

EMERGENCY CARE CENTRE

LOGISTICAL PLANNING

By Mark Alberts (Planning Manager)



The Challenges

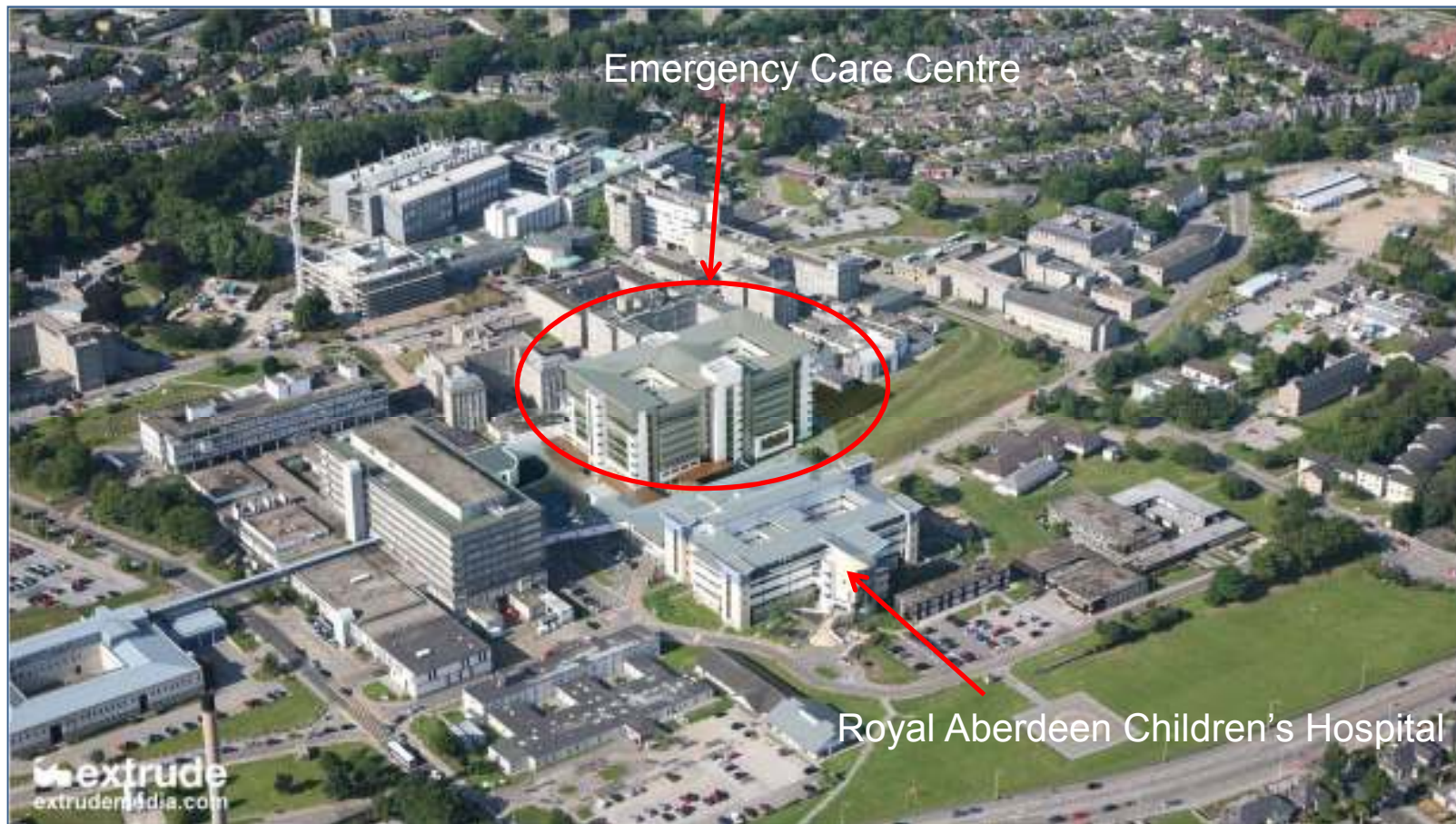
Scope

- The Big Picture
- Key Quantities
- Key Logistical Challenges

The Solutions

- Material Delivery Holding Zone & Dedicated Access into Site
- Tower Cranes
- Hoist & Telescopic Platform Locations & Delivery Zones
- Labour Force Histogram
- Labour Force Car Parking Solution
- Programme/Method Strategy
- Approach to Pricing

The Big Picture



Royal Aberdeen Children's Hospital: Completed in 2003 by Robertson - 2 Year Build Period (Traditional)

Emergency Care Centre = RACH x 2.5 - To be Built Effectively in 2 Years and 6 Months (Design & Build)

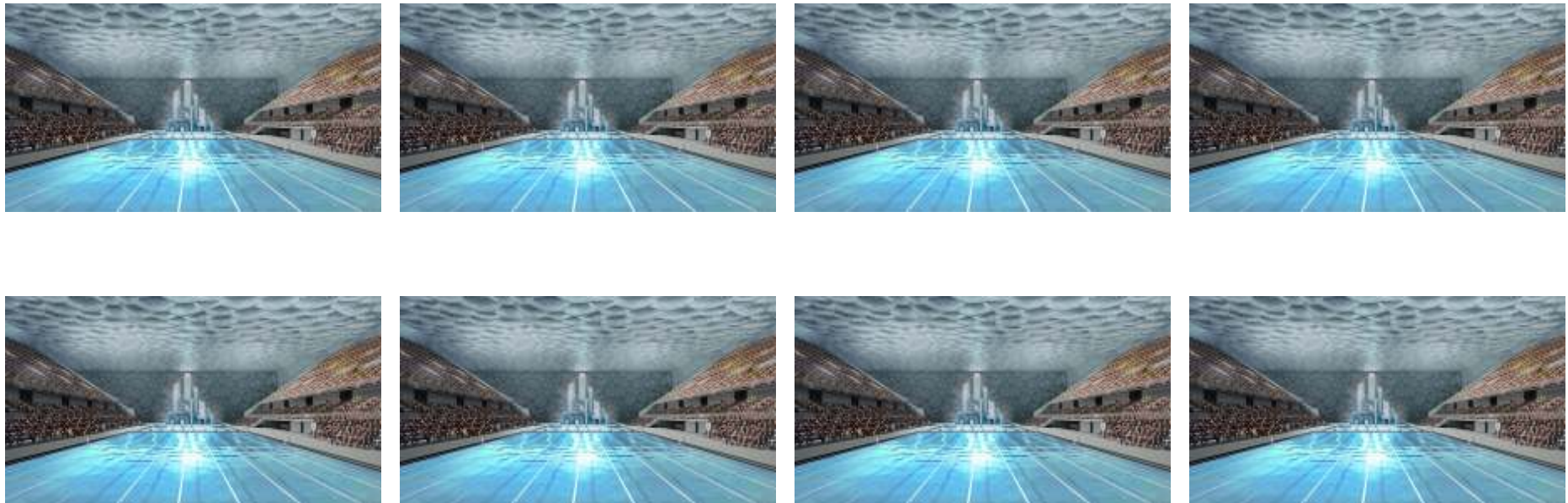
Key Quantities

Basement Excavation Volume

30,000M3

Enough to fill 8 Olympic size swimming pools – Excavated in 7 Weeks

10No. truck movements per hour on a live campus



Concrete Frame

Approximately 13,500m³ in the structure

∇

2330 Concrete truck deliveries in 10 months

∇

Average of 1.5 truck deliveries every working hour



Plasterboard Partitions



Sufficient plasterboard to totally encase the Empire State Building

Main Quantities Remaining

- Cladding/Roofing 16,000m²
- Number of Rooms 1450No.
- Floor Plate Modules 518No. (Ave. 5m Long)
- Riser Modules 12No. (Ave. 16m Long)
- Partitions 60,000m²
- Floor Coverings 25,000m²
- Suspended Ceilings 25,000m²
- Group 1 Equipment 31,800No.
- + Commissioning

TIME REMAINING FROM W/C 11 APRIL 2011 > 78 Weeks

Logistical Challenges

Fundamentals – Key Criteria to Satisfy



- Client Interface - Construction of a £100M Project in the heart of a live hospital campus
- Material Delivery Solution Required which:-
 - i) Does not affect the NHS operation on the campus
 - ii) Delivers to the multiple workfaces at the required rate
- Identification of appropriate plant and numbers required to serve production requirements
- Effectively a “City Centre” site. No storage or laydown area available
- Labourforce car parking solution required to avoid choking of campus & surrounding roads
- Identify working methods which recognise the environment in which the project will be Built

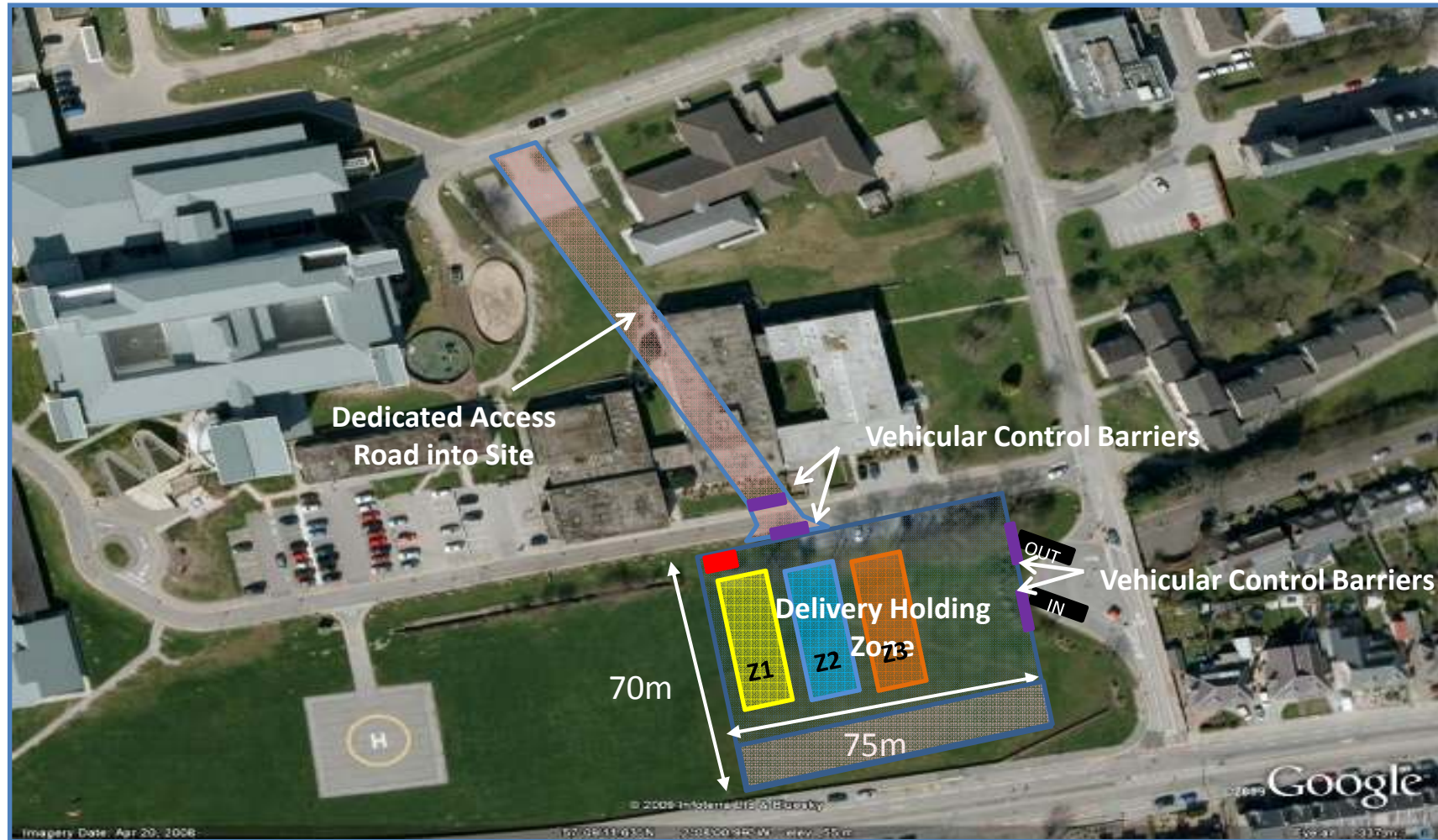
Material Delivery / Storage Options Considered

“No meaningful space on site”

- **Central Offsite Storage/Warehouse Facility or Consolidation Centre**
Exercise undertaken – Far too expensive
- **Use of Robertson Disused Precast Yard (Ex Doric Precast)**
Expensive and uneconomic. Very costly Planning requirements imposed by Aberdeen Planning Department
- **Use of Ground Floor in Building as Storage Level**
Programme sensitive - adds 6 months to programme as materials are drawn down to release the Ground Floor area
- **Use of a Delivery Holding Zone and Suitable Delivery Protocol**



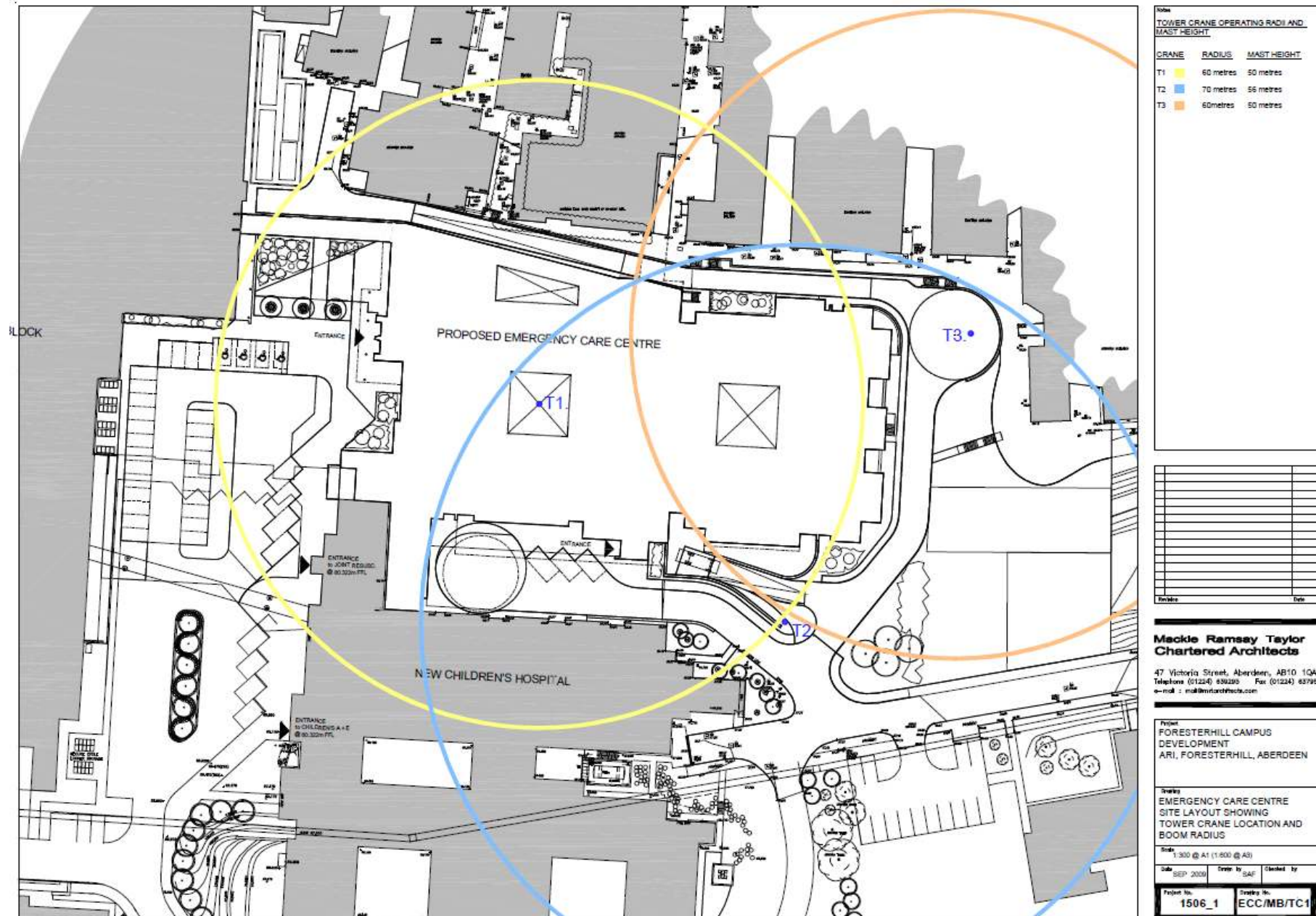
Material Delivery Holding Zone & Dedicated Access Into Site



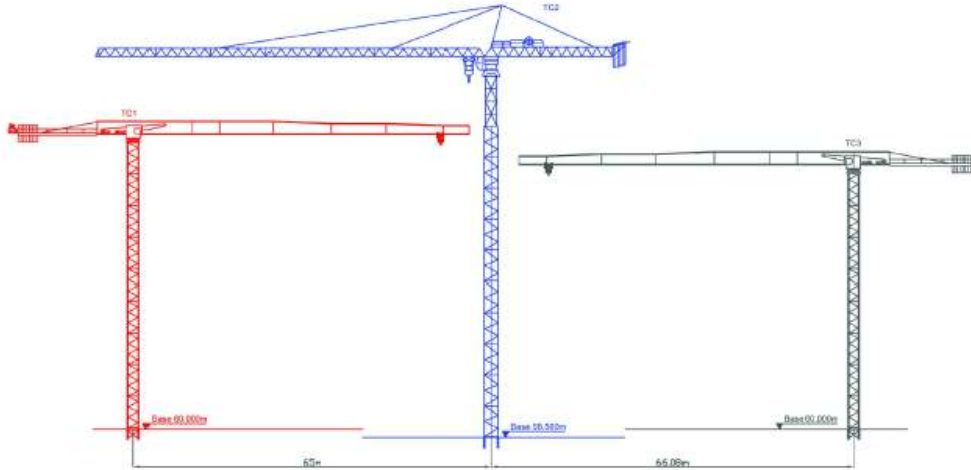
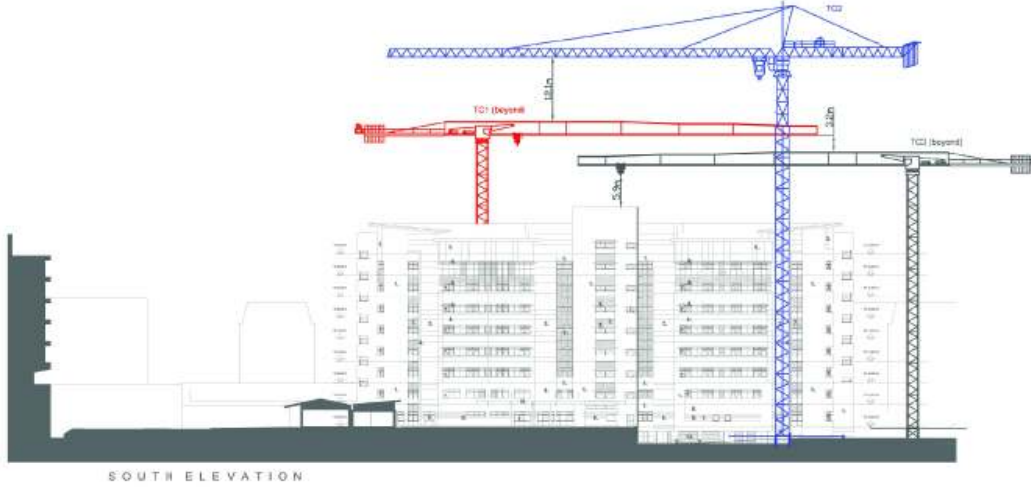
- Area Identified adjacent to helipad. Discussions with NHSG held to convince them of its benefit to both the project and the operation of the campus
- Removes delivery vehicles from campus and surrounds
- NHSG proviso was that the area was not allowed to be used for storage/laydown due to FOD (Foreign Object Debris) risk
- Agreements were required from helipad users RAF Coastguard, Air Ambulance, 3No. Oil Company users
- Delivery protocol designed to limit each delivery to a 2 day supply of materials per delivery per trade
- Delivery protocol included in tender package documentation and method/philosophy priced in

Major Plant & Material Movement

Tower Crane Locations



Tower Crane Heights



Possible Tower Crane Specifications

DESIGNATION	TYPE	MODEL	JOB (m)	TAJIR/IN FROM BASE (m)	BASE	BASE LEVEL (ADD)	SWL 20% SE-RATE
TC1	Seaside jet	Just 352-12	85	55.4	PA	TBC	90
TC2	Seaside jet	Perini PA-3400	70	66.9	PA	TBC	90
TC3	Seaside jet	Just 352-12	85	47.3	PA	TBC	90

Joint 352.12-2 FALL - 100% Duties										
1/2 length (ft)	EO	Radius (in)	3.0 - 47.6	30	20	40	45	25	15	50
		50W (torque)	8.0	6.8	6.0	6.2	6.0	5.67	5.0	4.67

Protein KA56C - 2 FALL - 100% Dishes										
Jb length (p)	70	Radius (p)	5.3 - 52.5	40	40	30	30	90	83	70
		WVL [Ternes]	0.0	0.0	0.0	0.0	*45	0.0	0.15	5.6

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Project	FORESTERHILL CAMPUS DEVELOPMENT ARI, FORESTERHILL, ABERDEEN
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Tower Crane Elevations and Operating Heights

Serial	
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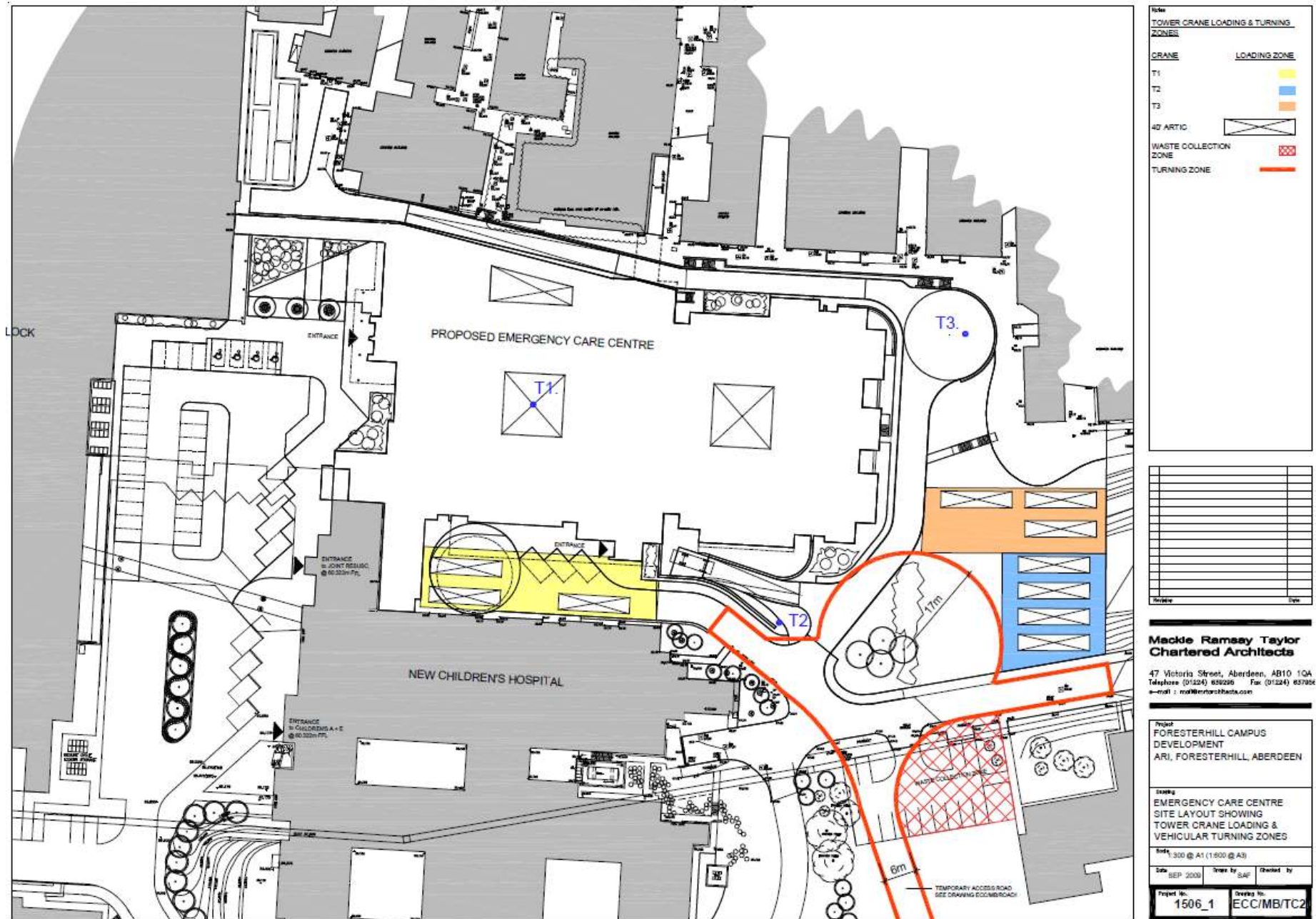
Date OCT 2009

Drawn by _____

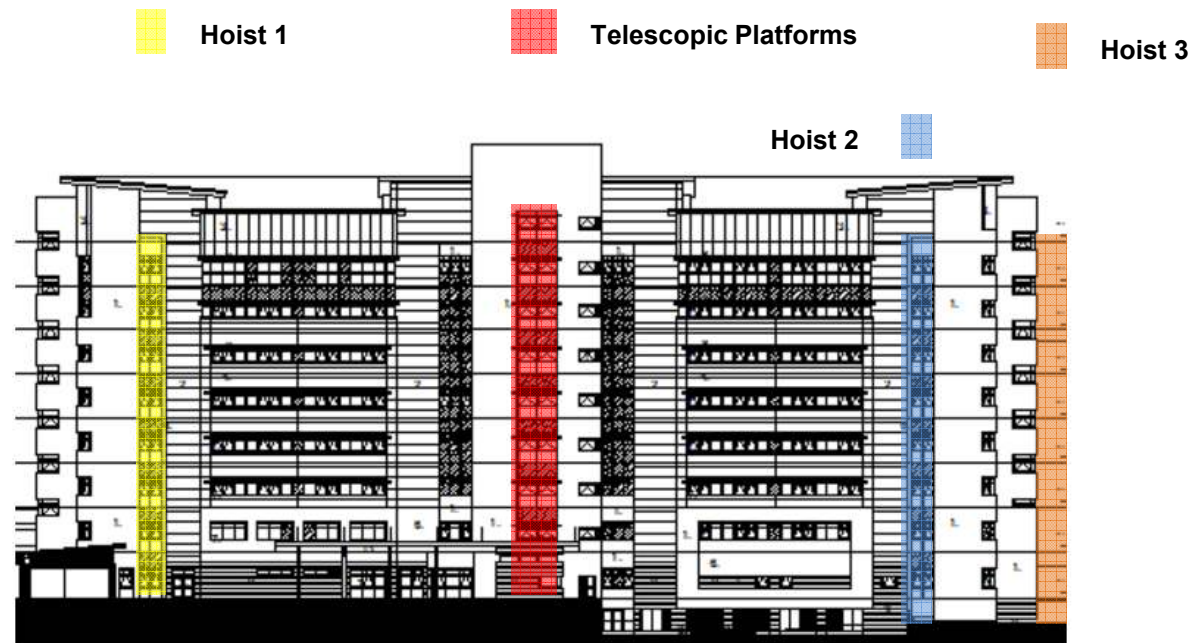
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Project No.
1506_1Drying No.
ECC/MB/TC3

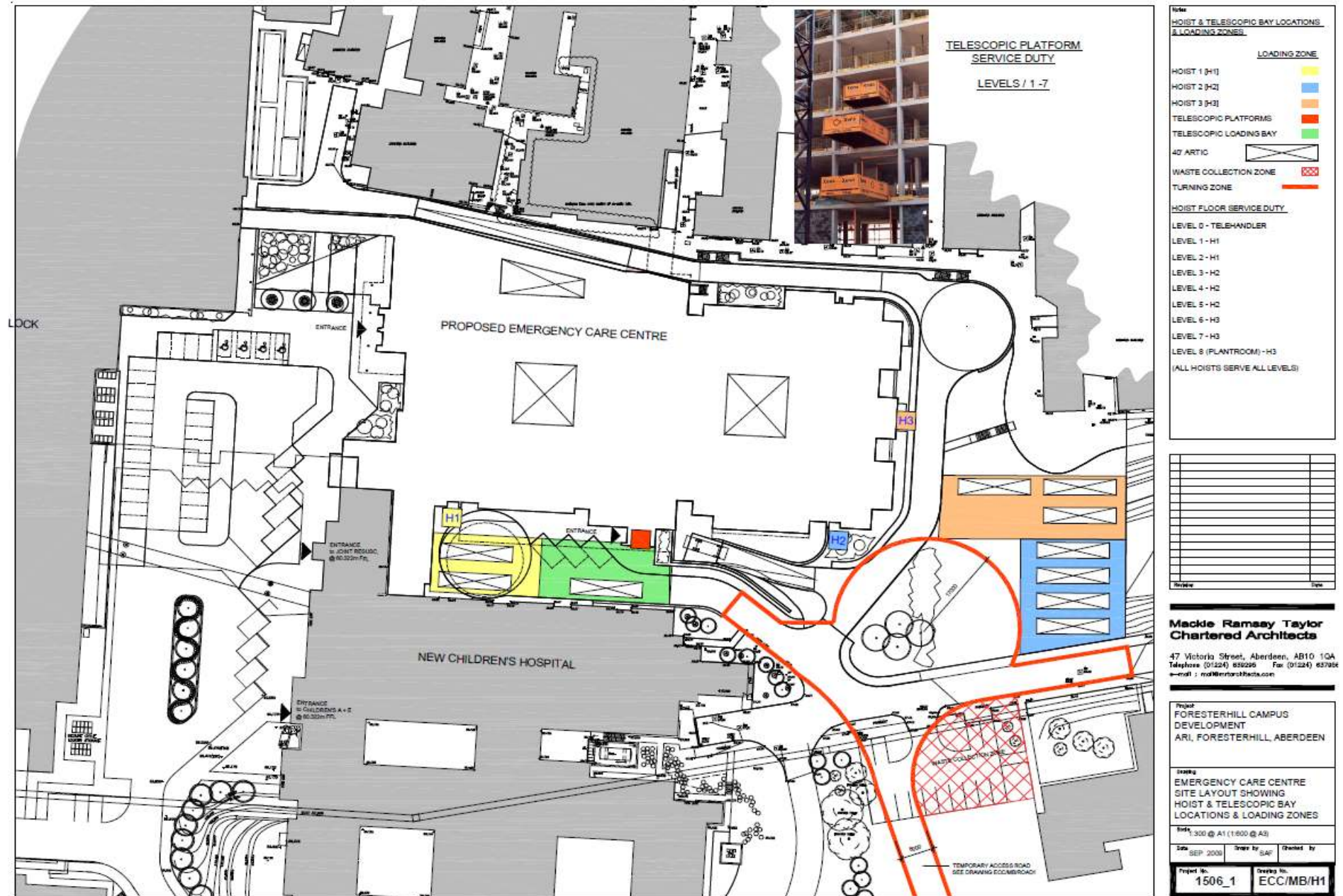
Tower Crane Material Delivery Zones



Hoists & Telescopic Platform Locations

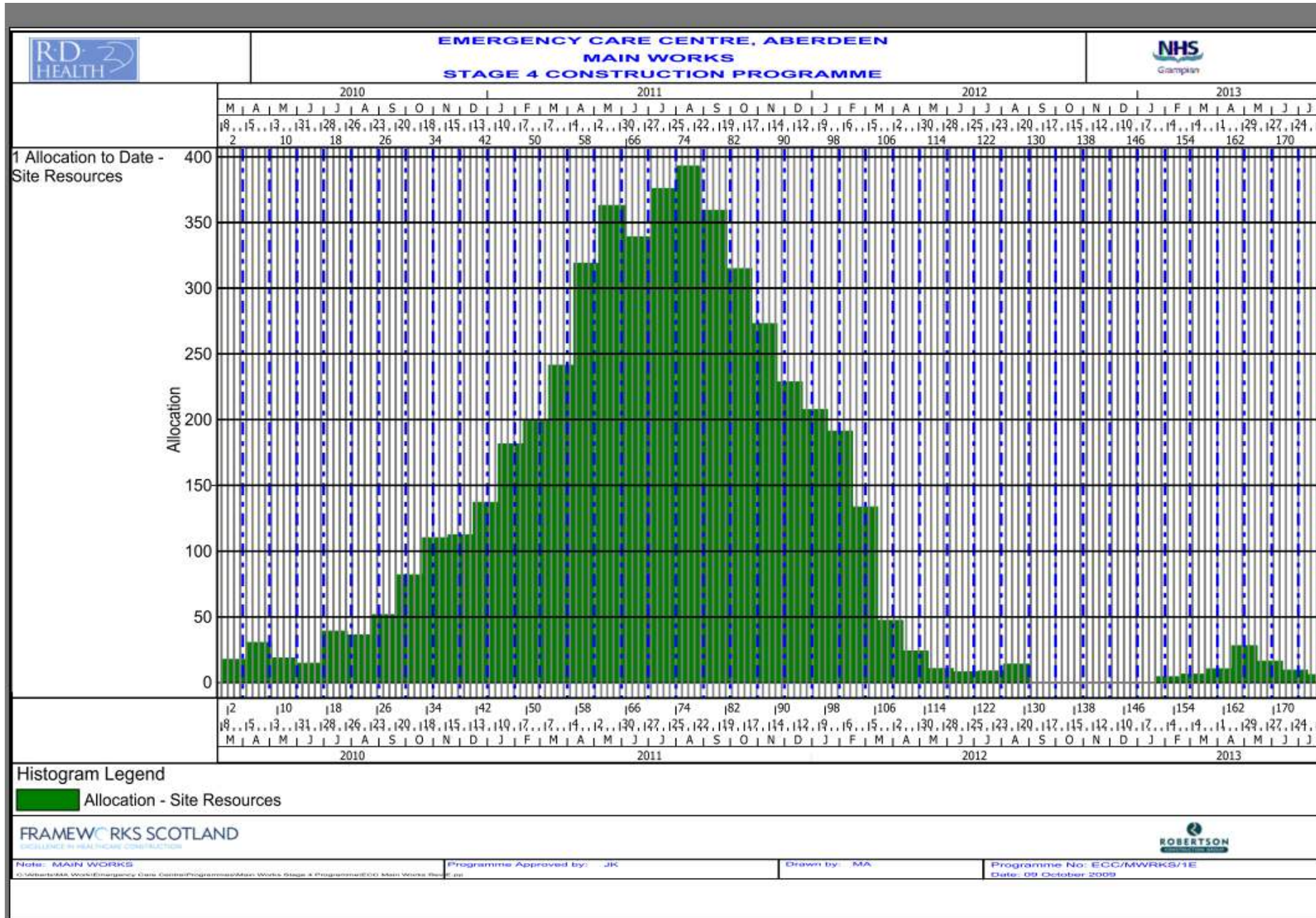


Hoists & Telescopic Platform Locations & Delivery Zones



Labourforce and Parking Management

Labourforce Histogram



Labour Force Car/Van Number Rationale at Peak

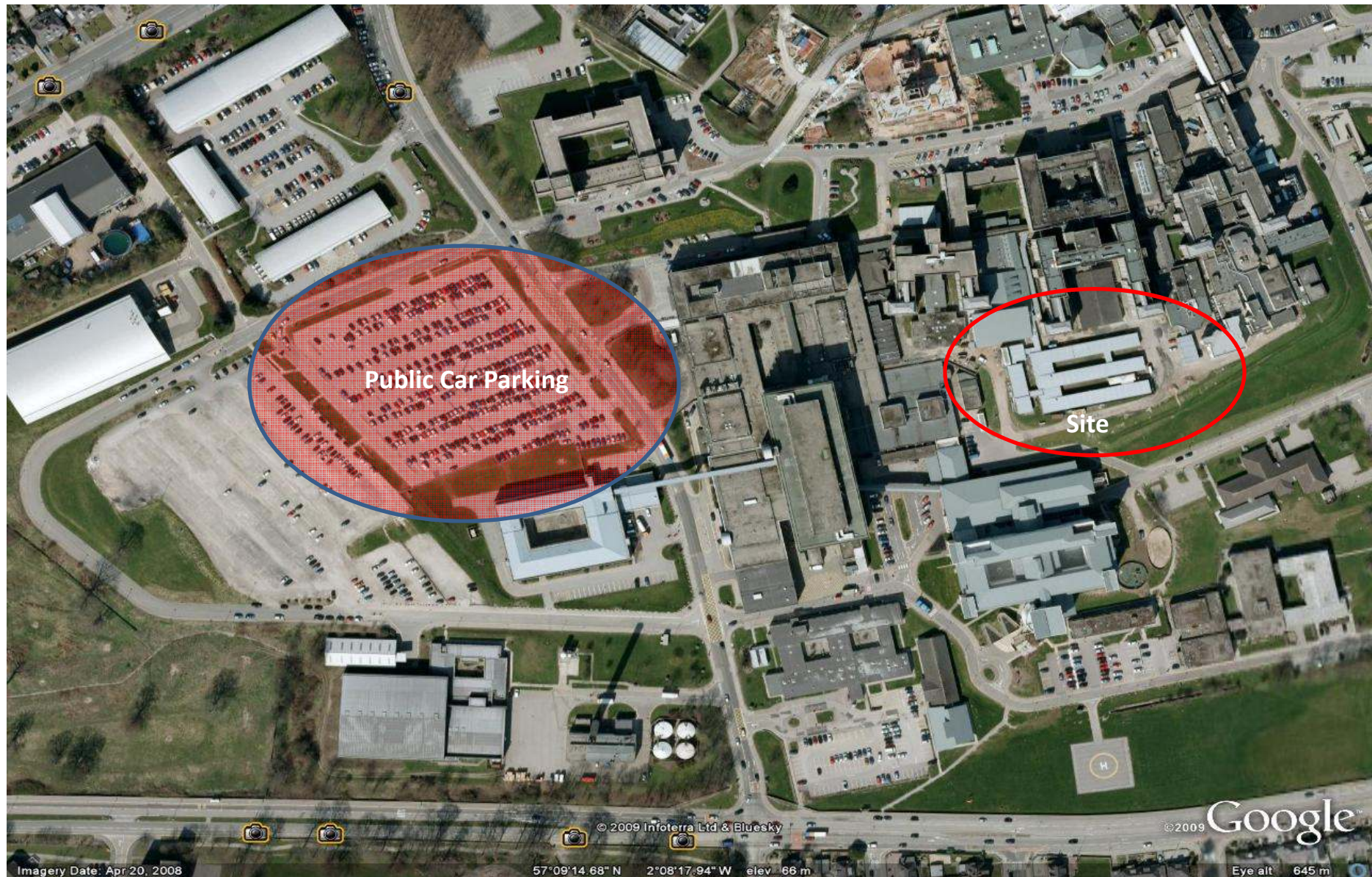
Model for Peak Labour of 400

50% 2 Per Car > 100 Cars
+ 25% 3 Per Car > 33 Cars
+ 15% 4 Per Car > 15 Cars
+ 10% 1 Per Car > 40 Cars
Total Cars Labour > 188 Cars

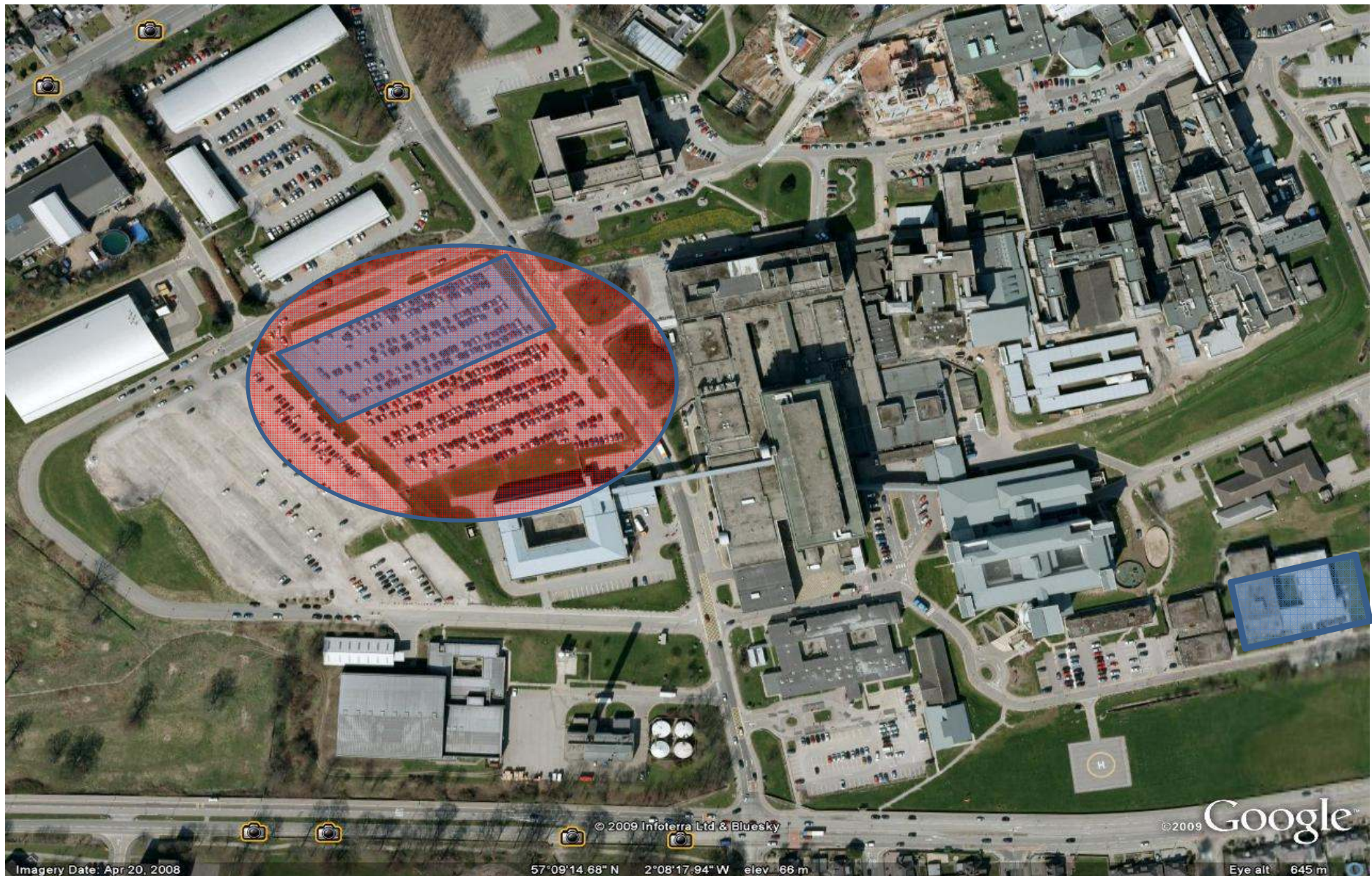
Collaborative Project Office > 35 Cars

Total Car Parking Provision Requirement – Allow 200 Spaces

ARI Main Public Car Parking Area



ARI Main Public Car Parking Area If 200 Spaces were Occupied by Work Force



Labour Force Car / Van Parking Solution (Post Westburn Centre Demolition)



Programme/Method Strategy

- Frame

- i) Changed MRT / R&C design from steelwork & metal deck (As at RACH), to a post-tensioned flat soffit concrete frame. Facilitates simpler services installation by avoiding downstand beams.



- ii) Target completion in 45 weeks to roof plantroom for fit out in readiness for 3 month final commissioning programme.(Frame completed 6 weeks early).
 - iii) This generated an opportunity for earlier module installation betterment within the floors. The opportunity was not built in and it has been referred to as “Closing the Wedge”

- Elevational fabric taken off critical path by advancing internal infill panels and closing window openings with temporary transparent reinforced plastic

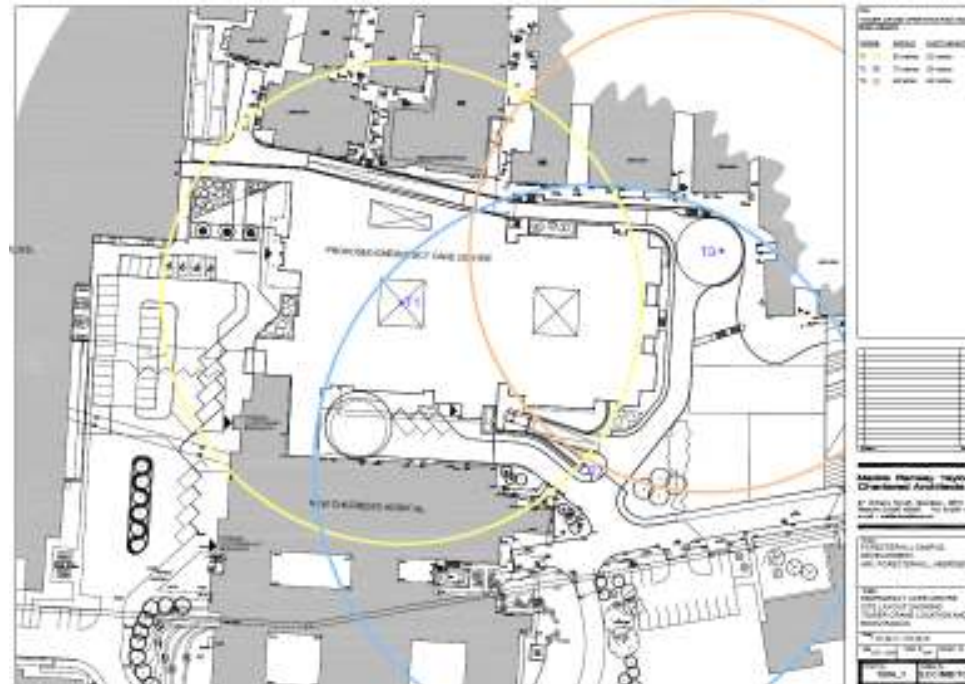


- Factory production methods encouraged commencing with modular installation for services complete with partition heads. (Partition heads on modules - A first in the UK). The modular philosophy also includes modular risers.



Other Initiatives:-

- Off-site pre-cutting of vinyl flooring to individual room sizes
- Ensuite bathroom pods considered but rejected due to attraction of additional premium compared with traditional elemental installation
- Use of Mastclimber external access system rather than complete scaffold access solution. Fully scaffolded scheme priced by 4 main subcontractors (Circa 750K including adoptions etc). Mastclimber solution cheaper by 63K.
- All 3 Tower cranes retained for full envelope period post frame completion. Facades virtually inaccessible on 3 sides due to live fire road. TC1 and TC2 can provide this service. Costs for TC3 full period included in price. Opportunity for savings to dismantle TC3 earlier.



Approach to Pricing

- Complete oncost book (inc. Tower Cranes, access system) was prepared together with pricing the logistics plan schedule ourselves. This gave us the opportunity to make commercial decisions on package scope inclusion, and offset pricing and execution risk.
- Tower Crane costs were eventually included in frame package, together with extended hire for envelope construction.
- Logistics plan identified and scheduled – Logistics specialists invited to price, present, and comment on viability of plan/schedule.
- In addition to attendance schedule, all associated preliminary and method related or delivery philosophy issues were included in subcontractor tender documentation for all subcontractors to price.
- Tender package subcontractors were invited to pre-tender meetings where the above logistical approaches were presented, clarified, and tenderers invited to comment.

Logistics Specialist – Why?

- All logistical planning solutions were identified by ourselves



- Our own oncost book was developed to reflect the planned solutions:- Circa £2M plus £1.5M for tower cranes and external access.



- Concern/risk that we may not have the expertise to execute the plan



- Approach to Logistics Specialists Munnelly, Elliot Thomas, and Alandale to price the plan



- Proved to be commercially beneficial and offset the risk concern with execution

Questions