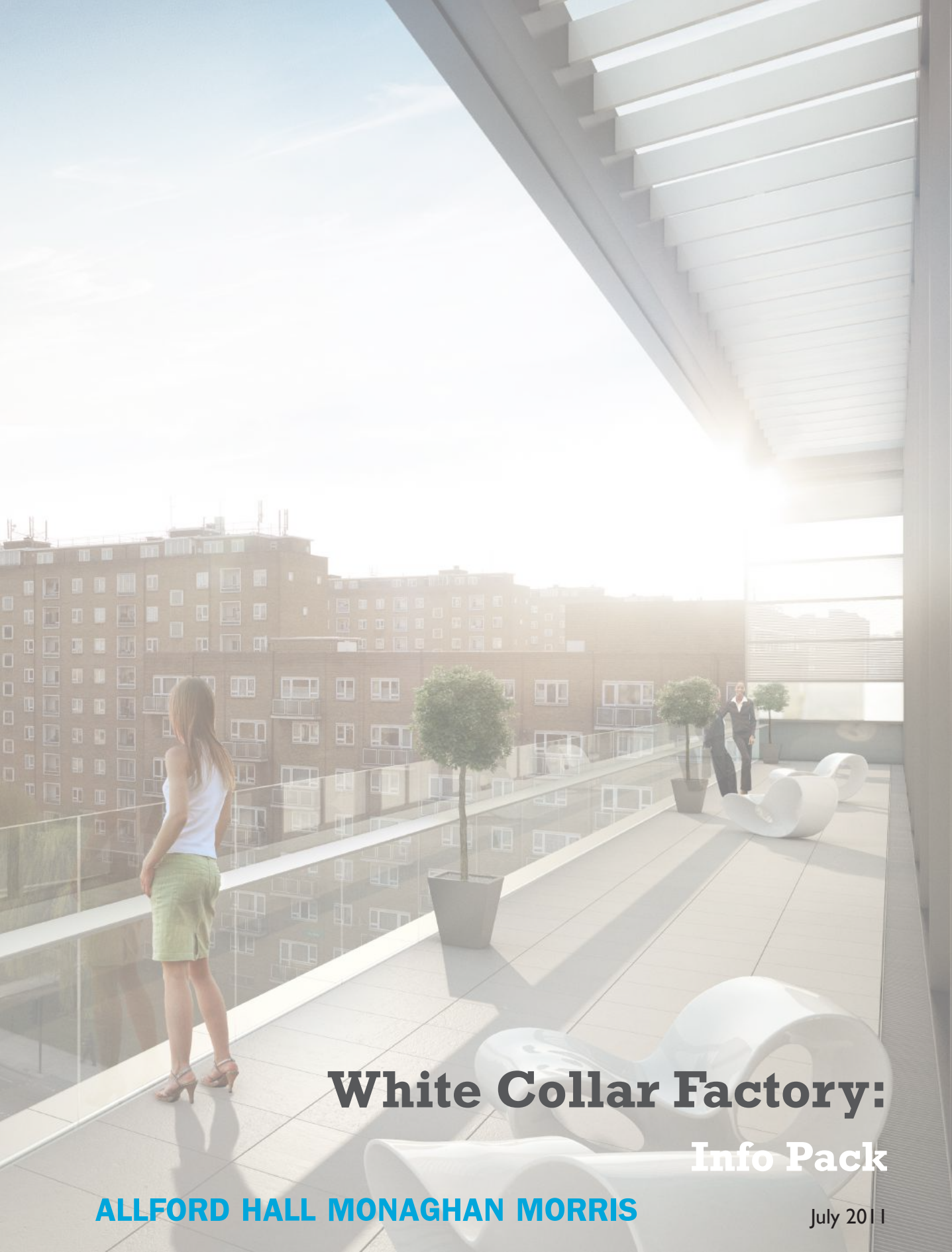


White Collar Factory:

Info Pack

ALLFORD HALL MONAGHAN MORRIS

July 2011

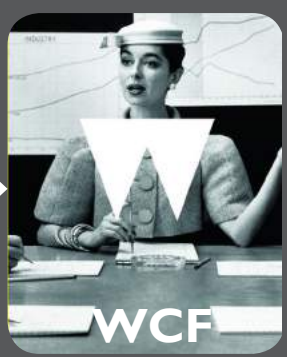
base

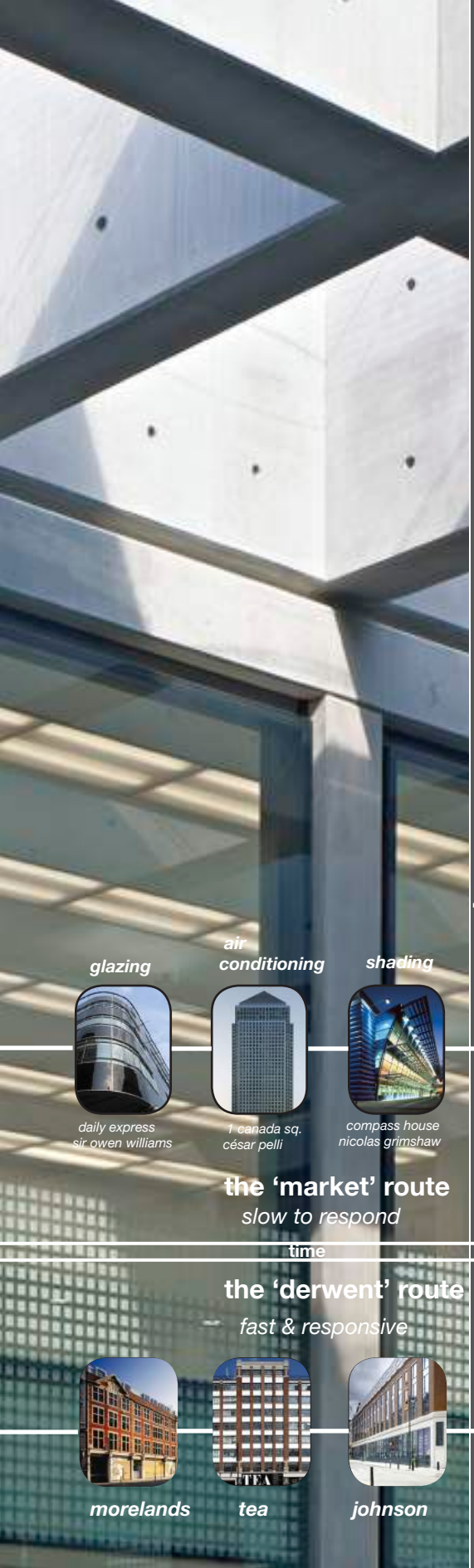
Introduction

The concept of **White Collar Factory** (WCF) evolved through work with **Derwent London**, who are seen as one of London's leading innovative developers.

The Derwent product derives from an **alternate route** to the market - centred on re-use of existing buildings.

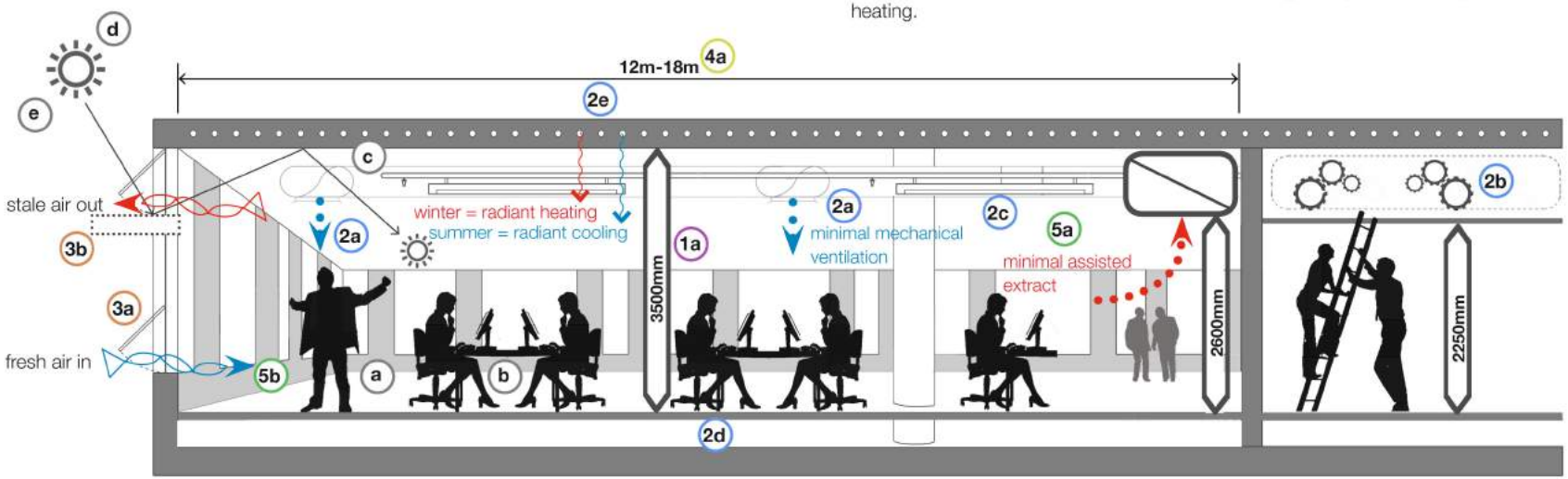
WCF captures the essence of these 'warehouse' buildings e.g. generous scale, natural ventilation etc. but with more **intelligent** control of the internal environment.





WCF Section:

The principle of the White Collar Factory is to optimise the climate control benefits of the building's passive design (tall ceiling, well insulated façade, exposed mass) to reduce the level of mechanical air conditioning required. The building is naturally ventilated at the perimeter with radiant slabs providing background cooling and heating.



1 tall ceilings =

- 1a 3500mm floor to ceiling heights

2 smart servicing =

- 2a minimal fresh air mech. ventilation & extract ductwork around core
- 2b on floor plant
- 2c light fittings included as basic product
- 2d power & data in 150mm raised access floor
- 2e radiant slab for cooling & heating

3 passive low tech facade =

- 3a opening windows
- 3b windows adapt to suit solar conditions i.e large openings to north, smaller to the south, or external shading where needed

4 deep plan =

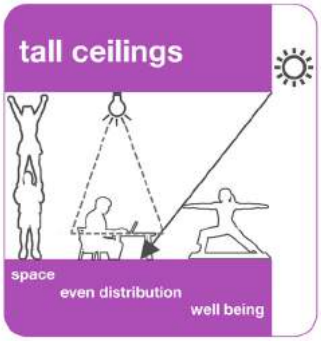
- 4a generous scale provides best opportunity for greatest market share

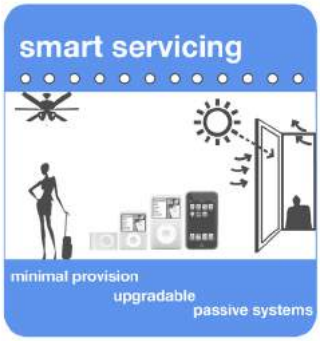
5 concrete structure =

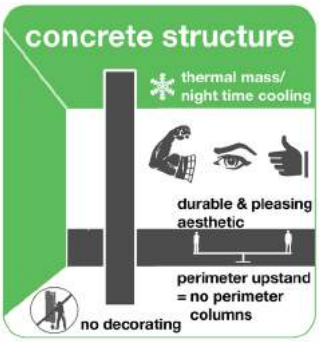
- 5a exposed concrete soffit
- 5b concrete perimeter upstand increases structural spans and eliminates perimeter columns

Design principles are based on :

- a 1 person per 10msq
- b 15 W/m² computers
- c 10 W/m² lighting
- d 25 W/m² solar
- e for the hottest summer day 37 hours exceed 25 °C or <1% of annual working hours







far left: generic WCF section

left: summary of 5 key principles

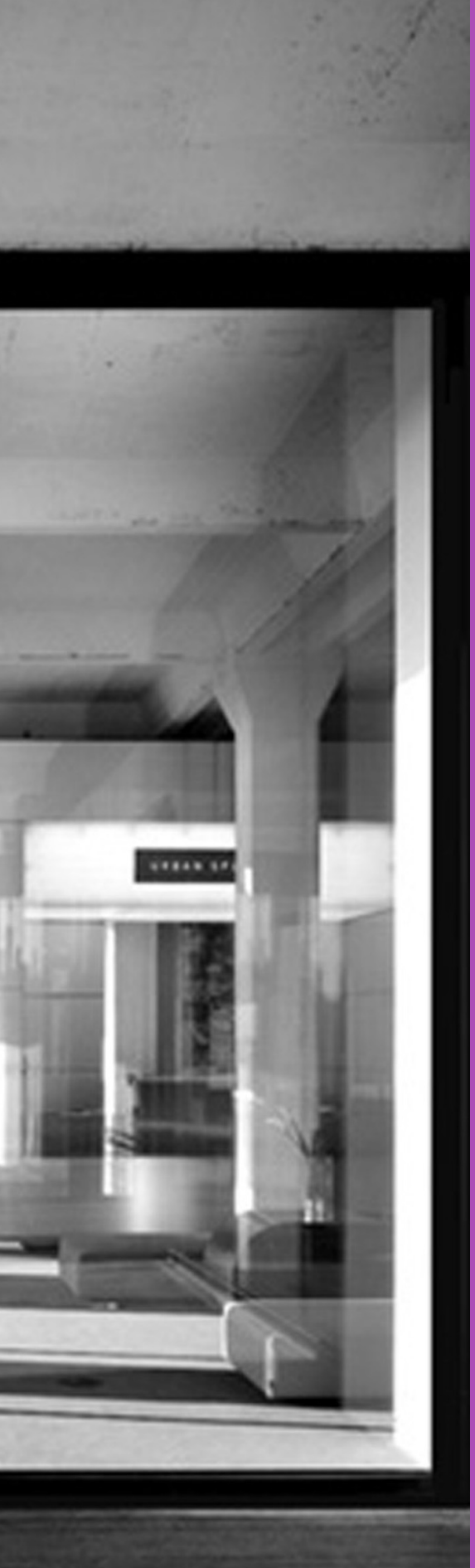
Key Principles

The principle of the **White Collar Factory** is to **optimise** the climate control benefits of the building's **passive design** (tall ceiling, well insulated facade, exposed mass) to **reduce** the level of mechanical **air conditioning** required.

The White Collar Factory uses **Concrete Core Cooling** (CCC) as its primary method of conditioning the office environment. **Chilled water** is circulated via pipes embedded in the floor slabs.

The **cooled slabs** provide radiant cooling and thermal mass to absorb heat generated in the office from computers, lighting and people,

Along side **CCC** there are **5** key design strategies as follows:

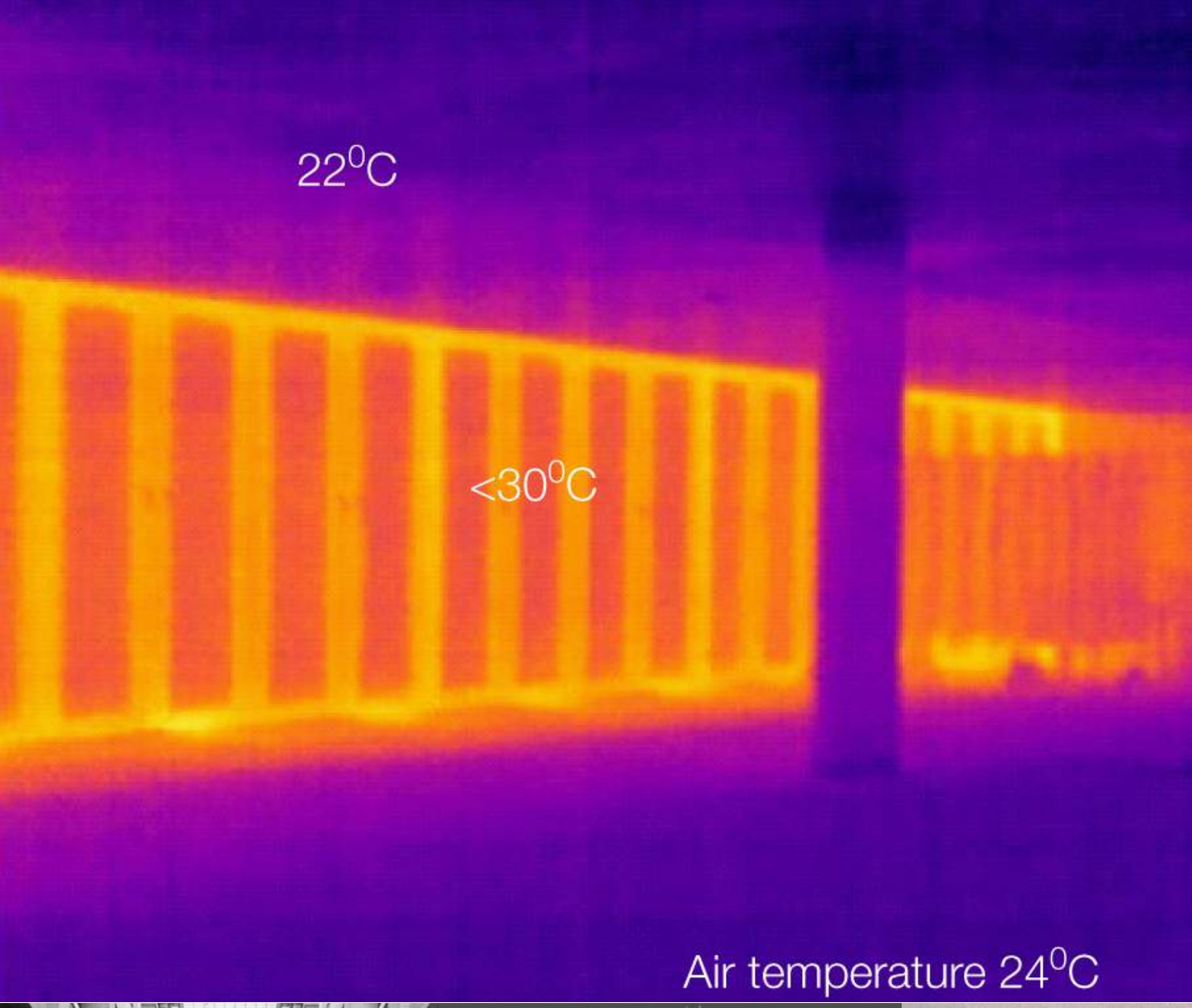


left: Fort Dunlop, Birmingham, Sidney Scott & W.W. Gibbings, 1920

01 Tall Ceilings

Benefits:

- increased **flexibility** of use: volume provides for future market lead upgrades
- increased natural **daylight** penetration
- **efficient** and even distribution of artificial lighting
- **improved** temperature comfort levels
- **beneficial** +5% on travel distances (smoke reservoir): provides for deeper floor plates


22°C
<30°C
Air temperature 24°C

“The system uses the principle of lowering the surface temperatures to create good comfort conditions.

Radiant systems account for the fact that comfort is a result of several factors including surface temperature as well as air temperature.”

Arup Engineers

02 Smart servicing

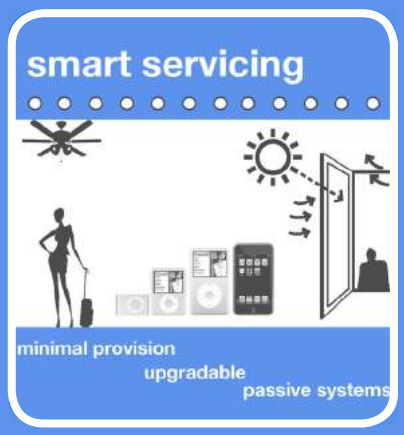
Benefits:

- **minimal** provision i.e. no excessive ‘kit’
- **maximum** use of passive systems i.e. natural daylighting & ventilation
- **radiant** slab providing cooling & heating
- optional ‘**up-gradable**’ add-ons by tenant
- on floor plant above wc area to maximise **benefit** of tall ceilings

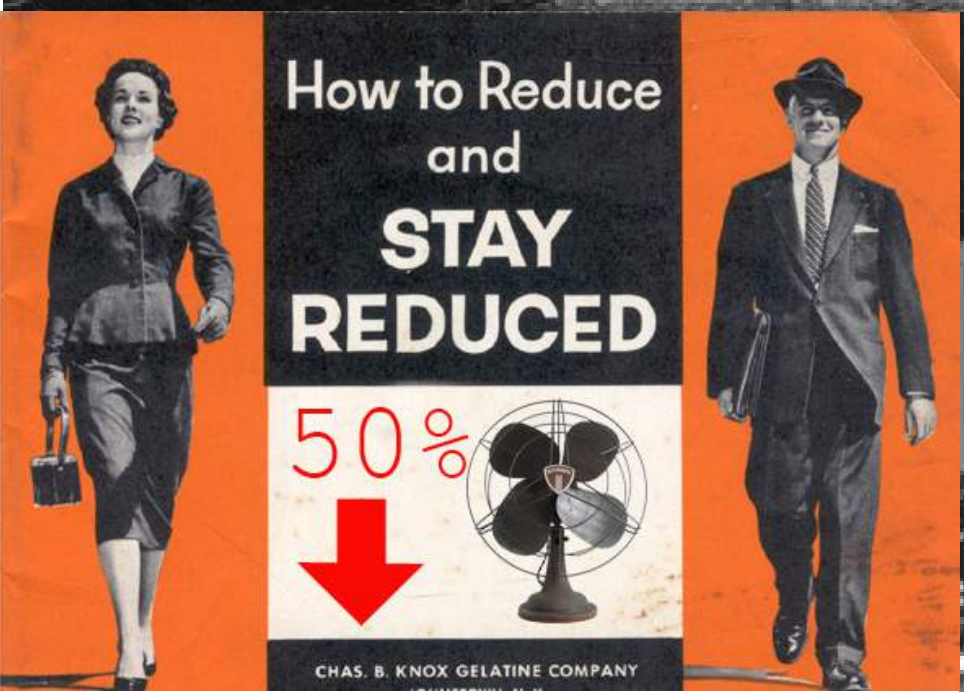
above left: thermal image illustrating cooling affect of radiant slab

far left: radiant slabs first used in Larkin Building, (FLW, 1906) & Highpoint, Highgate (Lubetkin, 1935)

left: the difference between air temperature & surface temperature can be dramatically different yet change our notion of comfort.



> “CCC is suited to natural ventilation as its performance is not impeded by opening windows.”
>
> *Arup Engineers*



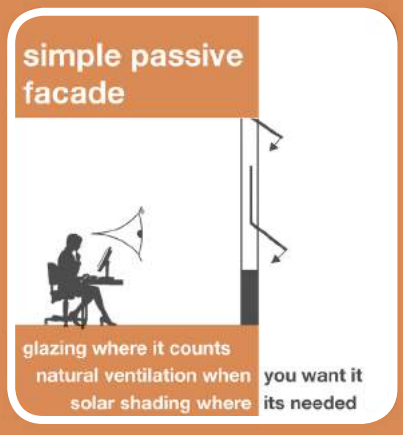
03 Simple passive facade

Benefits:

- **glazing** where it counts i.e. above desk height
- **openable** windows controlled by users
- **shading** where necessary i.e. to south/ east & west elevations depending on context
- % of glazing varies to suit **orientation** i.e. more to north, less to south

above left: Van Nelle factory, Rotterdam, Johannes Brinkman & Leendert van der Vlugt, 1931

left: by encouraging users to open the window, the need for additional mechanical ventilation can be reduced by as much as 50%.



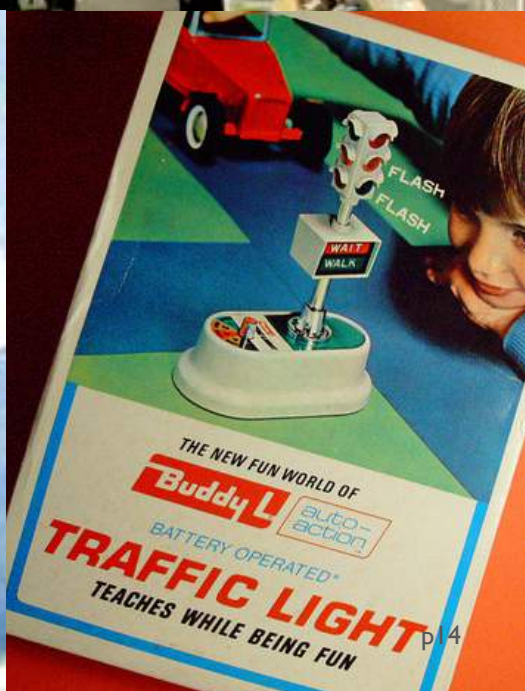
04 Deep plan

Benefits:

- generous **scale** provides best opportunity for greatest market share
- **potential** for 2-way split tenancy per floor
- potential for optional voids between floors to connect tenancies
- compact central core provides good nett to gross floor ration and wall to floor ration

left: Johnson Wax Building, Wisconsin, FLW 1939

- WCF: 22-28C
- BC0: 24C



> "With the CCC system the cooling proportion of energy use is significantly reduced to just 3% from a more typical value of 15%"
>
> *Arup Engineers*

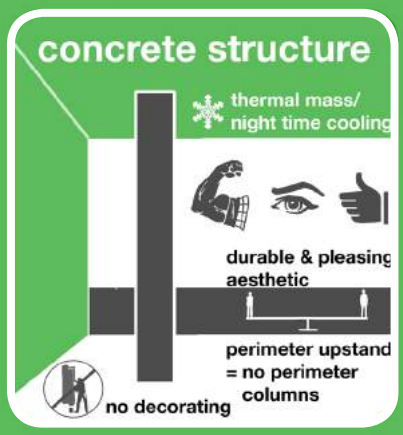
above left: The Yellow Building, AHMM 2008

left: by giving control of comfort levels to tenants & providing incentives, the financial savings of a 'minimal -kit' system can be passed on

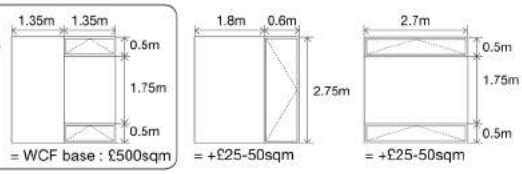
05 Concrete structure

Benefits:

- exposed concrete **minimises decorating**
- exposed concrete a **durable & pleasing** contemporary aesthetic
- use of concrete perimeter upstand (i.e. the spandrel zone) & 'punched' windows **increases structural spans** & eliminates perimeter columns
- exposed concrete provides **thermal mass** i.e. night-time cooling



windows

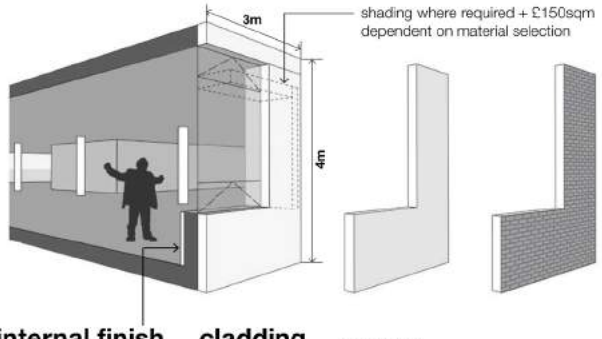


no jacket required

integrated skin and structure

- no perimeter columns
- punched openings and simple windows
- pre-fabricated, pre-clad structural panels to be investigated

WCF base facade = £500sqm



internal finish

pre-cast concrete to control quality

or

spray plaster

cladding

a_render

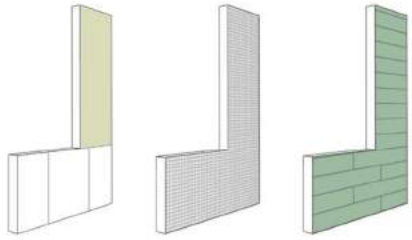
= £500sqm

b_pre-cast concrete

= £500sqm

c_brick slips

= £500sqm



d_metal panels

= £575sqm

e_mosaic tiles

= £600sqm

f_glazed terracotta tiles

= £650sqm

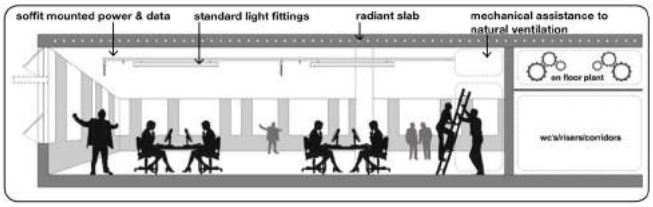
increasing cost

keeping up appearances

mix and match?
vertical or horizontal?

to be drawn and discussed

Cat A Fit-out



WCF shopping list

now you have the base.....
upgrade to suit your specific location and tenant requirement

+ optional shopping list items

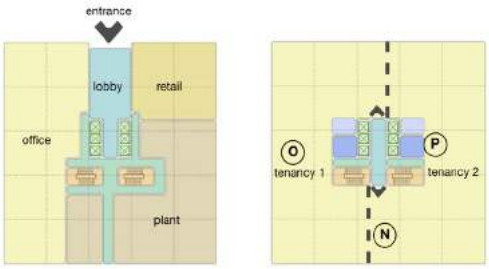
	on-floor shower facilities	£30,000 each (pre-fabrication & lower cost to be investigated)
	additional wc facilities	£20,000 each (pre-fabrication & lower cost to be investigated)
	suspended ceiling	£5ft2
	enhanced lighting eg Zumtobel	£2/ft2
	150mm raised floor i.e. housing power & data only	£4ft2

+ costs requiring further investigation

	additional cooling i.e. ceiling fans	£?/ft2
	additional heating i.e. perimeter radiators	£?/ft2
	additional cooling to cellular rooms i.e. VRV's	£?/ft2
	additional cooling generally i.e. VRV's	£?/ft2
	kitchen facilities	£?/ft2

Generic WCF building = £165 per sqft

- (A) building height G(5m) + 5 storeys
- (B) 45 x 45 m floor plate
- (C) 4m floor to floor = tall ceilings
- (D) 9m x 9m insitu concrete frame
- (E) central core
- (F) GIA = 130,000 sqft
- (G) NIA = 105,300 sqft
- (H) overall NIA:GIA = 81%



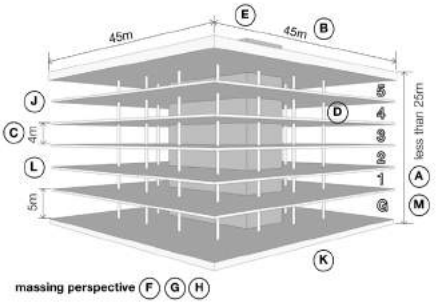
ground floor plan

typical floor plan (I)

key

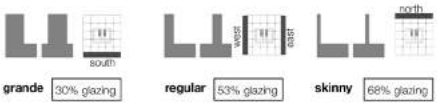
Office	lifts	stairs
retail	plant / servicing	WC's
lobby / reception	circulation	optional extra WC's

- (I) typical floor NIA:GIA = 85-87%
- (J) Wall to floor ratio = 0.35
- (K) No basement, car park or transfer structure
- (L) Min. fresh air and radiant slabs
- (M) section 20 does not apply
- (N) limited sub divisible floor plates
- (O) 1 or 2 tenancies
- (P) 8 WC's per floor



massing perspective (F) (G) (H)

facade modules



grande 30% glazing | regular 53% glazing | skinny 68% glazing

WCF Prototype

These 5 principles were developed into a **prototype WCF** building with following criteria:

- 6 storeys high
- 45mx45m plan
- 4m floor to floor
- central core
- NIA:GIA - 81%
- £500sqm cladding system

resulting in an overall build cost of **£165sqft** (*Davis Langdon*)

This included a standard **Cat A fit-out** however a 'shopping list' of add-ons was developed, with associated costs, which specific tenants might desire.

far left above: principle of economic cladding strategy

far left below: fit-out principles

left above & below: key design factors of WCF prototype

Project vehicles

Aspects of the WCF prototype have germinated in Derwent projects over many years, including:

- **Tea Building** 2004
- **Johnson Building** 2006
- **Horseferry House** 2008.

Tea Building is now being revisited as **Green Tea** with improved sustainable credentials & similarly **Morelands** will benefit from a new rooftop extension achieving BREEAM excellent.

Two recent projects are earmarked for embracing the WCF prototype even further & these, **100 City Road** and **Hampstead Road** are described over the following pages.

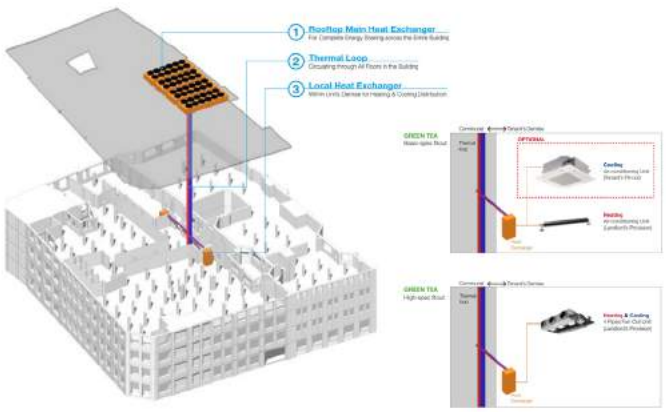
top left top: Johnson Building Hatton Garden

top right: Morelands

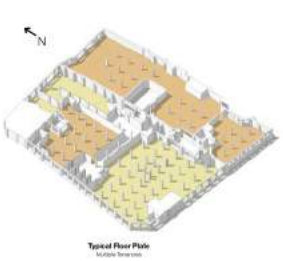
bottom left : Horseferry House

bottom right: Green Tea

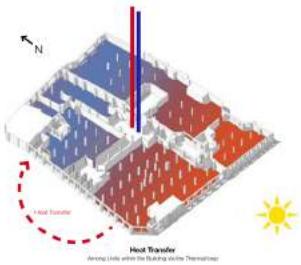
Stage 3
We are installing new high efficiency rooftop plant which will provide a hot and cold water thermal loop (see below) through the building that can be connected to provide heating, cooling (or both) to any unit.
Basic-spec fitout includes a local heat-exchanger and perimter radiators throughout the unit, tenants can add localised cooling units for high-capacity areas (e.g. meeting rooms, server rooms, etc.) without the need for additional plant.
High-spec fitout supplements the radiators (and cooling units) with high-efficiency combined heating & cooling units.



Thermal loop
When it's cold outside, units to the south will warm up quicker from direct sunlight. The thermal loop will allow this heat to be shared with the colder units reducing the building's overall energy consumption.
When it's warm outside, units to the north will remain cooler for longer, the thermal loop will share the energy required to cool.



Typical Floor Plate



Heat Transfer

Green Tea is:
- Improvement of the building and windows.
- Improvement of the office fit out to give more efficient lighting
- Use of a smart thermal loop and heat pumps.
- Allowing energy sharing.
- Encouraging localised rather than full-space cooling
- Allowing low carbon technologies to be incorporated at any stage of the development

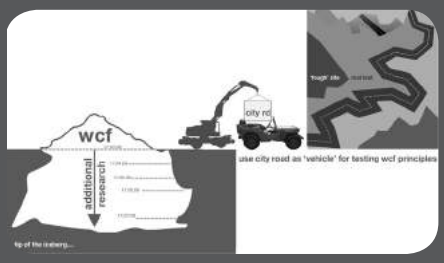
Green Tea
an example of smart and sustainable development

WCF @ City Road

100 City Road involves the redevelopment of a **city block** on Old Street roundabout with both **new build** & **refurbished** elements.

The scheme will be led by a 16 floor building providing the tall, generous and flexible working environments of the WCF generic.

Adjacent a redundant service yard is re oriented to become a **new public square** for the entire development, and a series of new alleys and passages connect it to the wider city which will vastly improve the **public realm** at the corner of City Road and Old Street

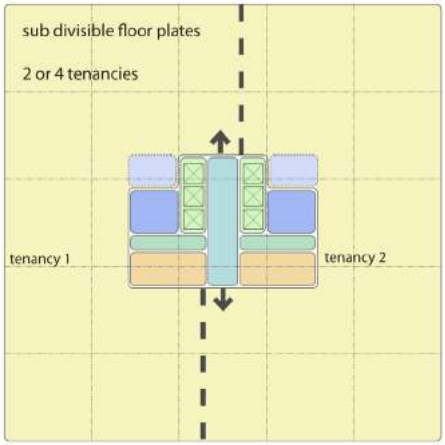


right: view into new courtyard from City Road

Despite the complex site conditions, 100 City Road remains competitive at **£193sqft** with the cost extras primarily due to:

- existing basement condition
- increased building height & subsequent sprinkler requirements

WCF: prototype plan

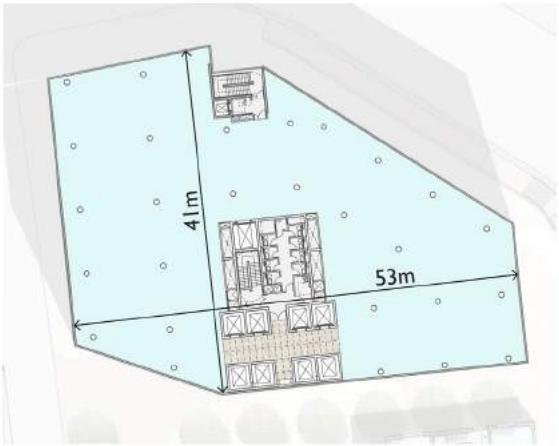


typical floor plan

- *building height G(5m) + 5 storeys*
- *45 x 45 m floor plate*
- *4m floor to floor = tall ceilings*

= £165 per sqft

City Road: developed plan



typical floor plan

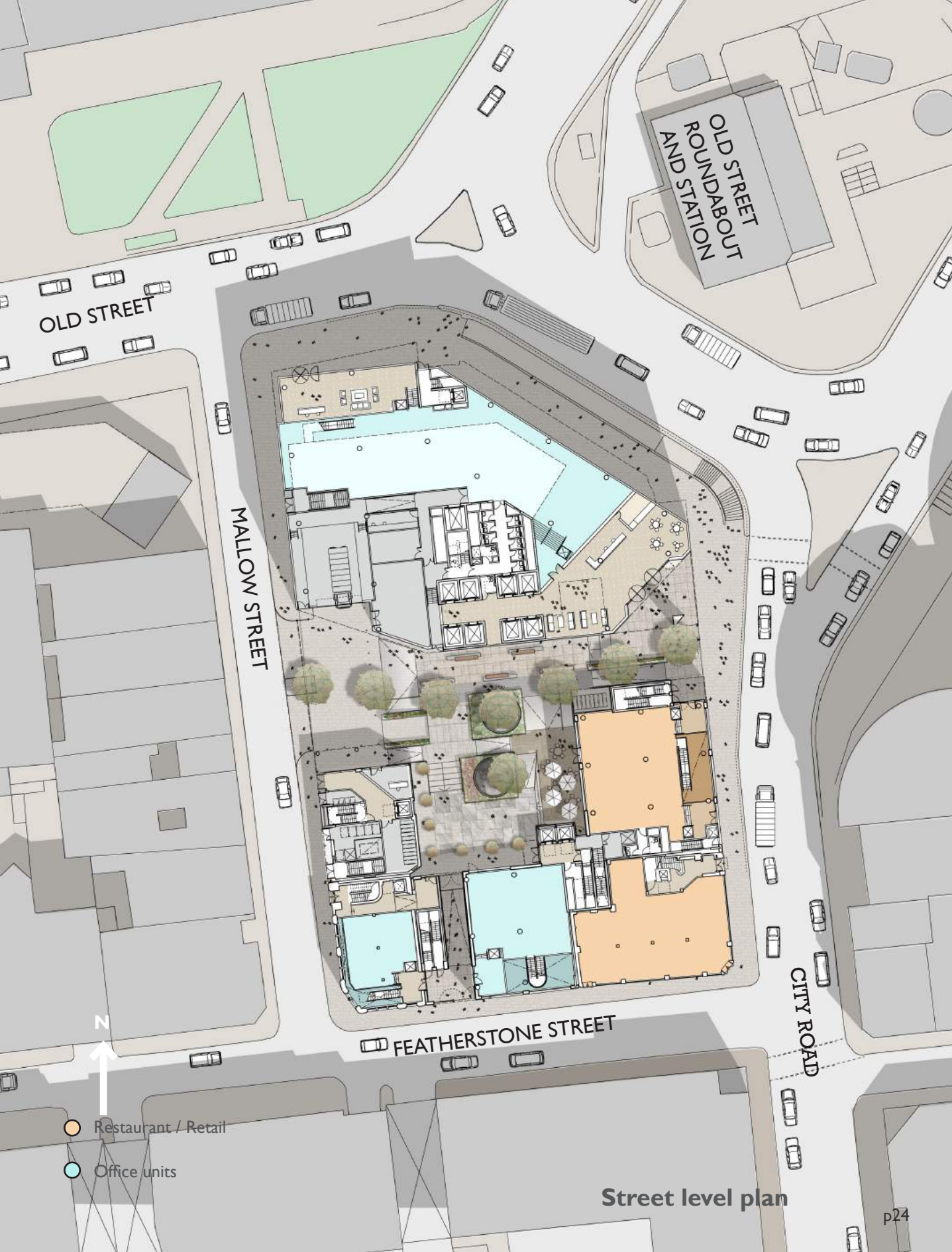
• *includes basement*	**+ £10 per sqft**
• *increased building height G(6.5m) + 15 storeys & structure*	**+ £8 per sqft**
• *increased services distribution*	**+ £5 per sqft**
• *includes sprinklers (Section 20)*	**+ £5 per sqft**

= £193 per sqft

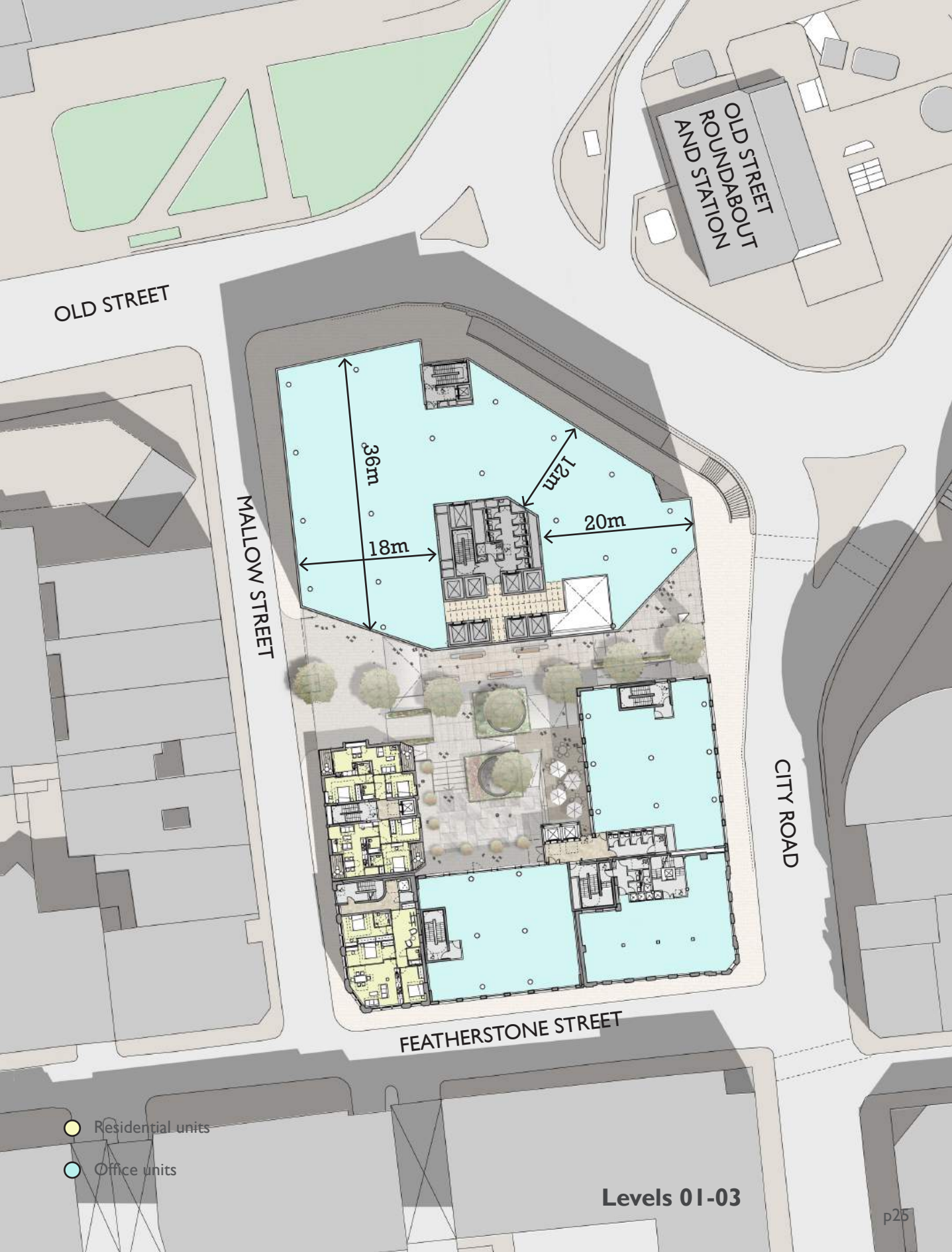
right: comparisons of WCF & City Road footprints & cost rates

far right: view from Old St roundabout


OLD STREET
iPad



Street level plan


OLD STREET ROUNDABOUT AND STATION
OLD STREET
MALLOW STREET
CITY ROAD
FEATHERSTONE STREET
36m
18m
12m
20m
Residential units
Office units
Levels 01-03

View from Featherstone Street

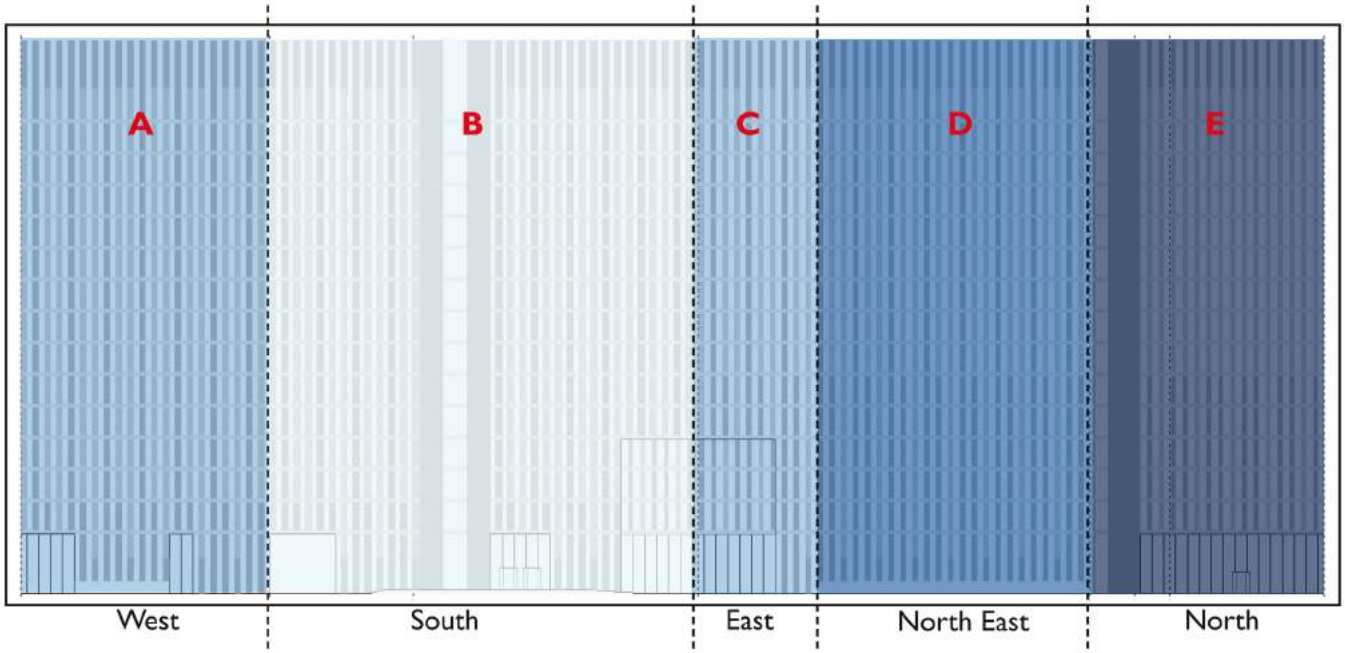
Building A: Facade Analysis & Treatment

The following pages are an explanation for the emerging strategy regarding the treatment for the facade.

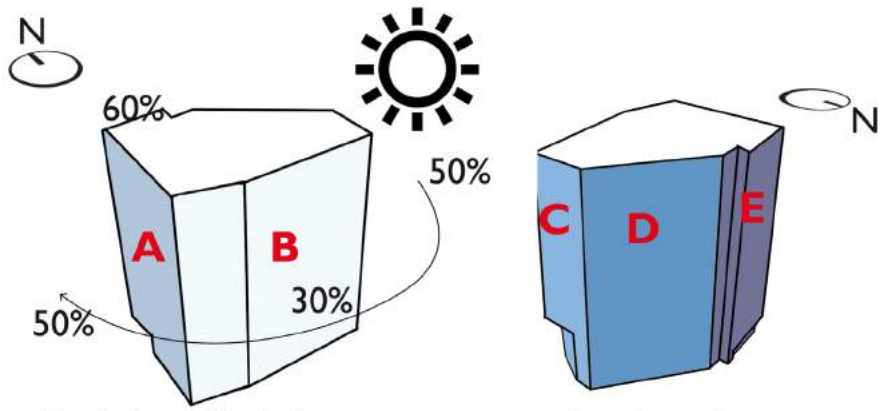
Identifying specific environmental and functional influences which have led us to respond to three separate conditions:

1/. Orientation of the site 2/. Air Quality 3/. Function

1. Response to Orientation



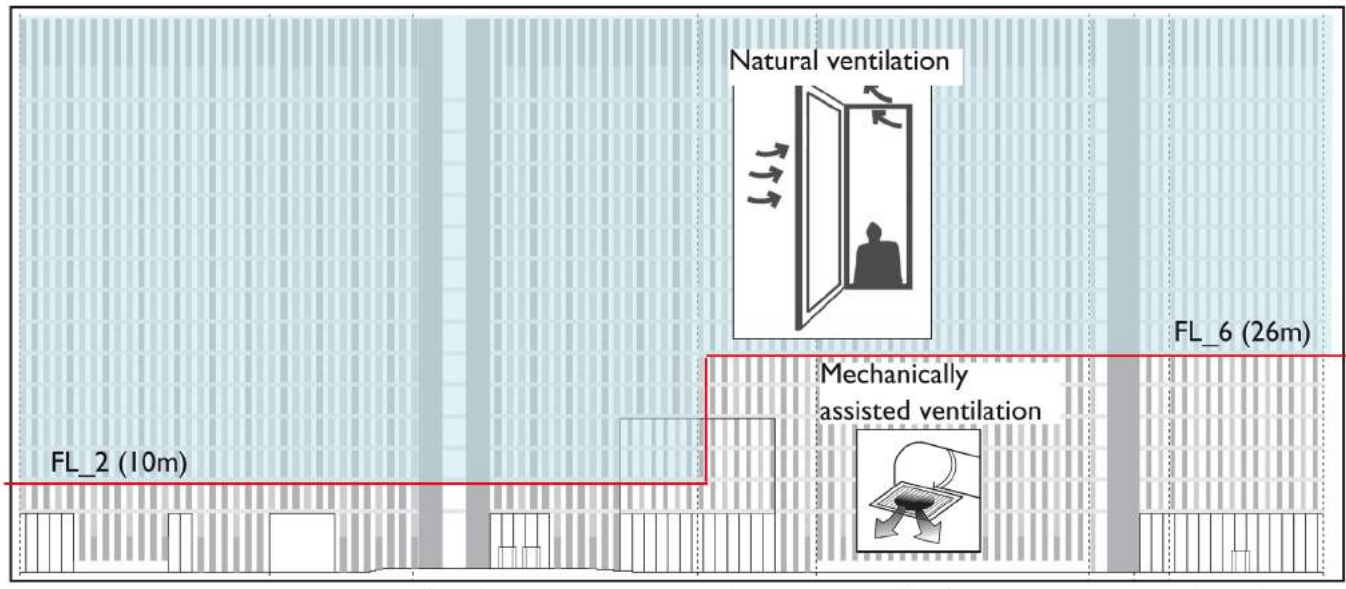
A graded system emerges as a response to the varying requirements each elevation has, regarding the reduction of peak solar gains.



Optimised % glazing to manage peak solar gains
(Assumed no shading device)

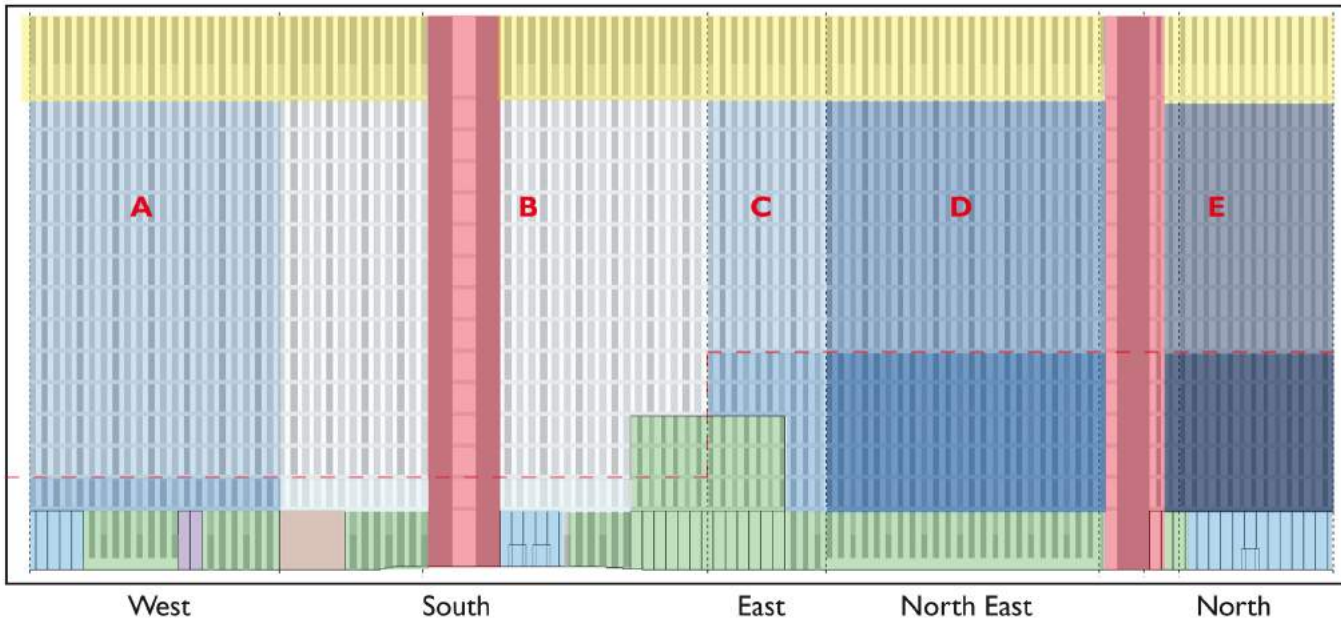
Diagrams highlighting the impact of the orientation of the site within initial facade studies

2. Response to Air/Acoustic Quality



The amount of traffic and street pollution can have an enormous impact on the level of air quality. By identifying areas of high pollution (such as the North and East elevations as a result of Old Street and City Road junction), a threshold can be determined to establish exactly where full natural ventilation is beneficial and where it is not.

3. Response to Programme



By identifying the different and specific functions within the building, it has generated possible areas of the facade that can be articulated in alternative ways.

Building A: Facade Panels
What offers difference?

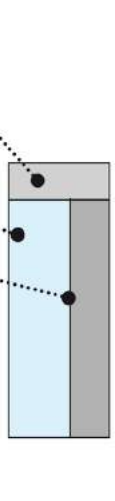
Ground and top levels provide opportunity for difference e.g through extension of panel size

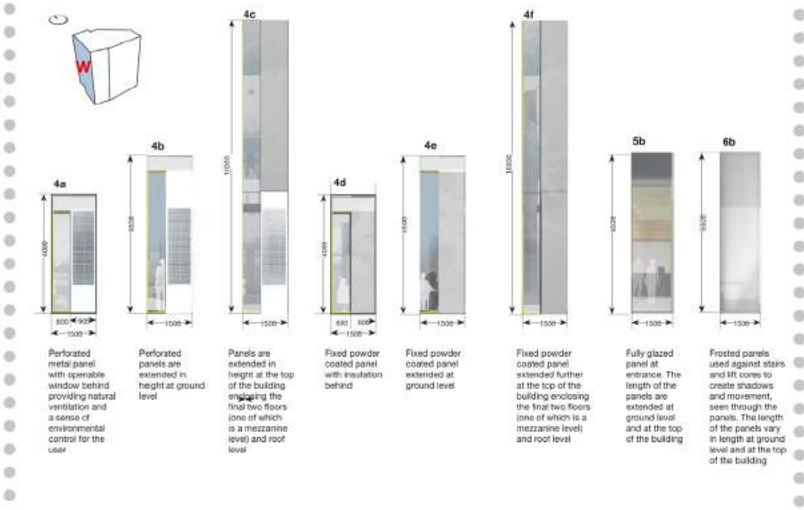
Changes in width of glazing depends on where facade faces the sun

Perferations to allow air through occur when air quality and acousitcs allow

Programme offers change e.g. frosted panels are used against stair and lift cores

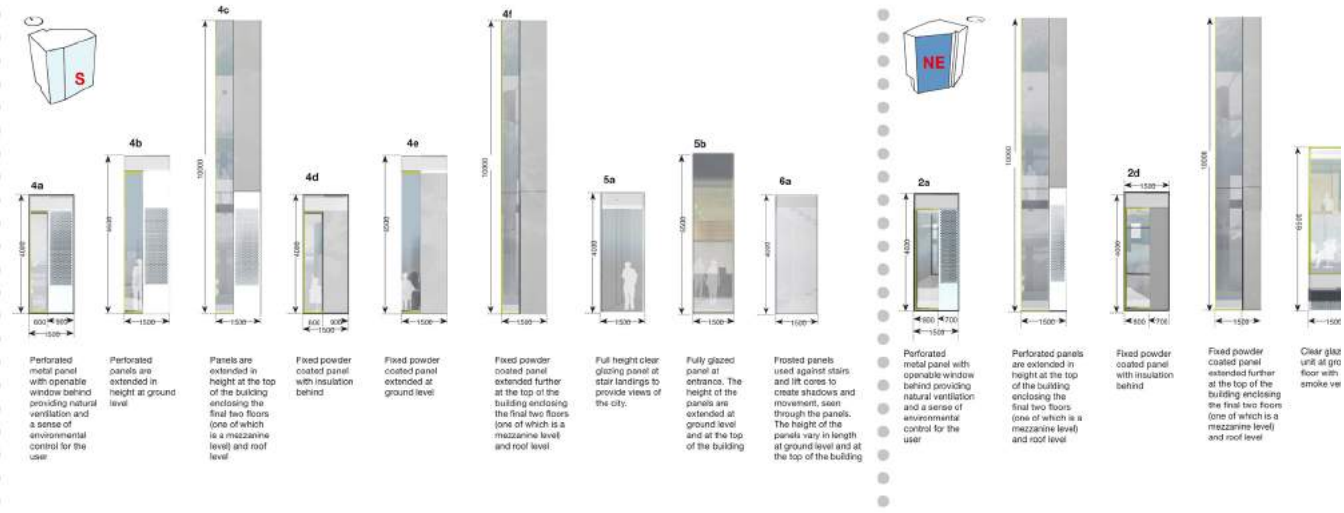
Matt and reflective metals are used to provide variation e.g fixed panels are powder coated.
perforated panels are anodised





North East Facade

North Facade



South Facade

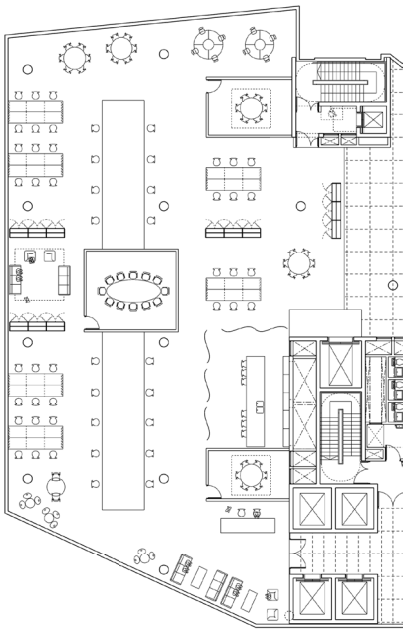
Fit-out Type 1:

10% cellular or "funky" media occupier e.g. Mother

- Floor: industrial raised access
- Ceiling: exposed concrete soffit
- Electrical power & Data: within 150mm raised access floor
- Heating & cooling: radiant slab
- Ventilation: mechanical assistance to natural ventilation
- Partitioning: lightweight 'screens' with minimal acoustic separation

= £35 per sqft

*(typical Fit-Out Cost £45sqft)**



** WCF costs less as:*

- *limited adjustment to Cat A fit out of M&E*
- *no requirement to take down, adjust or replace ceilings*

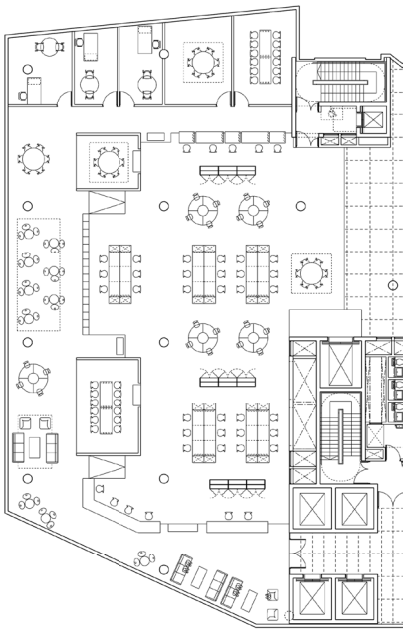
Fit-out Type II:

20% cellular or typical media occupier e.g. TalkTalk/ Ogilivy & Mather

- Floor: timber on raised access
- Ceiling: exposed concrete soffit
- Electrical power & Data: within 150mm raised access floor
- Heating & cooling: radiant slab + optional additional a/c local to meeting rooms & offices
- Ventilation: mechanical assistance to natural ventilation
- Partitioning: acoustically sealed 'island' units with contained ceiling

= £50 per sqft

*(typical Fit-Out Cost £60sqft)**



** WCF costs less as:*

- *limited adjustment to Cat A fit out of M&E*
- *no requirement to take down, adjust or replace ceilings*

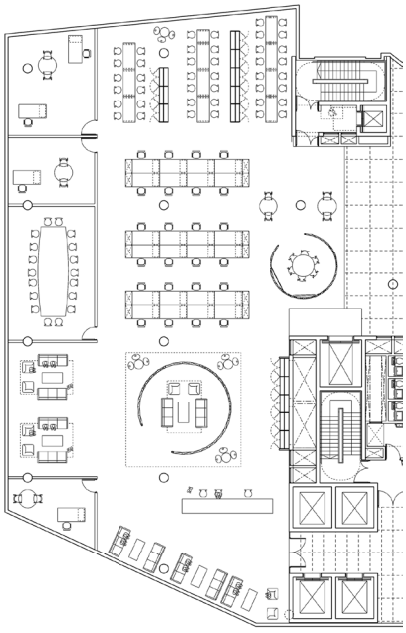
Fit-out Type III:

30% cellular or typical corporate media occupier e.g. WPP

- Floor: timber on raised access
- Ceiling: exposed concrete soffit
- Electrical power: within 150mm raised access floor
- Heating & cooling: radiant slab + optional additional a/c local to meeting rooms & offices
- Ventilation: mechanical assistance to natural ventilation
- Partitioning: full height partitions to ceiling (see appendix) + showpiece

= £65 per sqft

*(typical Fit-Out Cost £80sqft)**



** WCF costs less as:*

- *limited adjustment to Cat A fit out of M&E*
- *no requirement to take down, adjust or replace ceilings*

Top floor fit-out:
with mezzanine

- Floor: timber on raised access
- Ceiling: exposed concrete soffit
- Balustrade: glazed with timber rail
- Electrical power: within 150mm raised access floor
- Heating & cooling: radiant slab + optional additional a/c local to meeting rooms & offices
- Ventilation: mechanical assistance to natural ventilation
- Partitioning: full height partitions to ceiling (see appendix) + showpiece 'pods'

WCF @ Hampstead Road

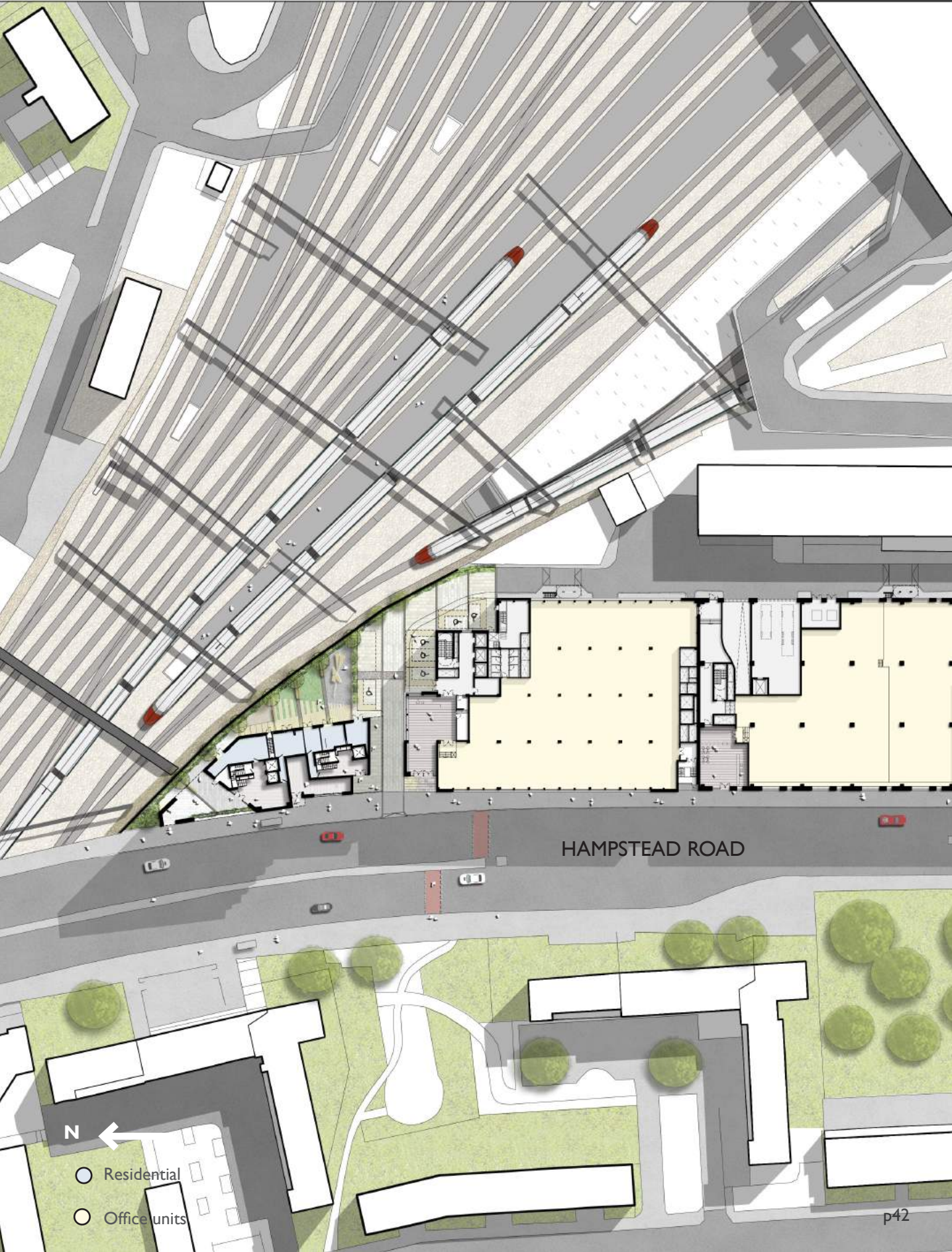
This project is a **mixed-use** office and apartment scheme in Euston, involving the **refurbishment** and **rooftop extension** of two late 1960s warehouses to create 230,000 square feet of office accommodation as well as a residential building.

The existing buildings' structure and fabric is re-used to create modern and unique office space that retains a raw and **industrial aesthetic**.

New large windows and metal clad portals re-define entrances and generate activity, making a **positive contribution** to an uneventful existing street scene.

Striking light-weight roof extensions contrast visually with the refurbished elements and provide **light** and **generous** office space.

left: view looking north up Hampstead Road


HAMPSTEAD ROAD
N
Residential
Office units

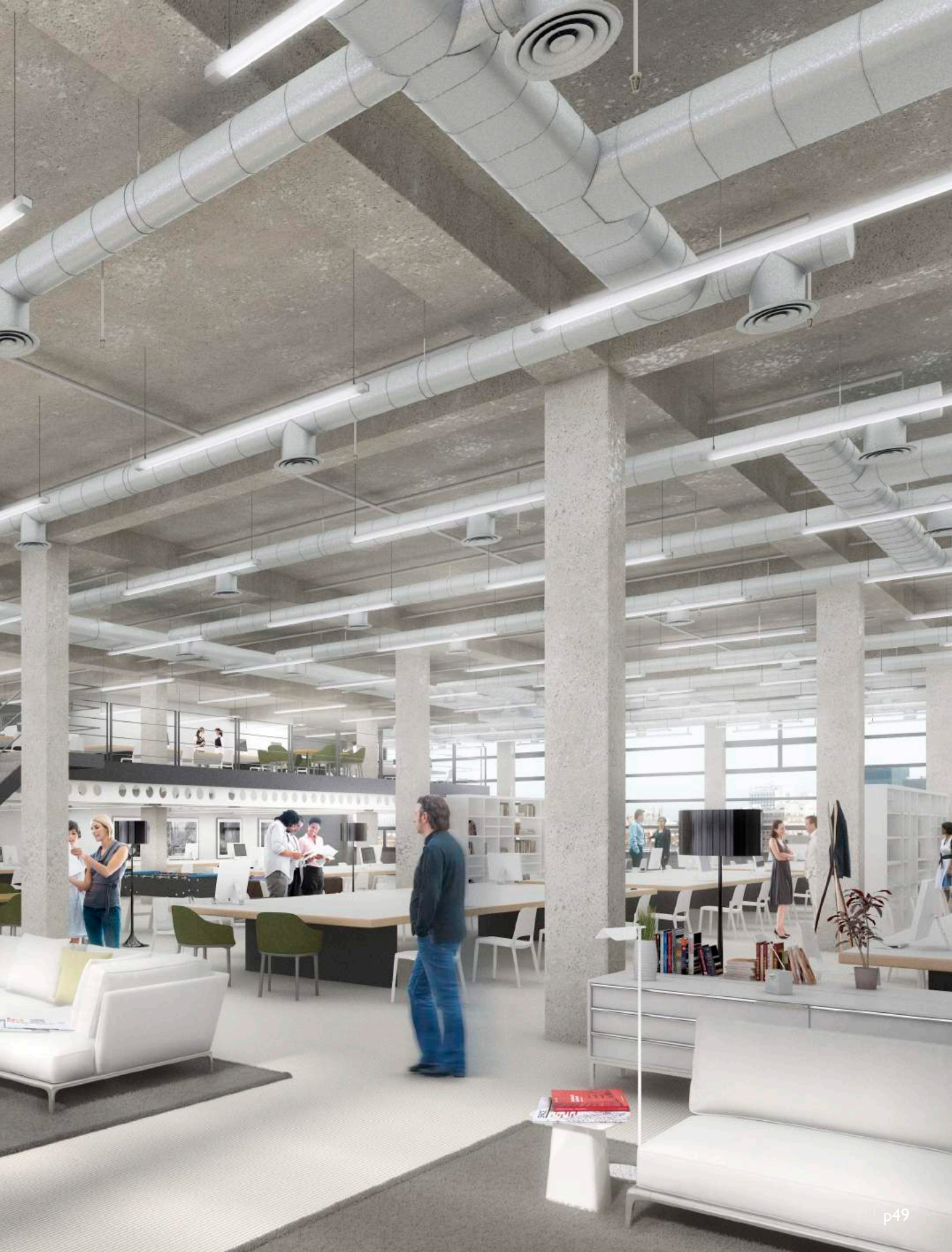
left: street level plan

View looking south along Hampstead Road


140
international
minutes free
We're better, connected
O2

Interior view of refurbished office space with mezzanine

Interior view of refurbished office space with mezzanine



Interior view of new rooftop extension

Interior view of new rooftop extension with mezzanine