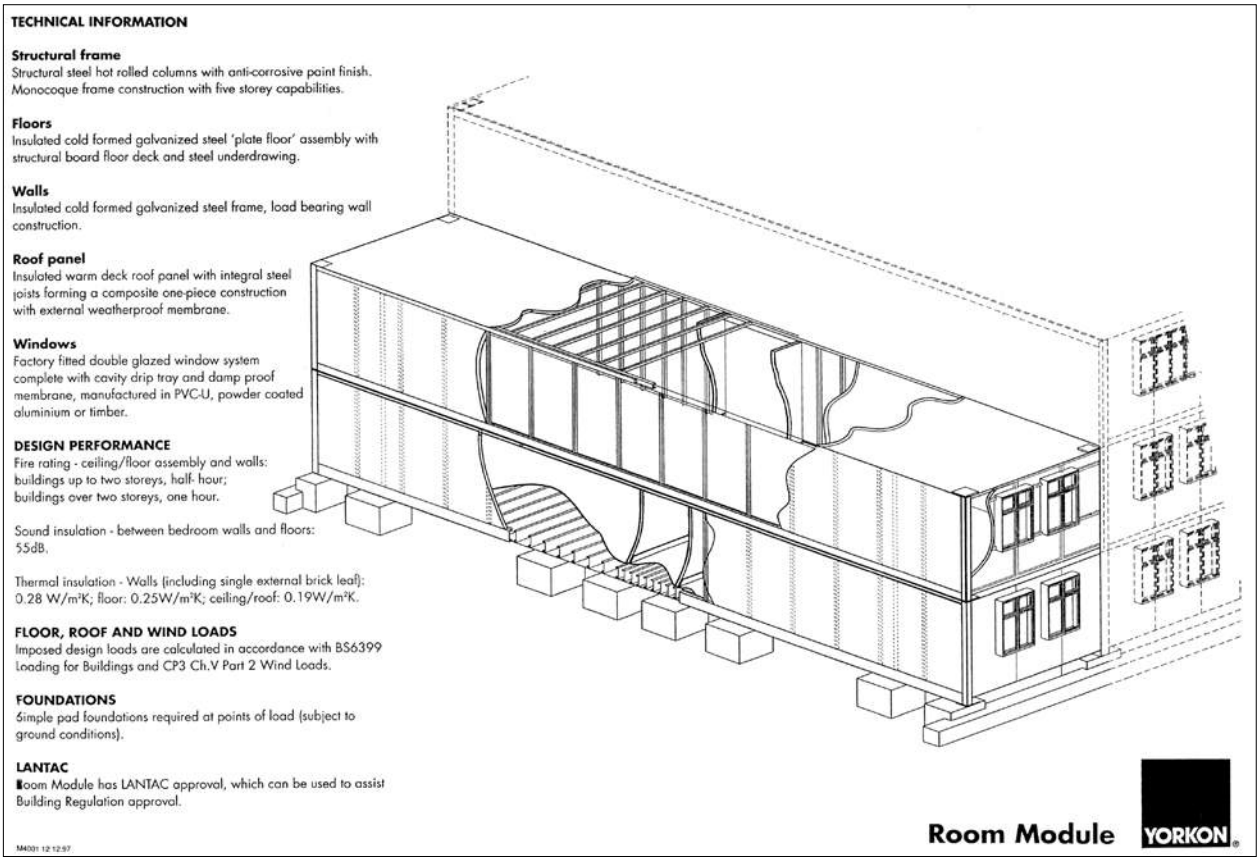
The aim is to design and manufacture pre-fabricated volumetric modules which are then delivered to site fully serviced and fitted out with bathroom and kitchen fittings, doors, windows, trim and internal decorations, and, as far as is possible, with integral external cladding and roofing. The parameters of the volumetric modular construction have been carefully considered so that, working with the manufacturer from the outset, the module itself has evolved towards an improved generic product. The belief is that efficient construction and design should allow the client and the design team to provide more generous space standards and internal and external construction quality than that obtainable by traditional methods.

Massing

The development of Raines Court site is effectively arranged into 3 separate blocks, two of which create a new urban front to Northwold Road, whilst the third sits perpendicular to these at the back of the site, away from the road. It is in this block, in the quietest and most protected location, that the family units are provided. The blocks are linked by a central circulation core positioned two thirds of the way along the street frontage. The building effectively increases in density and scale from the western end to the eastern end of the site reflecting the changing context from that of the two storey Alms House to the West and the 18-storey tower block to the east.



Axonometric Massing Study

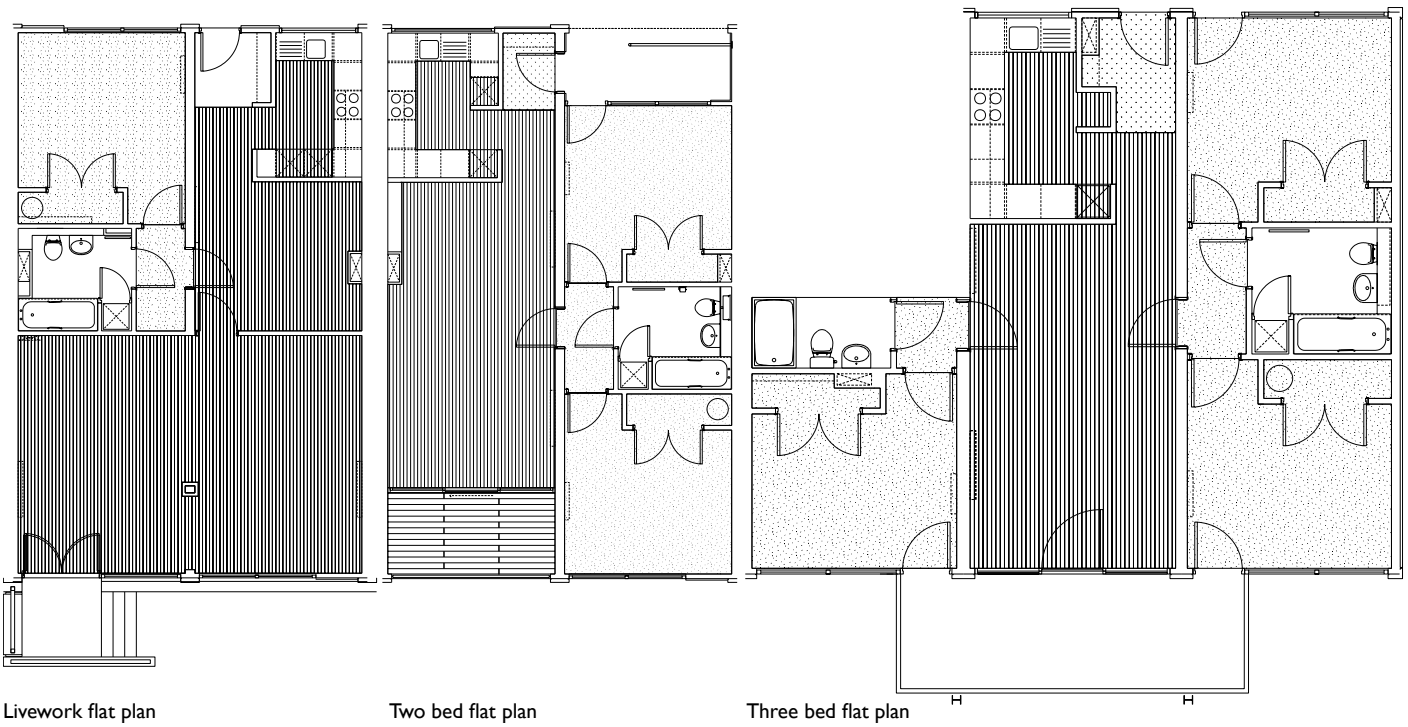


The size of each module needs to be carefully considered from the point of view of transportation to site, and flats themselves need to be planned to utilize the minimum number of modules which have a high basic cost. In this way the module, which has inherent structural redundancy, is made to work more efficiently and gives better value. The Yorkon modular system does not integrate vertical or horizontal circulation, so to maintain efficiency and continuity of construction and envelope, the modular accommodation and the non-modular circulation are kept distinct, resulting in a dual aspect walkway access typology.

In the case of Raines Court, an innovative 2-bed flat plan was developed which maximized the internal space and external amenity of each dwelling and reduced the internal circulation space down to 2.5sqm by providing a secondary means of fire escape from one bedroom through the other. This was achieved in such a way that they could be joined together with minimal work on site, being linked only by a single door. The flats employ the maximum 3.8m width module that it is possible to transport on public highways without requiring special outriders. The modules themselves at 12m are also approaching the maximum possible length. The project is built to 6 floors which is the maximum height that the light steel Yorkon modules can self-stack. This plan grew out of AHMM's investigation into the discipline of modular construction, but is replicable in traditional construction, and has also been used efficiently in a private housing scheme in Leeds.

The three and one bed flats are variants on this layout, with an additional module sandwiched between two 2 bed flats to provide one additional bedroom and shower to each. A stack of large 12sqm balconies are propped against the family block, replacing the integral balconies of the typical 2 bed flat modules. The live/work units are designed to be flexible in terms of their occupancy and the proportion of each unit given over to 'work' can be varied depending on the location of internal partitions. Each unit is provided with direct access to Northwold Road, acting as a commercial entrance to the unit with separate access to the 'live' areas of the units via the rear of the building. The glazed façade of each unit provides a potential 'shop window' type display area for the business directly onto Northwold Road.

The balconies to the typical flats are integrated into the modules in a recessed arrangement, one facing south overlooking the common, and the other creating a recessed 'entrance court' adjacent to the access walkways, giving the flats a private defensible space and allowing the bedrooms on that side more privacy.



Livework flat plan

Two bed flat plan

Three bed flat plan

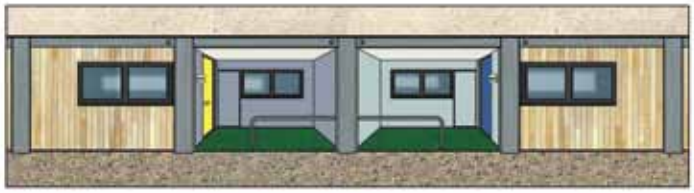
Flat types

While the entire roof was prefabricated and delivered with the modules below, only parts of the cladding were installed off site: the lining to the recessed balconies and the rainscreen to the eastern gable of the building abutting the railway tracks where access was restricted. The remainder of the cladding was designed with lapped zinc and timber panels to be installed in the factory, and pressed zinc cover strips covering the joints between the modules to be fitted from mobile platforms on site. However, in the event, concerns about damage to the cladding in transit from York, and warranty issues resulted in the majority of this external skin being installed on site from a scaffold erected to the facades without walkways, which would otherwise have been unnecessary.

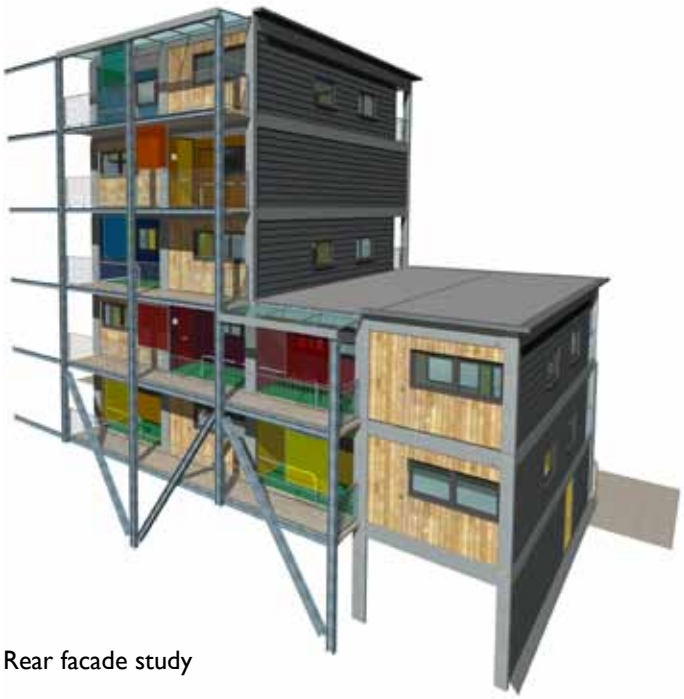
The rest of the major ancillary building components are 'non-modular', i.e. not integral to the Yorkon residential modules, but where possible still made from large pre-fabricated units. Concerns over acoustic isolation meant that the walkways could not be built into the Yorkon modular system, so they were constructed from pre-cast concrete units propped off the modules with their outer edges supported by steel columns, while the main entrance, lift cores and common areas are also of steel frame and pre-cast concrete slab construction. The staircases and balustrades were prefabricated in and bolted together on site in module sized units.

This design was a development of the Murray Grove model, (Peabody and Yorkon's first prefabricated project), in a number of ways: the scheme was 6 storeys tall (the maximum that the Yorkon system could self support) consisting of two larger close sided modules rather than three or four open sided modules, the balconies were integrated into the module, and areas of cladding were installed off site. A number of other modifications were made to the basic module design, making them easier to assemble and access the services etc.

Balcony Arrangement



Material and colour study of Entrance Courts



Rear facade study

Street facade study

CGI's

Perspective from Northwold Green

Looking west along Northwold Road

The Future of Modular Construction
Lessons Learned

The work undertaken by the design team and Peabody Trust on the Raines Court project has been recorded in a series of studies that set out the possible long term benefits of modular construction. The key principles of the conclusions of this research have been published in the architectural and construction press, and are summarised below.

Less Waste

• Working under controlled factory conditions minimises wastage

• It is estimated prefabrication only creates 1/10 of waste associated with sitebased construction methods

• Steel waste can be recycled, site-based construction waste is sent to landfill

Less Transportation & Disruption

• Construction products account for around 20% of commercial vehicle journeys in the UK

• Prefabrication reduces the number of vehicle movements through majority of construction being off-site and thus decreasing disruption to local residents

Quality Control

• Potentially superior quality control because building is precision engineered offsite

• Future maintenance is then reduced

• Modular construction is not reliant on traditional skilled labour which is in short supply

• Air tightness and sound proofing are greatly improved

• As there is no thermal mass the heating of homes can be more efficient

Implementation

• It is key to involve the manufacturer at the earliest stage to maximise the benefits of off-site construction

• A close relationship between the manufacturer and the main contractor from the outset would improve the interface between the modular elements and the traditional site-based construction elements.

The level of off-site construction can be increased

• The modules at Raines Dairy were delivered to site complete with bathrooms, kitchens, heating, decorated – including all doors & ironmongery and fully serviced.

• Balconies were also incorporated with some of the modules in the factory and thus reducing work onsite.

• It is also envisaged that external cladding, staircases and walkways could also be installed in the factory which would improve quality, safety during construction and reduce the site programme time

Suppliers and subcontractors

• To improve quality and client control suppliers and subcontractors were be involved at an earlier stage.

• To reduce the risk of conflict and incentivising subcontractors to bring about cost

savings a partnership approach across the supply chain was considered.

• The client introduced the PPC2000 contract to ensure all parties were involved in the project from the very outset.

Module size

• The site allows for 12m long x 3.8m wide modules

• The benefits of this configuration included wider rooms and fewer modules overall this was, more efficient and cost-effective in terms of transportation to site, craneage, foundations, services and fitting-out.

Dwellings

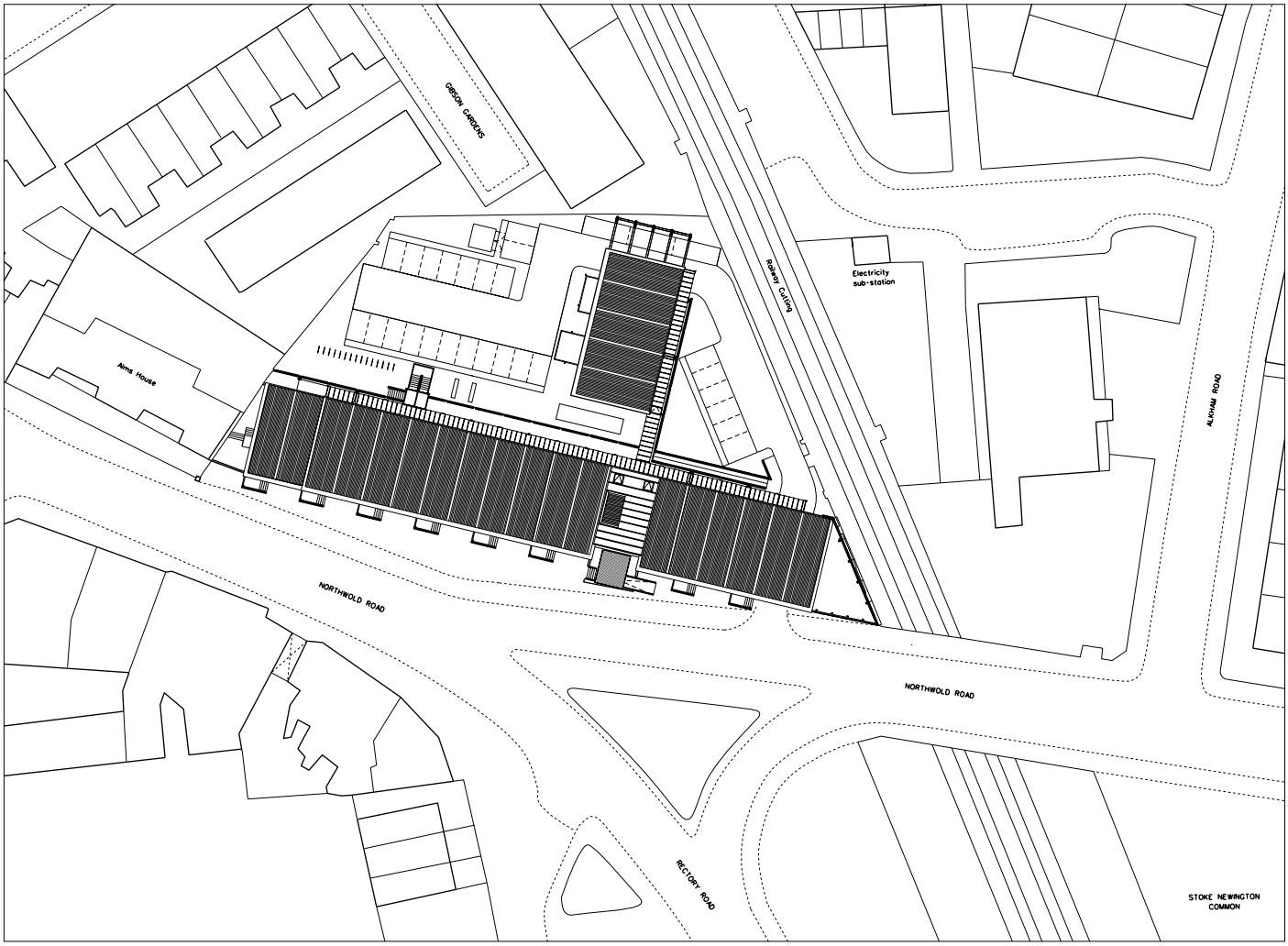
• The high specification and prototype nature of the project contributed to the dwellings being expensive to build in relation to other developments Tenants

• Raines Dairy was the client's first modularly constructed development for shared ownership and in the case of the eight live/work units, outright sale.

Future

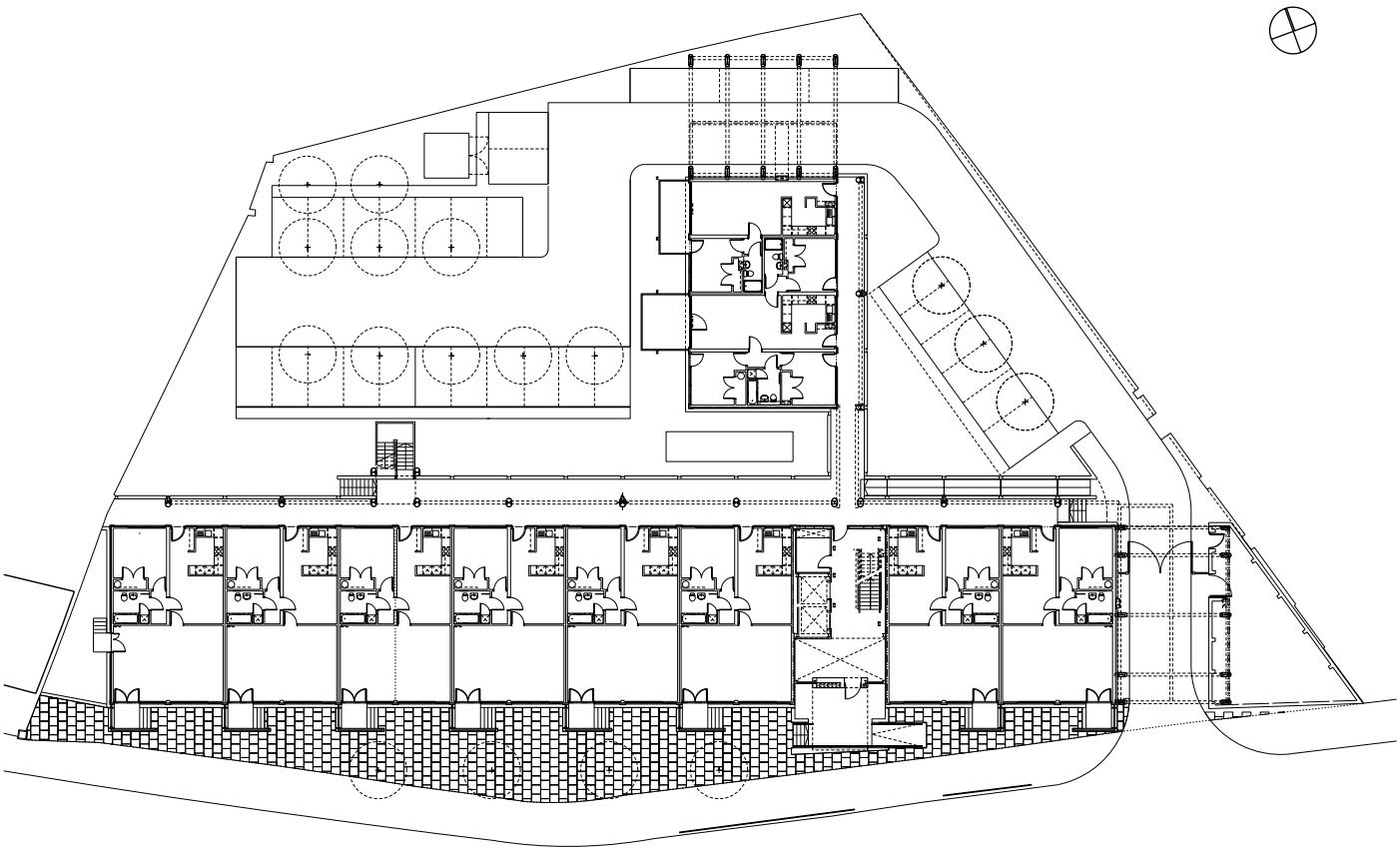
• There may be an opportunity to significantly reduce the use of scaffolding on subsequent schemes if the erection of the deck/walkway access is carefully co-ordinated with the arrival of modules on site.

Drawings

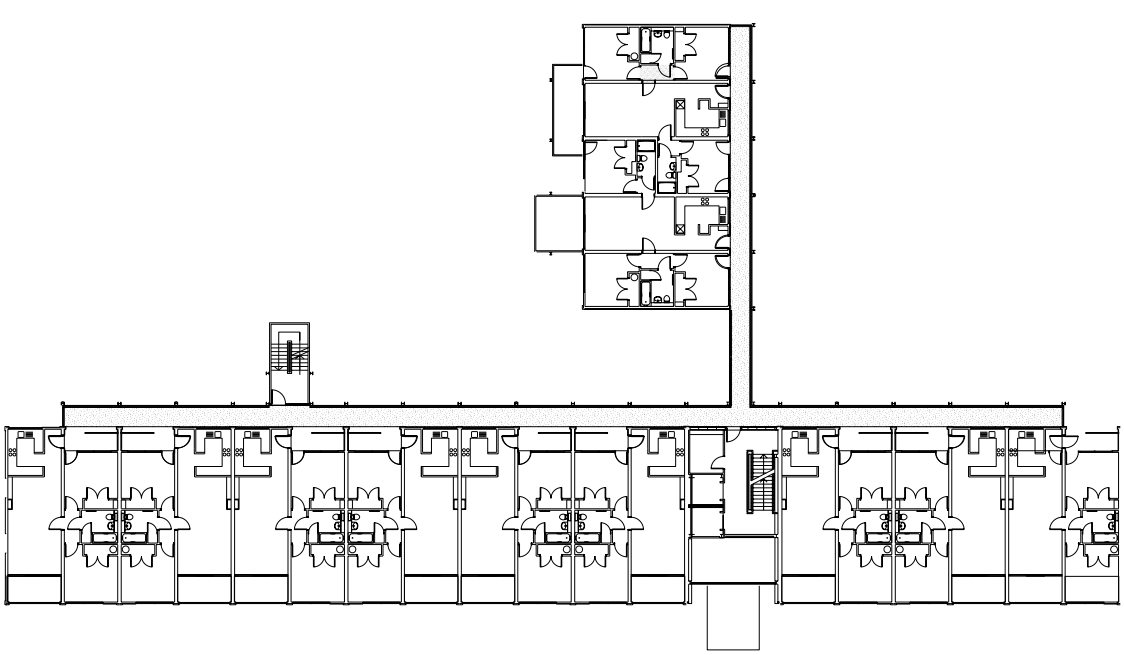


Location Plan

Drawings

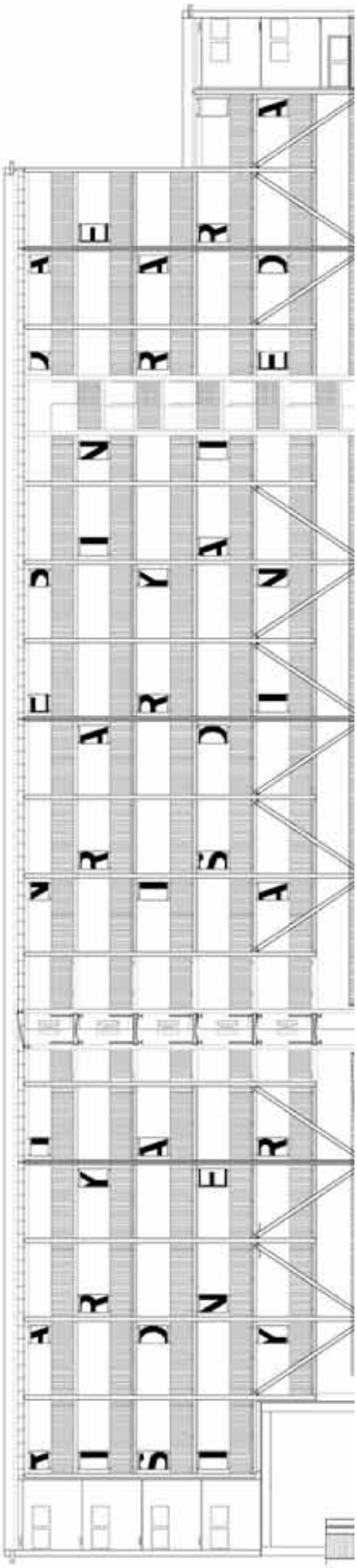


Ground floor plan

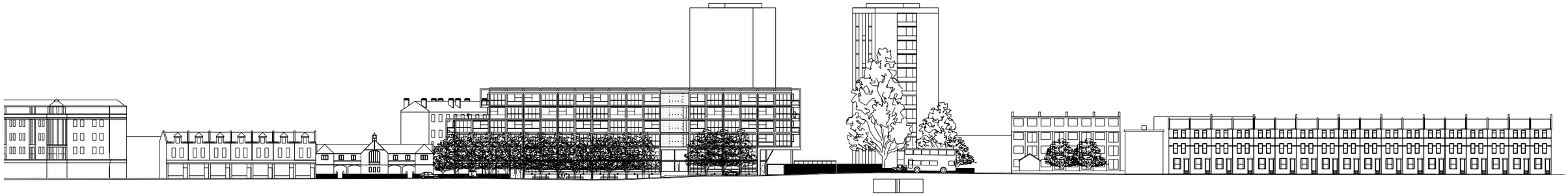


Second floor plan

Drawings

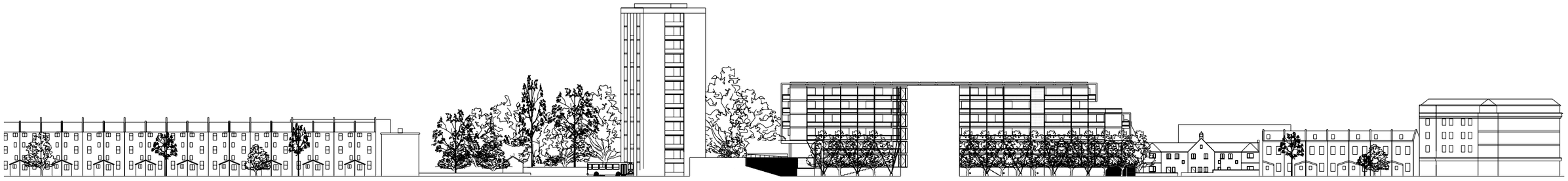


Elevation showing sinage screen with etched graphics



South Elevation 1:500

South Elevation 1:200



North Elevation 1:500

North Elevation 1:200

Site Shots

Site Shots


YORKON

Afterword

Much has been written about the benefits of prefabrication and its purest form, Volumetric construction, from improved quality and zero defects, less wet trades, single point procurement, cost certainty, use of mechanised or unskilled labour in controlled factory conditions in the UK or abroad, and ultimately, given sufficient repetition, reduced costs. This was most dramatically represented when the modules were delivered and stacked into position on site at 30 minute intervals giving the impression of almost instant building, while the remaining modules were in transit at 30 miles intervals down the motorway from York.

Raines Court succeeded within the scope of its ambitions. It avoided the past preconceptions of prefabricated homes by expressing the process by which it was built in a contemporary modular aesthetic, rather than hiding behind a facade with more traditional associations. It received a number of awards for its architectural quality, and one BCIA award for Best Practice in recognition of the open process and sharing of research into the form of construction. All units were sold in 3 weeks, mortgages were forthcoming and feedback has been positive with the walkways being increasingly inhabited as residents make them their own. Once this precedent had been set, the hope was that the large private house builders would start to adopt volumetric techniques and the price would be forced down.

It is worth focusing on some detailed aspects of the process to shed light on the reality of the process and share the lessons learned:

Extent of modularisation:

Designing a building in modular (factory assembled) and non-modular (site assembled) components can seem at times like designing two buildings in one. Modularisation of the cladding, horizontal circulation (walkways) and vertical circulation (lifts and stairs) is critical to easing this process, and working closely with the manufacturer from day one may ensure that it happens. However, at Raines, the development costs of modularising the common parts were a step too far for Yorkon. The division between the repetitive volumetric apartments and the less repetitive components of common parts, which were ore adaptable to the site constraints, was in some ways a neat architectural one and dealt with the acoustic, thermal and weathering breaks required for this residential typology. The substructure of the building had to interface between a sloping site and the datum of the modules base-plates, and so was more suited to brickwork than large repeated prefabricated elements.

Envelope:

The cladding sub-contractor who was brought on board at Tender was unwilling to install off-site, in spite of the fact that the cladding had been designed to allow it, resulting in the cost and associated mess of a full scaffold and the modules spending more time unclad. Whereas one might imagine that the whole process takes place within an enclosed factory, the sheer scale of the operation meant that in reality the modules were only manufactured on an indoor production line and were then placed in rows in a yard to be fitted out, with temporary weathering at joints and around the windows. It might be argued that a half finished but dry building site in London would be preferable to a yard in Yorkshire in winter for fitting a building out. Consequently, the timber laminate floors had to be installed on site due to the difference in temperature between the yard and their intended use.

Defects

The majority of the defects on site were a result of damp ingress from the modules' time spent in the yard and on site awaiting cladding. The notion of zero defects may have been achievable had the modules been snagged and sealed upon leaving the Yorkon factory. However, the timing and order of their arrival in London is so critical, that the whole process could not be delayed by a single module, with the result that the quantity of snagging of the apartments on site was not noticeably different from a traditionally built building.

Performance

It emerged that the Yorkon system was designed to lower U-values than required by Building Regulations, necessitating additional insulation to the external face of the modules, and increasing the amount of work required on site at the module joints. In order to reduce the number of unique module types, the internal modules had the same level of insulation as those at the edge of the building, making well insulated double skin party walls that exceeded the acoustic requirements of building regs. However, the feel of a lightweight building is noticeably different from a traditional heavyweight building, most evident in the slight reverberation when closing a door within your own apartment, and the lightweight construction also rules out any potential savings due to thermal mass. In broader sustainable terms, a clear benefit of volumetric construction is in the reduction of waste within the factory, but other pros and cons between it and more traditional construction are harder to identify.

Programme

The reduced programme of volumetric construction is a direct result of the ability to start on the frame and fit out concurrently with the preparing of the site. This is reliant on the extent of modularised parts of the building, and the site preparation is of course still subject to the usual uncertainties. Discovery of an abandoned sewer, high winds resulting in missed railway closures, and extensive non-modular works led to unforeseen delays and the programme extending by 4 months.

Supply Chain

Yorkon's initially took on the role of main contractor, but after tender were subcontracted to Wates Construction, who had a proven track record in housing. Yorkon's supply chain for modular housing was not fully established…building types such as Travel Lodges and McDonalds require a very different supply

chain and the knowledge could not readily be harnessed in housing. Similarly, the modular system was originally designed for hotels and fast food outlets rather than housing. A modular system designed specifically for low cost housing may be able to overcome the technical difficulties outlined above, allowing more of the building to be modularised.

Costs

In many respects, volumetric construction is caught in a chicken and egg situation within the construction industry. Like any form of mass production, until there is sufficient volume and repetition, a premium is paid for the fact that more is being demanded from the built fabric; a building that can survive transit in pieces, an inevitable amount of duplication and over design of structure to contain deflection, and higher design costs associated with the above. Murray Grove cost 15% more than the traditionally built equivalent, Raines Court 20%, and Lillie Road 100%. Until there is sufficient market demand, the capacity of UK fabricators will be limited and prices uncompetitive. Yorkon, the largest, could manufacture 600 apartments per annum in 2002. However, until voluetric construction costs at least the same as traditional construction, it will most likely be the exception, used in exceptional circumstances where site access or programme dictates.

Obstacles

Other obstacles to volumetric construction include the fact that homes tend to be bespoke products, sitting in irregular and different contexts and subject to varying planning constraints which require a variety of different unit and use types, some requiring larger spans than can be readily manufactured in transportable pieces. Of Raines Court's 127 modules, there were 18 different types, none of which will ever be manufactured again, and some of which were one-offs. There may be some reluctance to embrace change within the industry as a whole, although schemes now exist to facilitate Building Regs compliance and NHBC certification for prefabricated buildings. From the buyers perspective, mortgage lenders seem increasingly willing to lend on non traditional forms of construction, any stigma that accompanied the idea of pre-fabs is now over 50 years old, and there are now an increasing number of residential schemes built with prefabricated

In 1998, with significant government backing, it seemed that prefabricated housing would regain a foothold in the UK. Funding for innovative methods of construction from The Housing Corporation's Challenge Fund was intended to assist the early projects that would have to overcome the difficulties outlined above, and help such schemes become viable. Volumetric construction seemed to embody all the benefits, inspiring visions of houses rolling off a production line like cars in the early 20th century. However, the fund was undersubscribed, Peabody's series of experimental projects was discontinued, and today Yorkon advertise Education, Healthcare, Offices, and Retail…but not Housing.

Building Design May 9 2003

NEWS SPECIAL: OFF-SITE CONSTRUCTION 5

'Key is to build on experience'

As with any job, we are learning lessons from our experience of Raines Dairy, *writes Simon Allford, a partner with Allford Hall Monaghan Morris.*

As with any project, unbuilt ideas don't fall by the wayside but are set aside for the future, while built ideas are seen as prototypes for refinement.

Indeed, with another private client we are looking at building robust, traditionally constructed, self-finished concrete shells which we are fitting-out with pod bathrooms and "intelligent" floors which will provide all power, heat and lighting, thereby exploring another idea for reducing and managing site operations.

The real drive and test of prefabricated systems is how much they reduce operations on site. The key to future volumetric projects are as follows:

●**Volume** Maximise the floor area and volume of the module in order to reduce the cost of transport per sq m. Design the module to be as large as possible within the highways safety criteria to increase efficiency.

●**Elevation** To reduce the need for scaffolding on site ensure the module is preclad. The only cladding that should be installed on site is cover strips for where one module joins another.

●**Plan** A module must be 3.6m wide for ease of transportation. Ensure the impact of this on fire escapes is considered.

●**Access and amenity** Ensure that all decks, landings and balconies are integral to the module. This reduces the amount of work needed on site and allows the modules to be preclad.

●**Vertical circulation** Investigate prefabrication of the stairs and lifts as completed "vertical modules".

●**Shells** The design of the module should be standardised so it can be produced more efficiently and will be more flexible when you come to fit it out.

●**Services** Avoid horizontal services distribution as this could necessitate considerable site work. Try to make sure they are accessible from the outside.

●**Finishes** Investigate other "stable" finishes that are not so sensitive to temperature and moisture variations. This will help to deal with the journey from factory to storage to site.

●**Contract** Investigate contracts that recognise the increasing importance of the manufacturer to the process of construction.

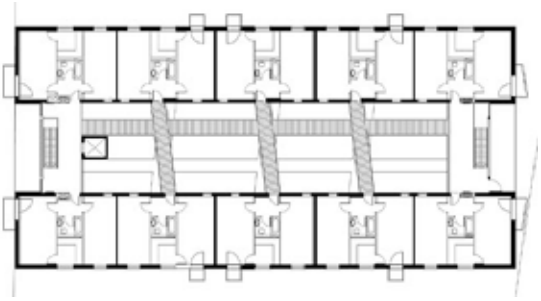
●And finally, it must offer delight!

Building Design, 9th May 2009

AHMM and prefabrication

Whilst it is a rare sight to see buildings being assembled using volumetric techniques, it is an increasingly common sight to see large prefabricated components in transit and being craned up onto building frames, an indication of the way in which construction may be headed. AHMM have and continue to instigate projects that test innovative means of procurement and construction, not for its own sake but as a means of delivering better buildings. It is worth putting Raines in the context of some other projects within the office to illustrate the direction in which our investigations have led us:

Caspar: Floating bridges connecting to each flat



Caspar: Plan of Central bridges connecting to each front door

Caspar

(50 flats for the Joseph Rowntree Foundation in Birmingham, completed in 2000):

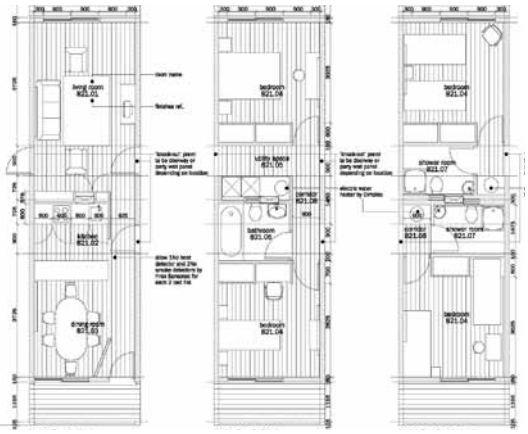
- A new residential typology of apartments accessed by galleries bridging across a covered courtyard.
- Volumetric bathroom pods by RB Farquhar placed centrally within the shell of the apartment also serving to partition it into living, bedroom, hall and kitchen on its four sides.

MOMO Elevation study

MoMo

(Modular temporary housing system for Peabody Tryst in 2003):

- Reliant on the established and widespread shipping container industry, (albeit one that has not been used in housing).
- A direct development of the Raines typology, it took the ideas instigated there to their logical conclusion.
- Fully volumetric apart from substructure, with integral cladding and circulation.
- Re-usable, so getting better value from an otherwise redundant modular structure, and allowing short term use of sites.



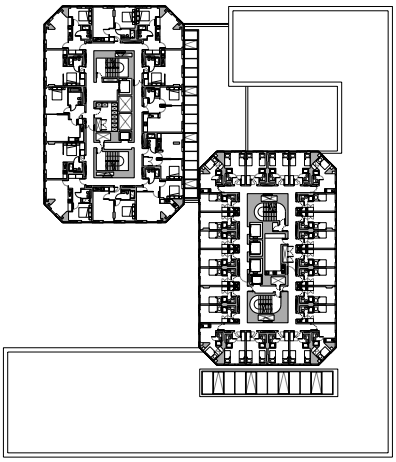
Modular housing plans

KX200

(846 student housing units and 62 flats for First Base in London 2008).

- Refurbished frame of an existing 1960s commercial office building, using office type construction techniques for a new residential use, illustrating the notion of 'long life loose fit'.
- Unitised curtain walling.
- Volumetric bathroom pods.

View of KX200 from Pentonville Road



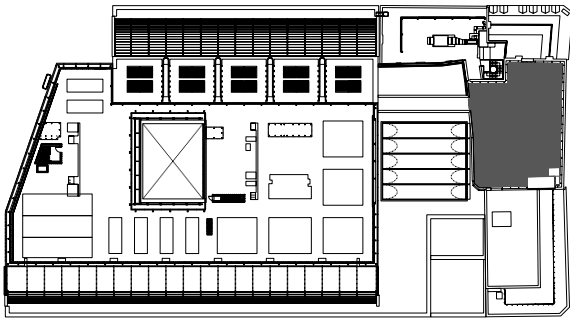
Thirteenth Floor plan of KX200

Tooley Street

(completed in 2008). 20,000sqm office speculative office development using precast elements for ease of build, restricted space on site with 'just-in-time' deliveries of pre-cast elements:

- Pre-cast concrete cladding, and unitised curtain walling externally.
- Prefabricated roof mounted plant lifted onto roof
- Exposed 50mm precast concrete biscuit as permanent formwork to post-tensioned concrete slab
- Hollow pre-cast concrete columns to be structural and deliver displacement ventilation through the floors
- Wet trades avoided generally, choosing instead to rely on self finished materials [eg. gustaf panels, exposed concrete soffits].

Tooley Street: Barnham Street barrel vault



Tooley Street ground floor plan

Adelaide Wharf

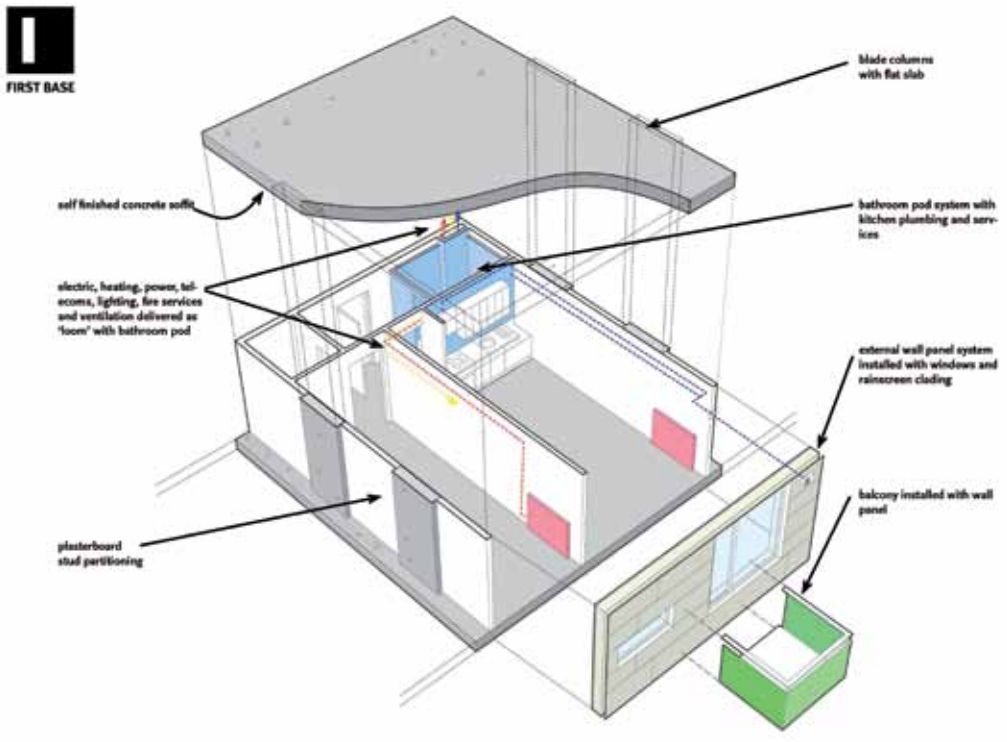
(147 flats for First Base and English Partnerships in Hackney 2008).

- Adelaide Wharf was the result of three years of working closely with Client and Contractor to develop a building system which minimised trades and interfaces while making extensive use of prefabrication to reduce time on site and improve the build quality. It progresses the key aims of Raines particularly, albeit in a slightly different direction: working with contractors from day one, using proven commercial construction techniques rather than volumetric, and assembling the system on site from a minimum of trades, prefabricated only where appropriate. This resulted in an estimated 20% reduction in overall construction costs, and delivery time. The resulting system is a prototype for other such housing schemes, which has and will continue to evolve as lessons are learnt from the procurement, construction and operation of Adelaide and future projects.

- Concrete frame with flat slabs and blade columns using prefabricated reinforcement mats.
- Unitised cladding erected without scaffold.
- Volumetric bathroom pods.
- Prefabricated balconies.
- Volumetric plant room lifted onto roof.

Adelaide Wharf: Shared landscape courtyard with children's play area

Typical upper floor plans of Adelaide Wharf



Buildability sketch

Final Photos

South facing elevation

A328_124 © Tim Soar

Street frontage to Northwold Rd

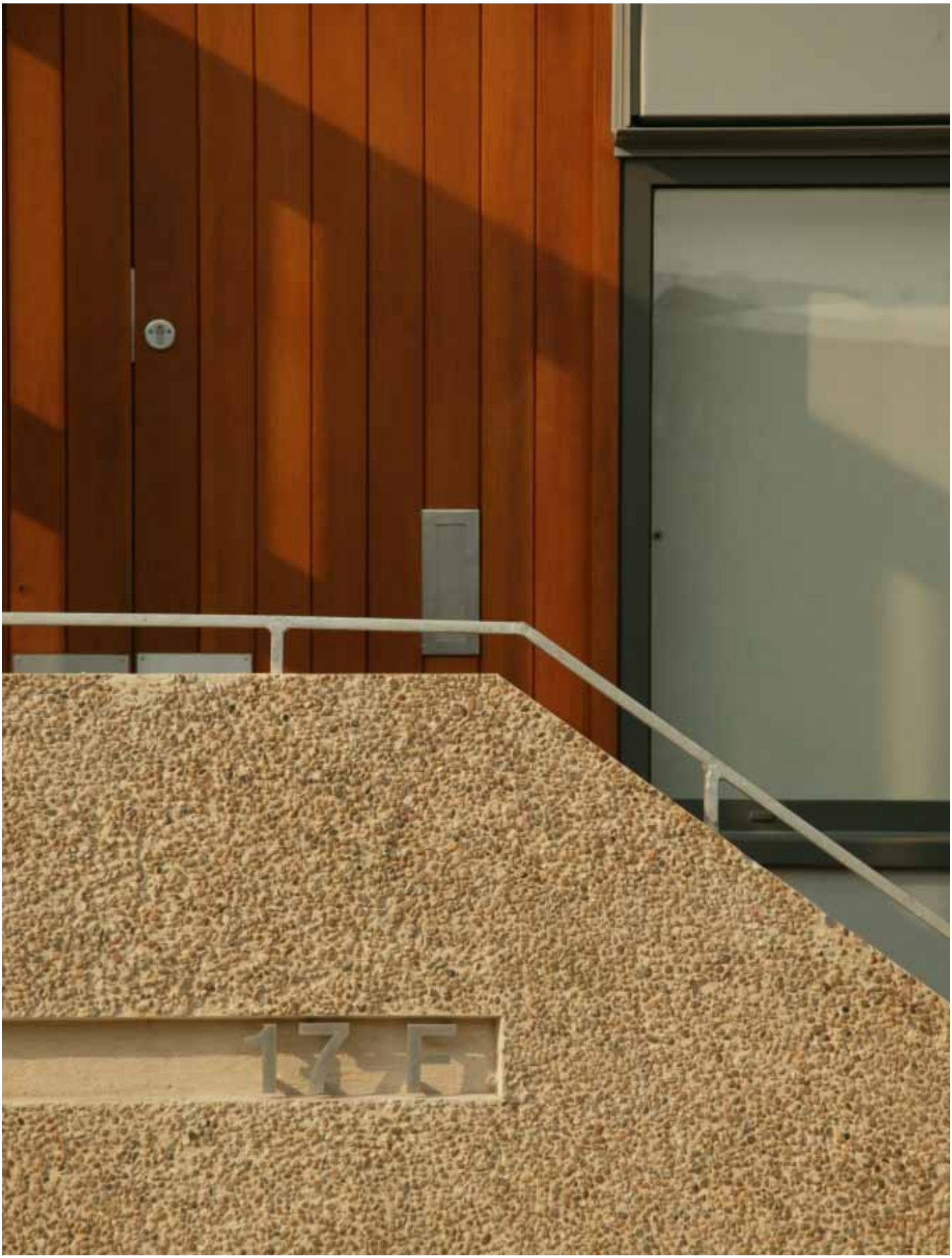
A328_060 © Tim Soar

Zinc cladding and recessed balconies

A328_138 © Matt Chisnall

Zinc cladding and recessed balconies

A328_136 © Matt Chisnall



Entrance steps to LiveWork unit on Northworld Rd

A328_105 © Tim Soar

Access walkways to north elevation.

A328_158 © Tim Soar

Access walkways to rear of site.

A328_121© Tim Soar

North elevation

A328_043 © Tim Soar

Propped balconies to family units of the rear block.

A328_122 © Tim Soar

Propped balconies to family units of the rear block.

A328_157 © Matt Chisnall

Entrance court study

Open plan living module

A328_126 © Matt Chisnall

Publicity

Books

a+t
Idensity - New Collective Housing
2006

The Prefabricated Home
Colin Davies
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Prefab costs 'twice normal construction'
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