

Technology and Environment in Architecture-

Site Diary

Joseph Beeley- N0810079

Nottingham Trent University- Enterprise and Innovation Centre



Location:
Dryden Street, Nottingham, Nottinghamshire, United Kingdom

Cost: £6M

Architect:
Evans Vettori

Construction:
Concrete Floor Slabs and Columns, Concrete and Steel Framework.

Contract: JCT, Joint Contracts Tribunal

Fig 1.1: Enterprise and Innovation Centre
(NOW, 2019).

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Specifications outline necessary material in the creation of the building and can be split into categories of function and material and made into individual reports. Specifications should outline the basic skills, tools and components required to construct all elements in a building, whether directly or through reading in conjunction with labelled drawings named in the specification.

NBS or the National Building Specification is a specific set of workmanship rules, material data tables and building standards for construction projects and was developed in the UK. Within it, will be slightly differing definitions of terminology appropriate in the workplace, the most commonly used structural elements based on material sourcing from local producers, and regulations they personal strive to implement, a quality assurance that will come with the stamp of this specification with the finished work.



Containing a systematic order of jobs as well as any accompanying documentation that may be needed for information prior to the job's completion. These begin with ground condition monitoring, explaining the safety requirements when removing topsoil and doing further site excavations. Ending with foundation depths and pouring. These can be used as a basis of creating a construction programme and/or ensuring quality and regulations are met on site.

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Doesn't contain the categories shared by the concrete and NBS spec, but instead focuses immediately on the drainage studies, highlighting first the system breakdown in its completed diagrammatic form, before explaining its function and aims, products in place for the sourcing of replacement parts, installation and finally any maintenance and ways in which to conduct tests and said maintenance, and the positive effects that these constructions may have on the landscape or the building itself. **Having a goal and environmental aim in mind contributes to the motivation of the contractor to produce good work.**



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Health and Safety-

Concerns about security were raised at the first progress meeting and have been interpreted in the minutes. It was discovered that somebody broke into the site for reasons unknown with the suspicion that it was a student of NTU, this lead to the installation of security cameras which could handily document the construction development, allowing us to view the proceeding from an otherwise inaccessible angle which could increase our clarity and allow us to notice further elements of the site.

Contractual Information-

Certain conditions were required to be met before the clarification of allowed planning permission on the current site. Necessary paper work and information as to how certain issue would be combated were as follows;

A noise assessment and sound insulation proposal. Which I can only assume is due to potential complaints from residences of Shakespeare Villas, but would have had to be conducted at the time the Dryden building or equally the new music centre on the adjoining road were proposed.

A plan for the drainage. Since the site lies on a small incline, water would have to be drained out of where it would collect; the area of the proposed building's partial basement floor. The spec provides essential information into precisely what drainage elements will be used and how they will be maintained, as asked for by the Nottingham County Council.

An investigation into the arboricultural. This includes tree and soil surveys to determine drainage options, root spread and water basins. The trees on and around the site are protected and therefore must not be touched or removed, hence the scheme and its shape that has been adopted. This extends into landscaping schemes that will ensure appropriate native plants are used and well maintained or replaced should they die.

The fourth floor office spaces for let and use by small businesses cannot be occupied until the Local Planning Authority has confirmed the safety of plant room amenities such as the boiler, gas levers and air conditioning and that they have been installed to a safe and professional standard.



Fig 1.4: Health and Safety Measures (Beeley, 2019).

My Ref: 18/02427/PFUL3 (PP-07271056)		Nottingham City Council
Your Ref:		
Contact: Mr Phil Shaw		
Email: development.management@nottinghamcity.gov.uk	Development Management City Planning Loxley House Station Street Nottingham NG2 3NG	
Evans Vettori Architects FAO Mr Robert Evans 31 Knowleston Place MATLOCK DE4 3BU		Tel: 0115 8764447 www.nottinghamcity.gov.uk
TOWN AND COUNTRY PLANNING ACT 1990 APPLICATION FOR PLANNING PERMISSION		Date of decision: 18 February 2019

Fig 1.5: Council Contract (NOW, 2019).

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Companies and Roles-

Management and Delivery Roles The embodiment of certain behaviours, rationale and actions on site with the aim to economise or boost production in some way. Reduction of accidents, persistence of workload to meet the programme etc:	Client- Nottingham Trent University Project Manager- Edge Property Solutions	 Can choose to have involvement in decision making based on their functional needs and desires. With eyes on the budget and time scale at all times, this role aims to reduce the effect of incorrect or late deliveries or botched work through reconsideration of the schedule.
Statutory Roles Roles which aren't delegated by contract, but by law as a means of improving the construction team moral and relationships on site.	Principal Contractor- Principal Designer- Evans Vettori	 Carry out building works of a particular specialised field, and can be sourced from one or many companies in order to meet programme demand. Lead decision maker in which elements or iterations work within the building scheme, from plan work through to the finer details.
Design Roles Keeping up with design norms. Producing ideas through the form of visual media to industry standard.	Architect- Evans Vettori Civil and Structural Engineer- Mott Macdonald Ltd Electrical Services Engineer- Couch Perry Wilkes Landscape Architect- Evans Vettori Mechanical Services Engineer- Couch Perry Wilkes Quantity Surveyor- Robinson Low Francis	 The designer of the Enterprise Building for Dryden Street, portrayed within their work the desired structure and materiality of the building, as well as layout and interior design. A designer with the extra responsibility of safety, confirmed through calculation of spans, ensuring the structure isn't susceptible to collapse. Installers of electrical components must partake in regular check ups to ensure the retention of the wiring systems within the walls, the safety of sockets and appliances etc: Designs pathways, seating and planting so the exterior is homologous to the building, its materiality and concept. A designer, builder and installer of mechanical components first outlined in the building specifications. Estimator of costings on site, whilst also watching over contractual dilemmas that may arise.

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Site Logistics-

The workers and their facilities sit within an area of little disruption, converting this once large car parking space into the project hub.

Admin and conversations between the council, local residents, potential traders and delivery personal take place in the office, and the canteen is a short distance from the pedestrian entrance, allowing for frequent return trips which I will say were seemingly happening a lot on site and possibly reduced productivity.

The confines of the small offices make it difficult to talk to a large crowd, meaning a muster point out front is used for moral boosting and important notices such as the changing of conditions leading to additional hazards on site. This may be down to the weather. It seems counter intuitive to place the fire assembly point at the Dryden side of the site, as the foot fall of non-construction workers is greater meaning student disturbances would be greater in numbers than on Shakespeare Villas.

- ◆ Sound resistant barrier
- Tower Crane positioning
- Site boundary and protected trees
- Crane loading area
- Turning had for delivery vehicles

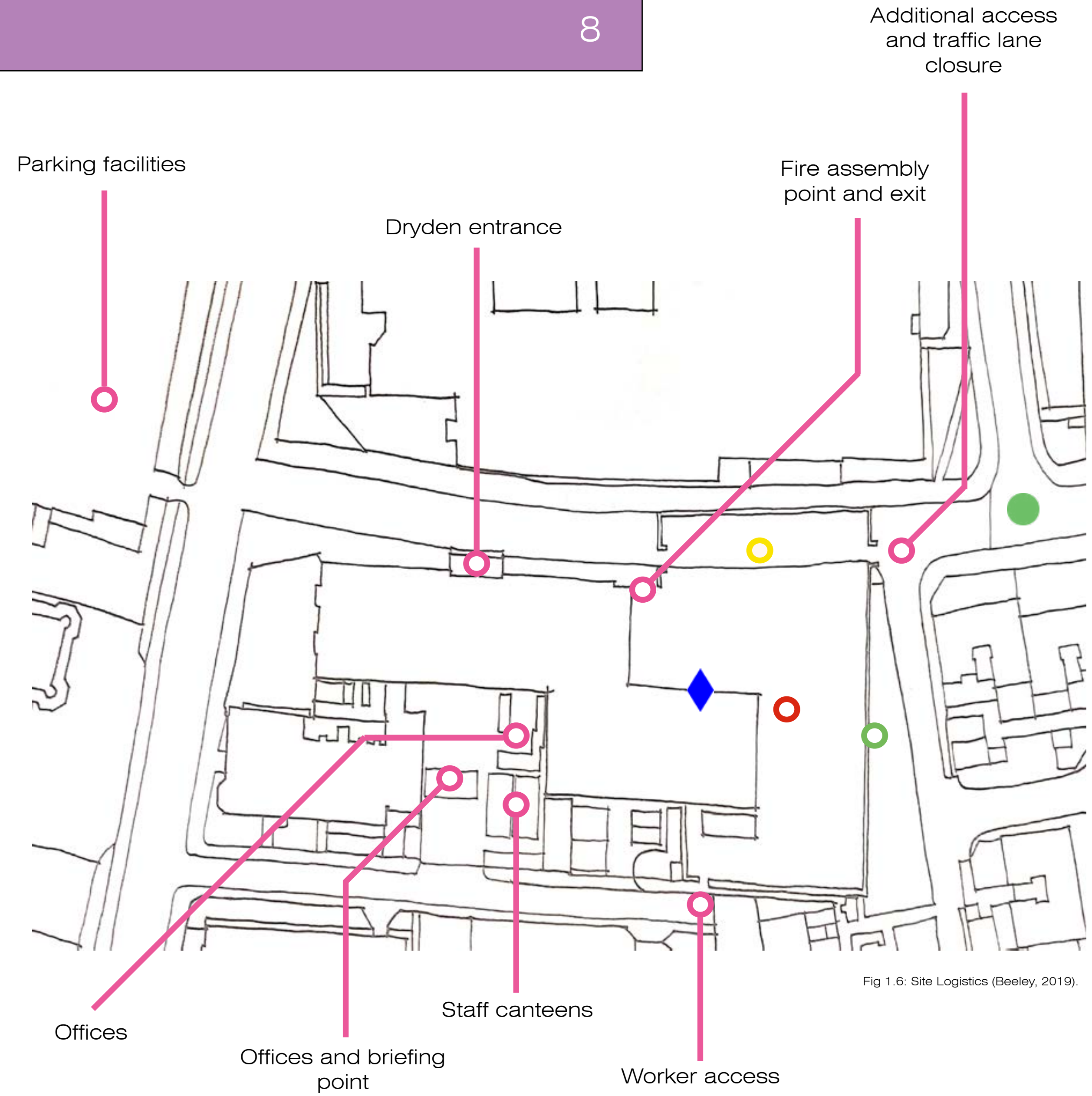


Fig 1.6: Site Logistics (Beeley, 2019).

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Site Materiality-

The existing topography that slopes down toward the side face of Dryden is being reduced and levelled out as a more economic and environmentally considerate solution than building up the hill. Which is logical considering the sloping of Dryden itself.

The kerb channels indicate a position in which the grass verge stops suddenly at perhaps a wall, then dropping to floor level below. This space could have been used a bin storage but instead became an emergency exit path brush against the side of Dryden from the fire escape stairs on the other side. The fire escape in question now being moved to the external wall of Dryden to the centre of the site, the path essentially following the fire-escape route in the new build through the front. Reducing escape time by half.

The site perimeter distinguishes the difference in material on wither side, from natural to man-made, the landscape verge essentially showing the bending moment in which the terrain begins to travel downwards following the hill.

- ◆ Site perimeter
- Short brick walls
- Kerb channel
- Landscape verge

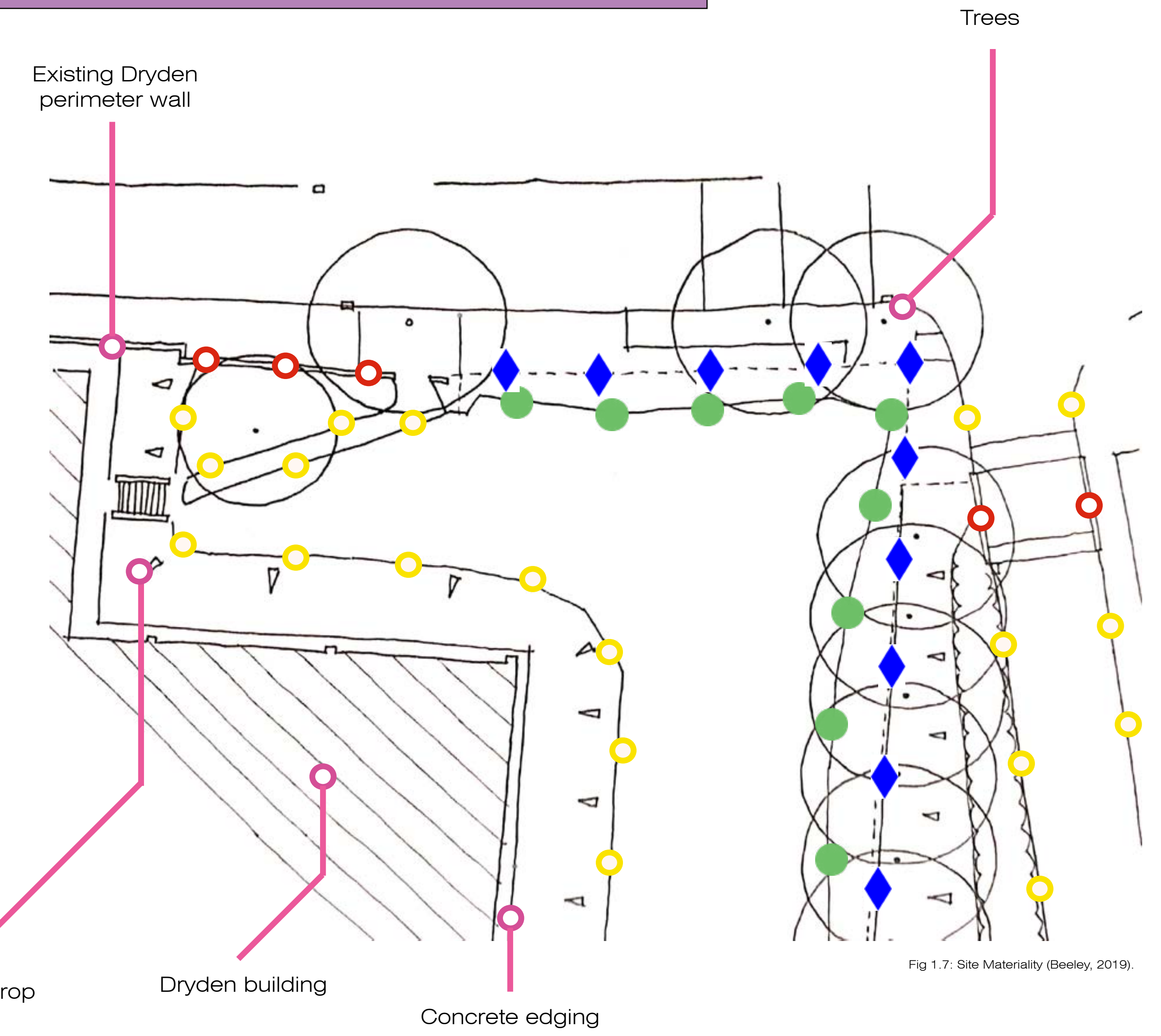


Fig 1.7: Site Materiality (Beeley, 2019).

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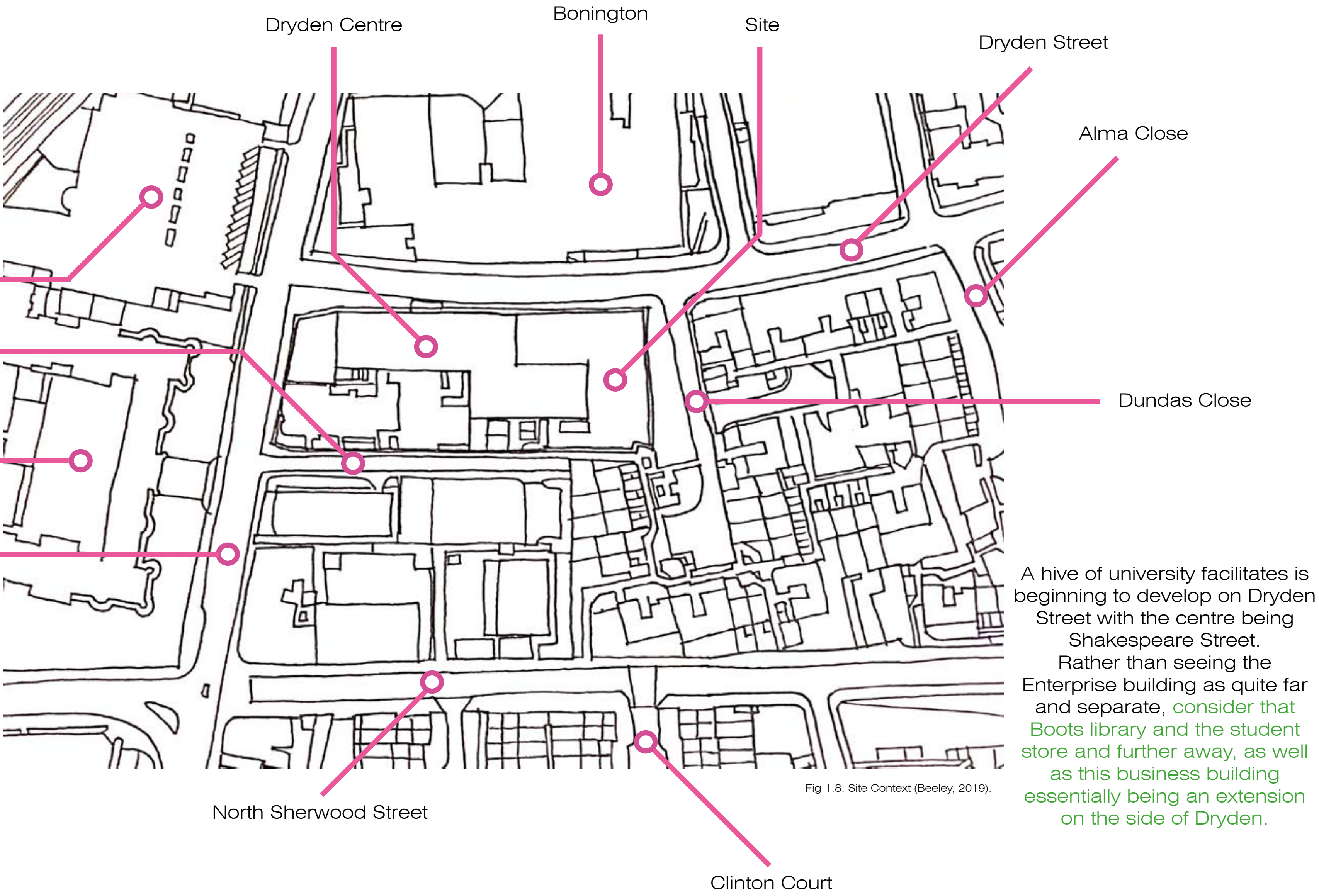
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Wider Context-

Dryden Street is often also associated with student accommodation and other residences, with this road being used plentifully. *Those from Dundas Close know intimate alley routes that save time.*

With such hefty amounts of pedestrian foot traffic travelling to and from the Arkwright building and Maudslay, it cannot be used for transport. Although additional works have begun at the intersection of Dryden on a count of the street beyond Shakespeare Villas being used solely for pedestrian use.



A hive of university facilitates is beginning to develop on Dryden Street with the centre being Shakespeare Street. Rather than seeing the Enterprise building as quite far and separate, *consider that Boots library and the student store and further away, as well as this business building essentially being an extension on the side of Dryden.*

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Section 2- Site Visits

Site Visit 1- October 23th 2019

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Site Visit 1- October 23th 2019

Installation of the other components of the crane occurred once the concrete cast was set roughly two weeks after being poured. It was essential that this was conducted on time as to allow the transportation and raising of heavy objects such as columns or their shuttering. It was done and operational on the day of this visit.

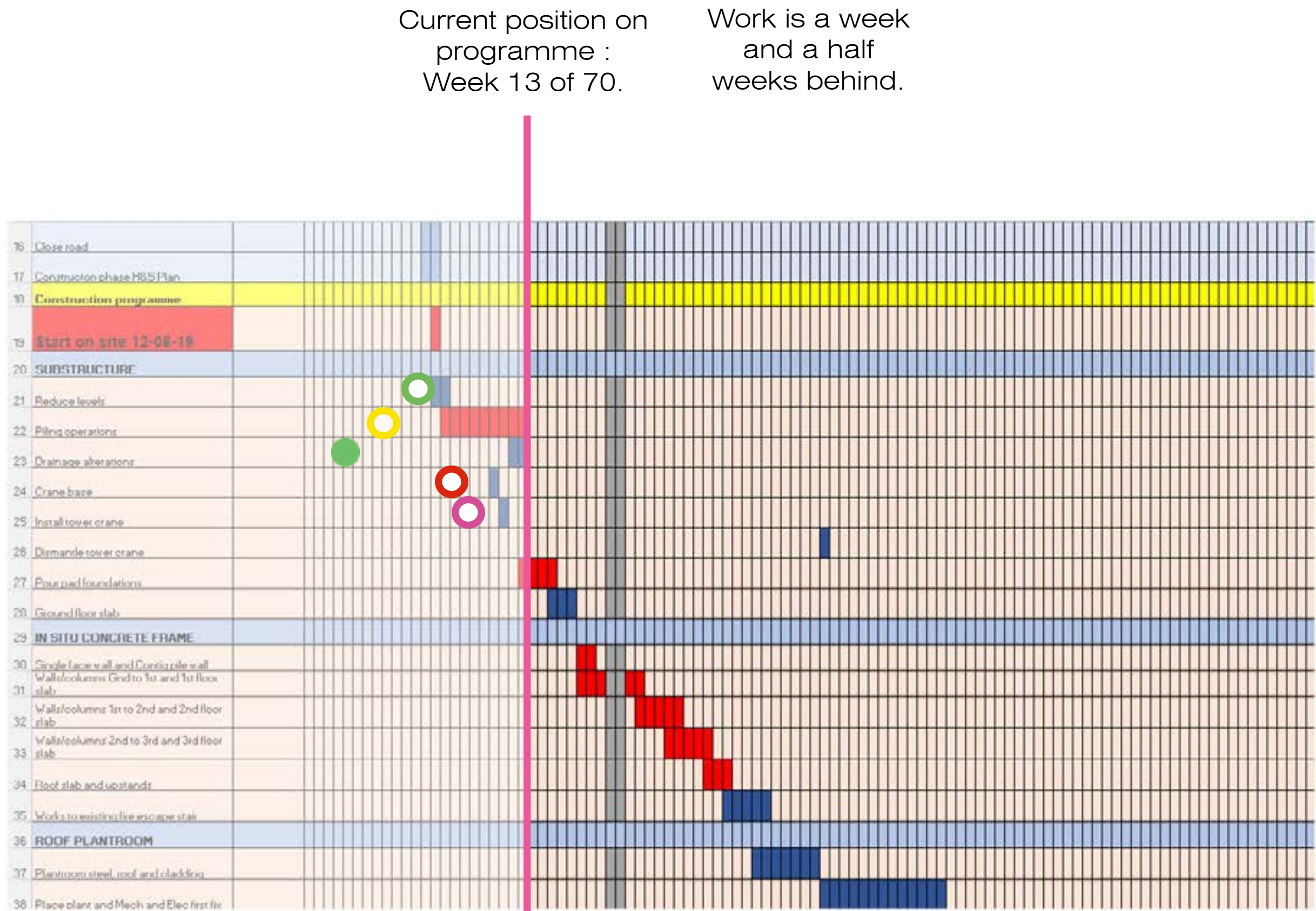


Fig 2.1: Running Programme (Beeley, 2019).

The piling operations were underway but most of the foundations were not yet poured on the back facade of the building facing Dundas close. The piling by the entrance hadn't been started or even excavated, despite coming to the end of that deadline.

Reduction of the levels was done to an extent upon arrival, although progress was hindered by the need to remove the Dryden staircase foundations and asbestos it emitted over the process of the visits to the site. The levels could have been excavated up to the EIC entrance in order to clearly indicate the intended building footprint.

The need to underpin the ground whereby the crane base would be situated was cause for delay, the base still in need of being poured after the first visit. Frame design issues followed in that they had to be strategically poured in order to manoeuvre machinery around site as the density of built structures increased.

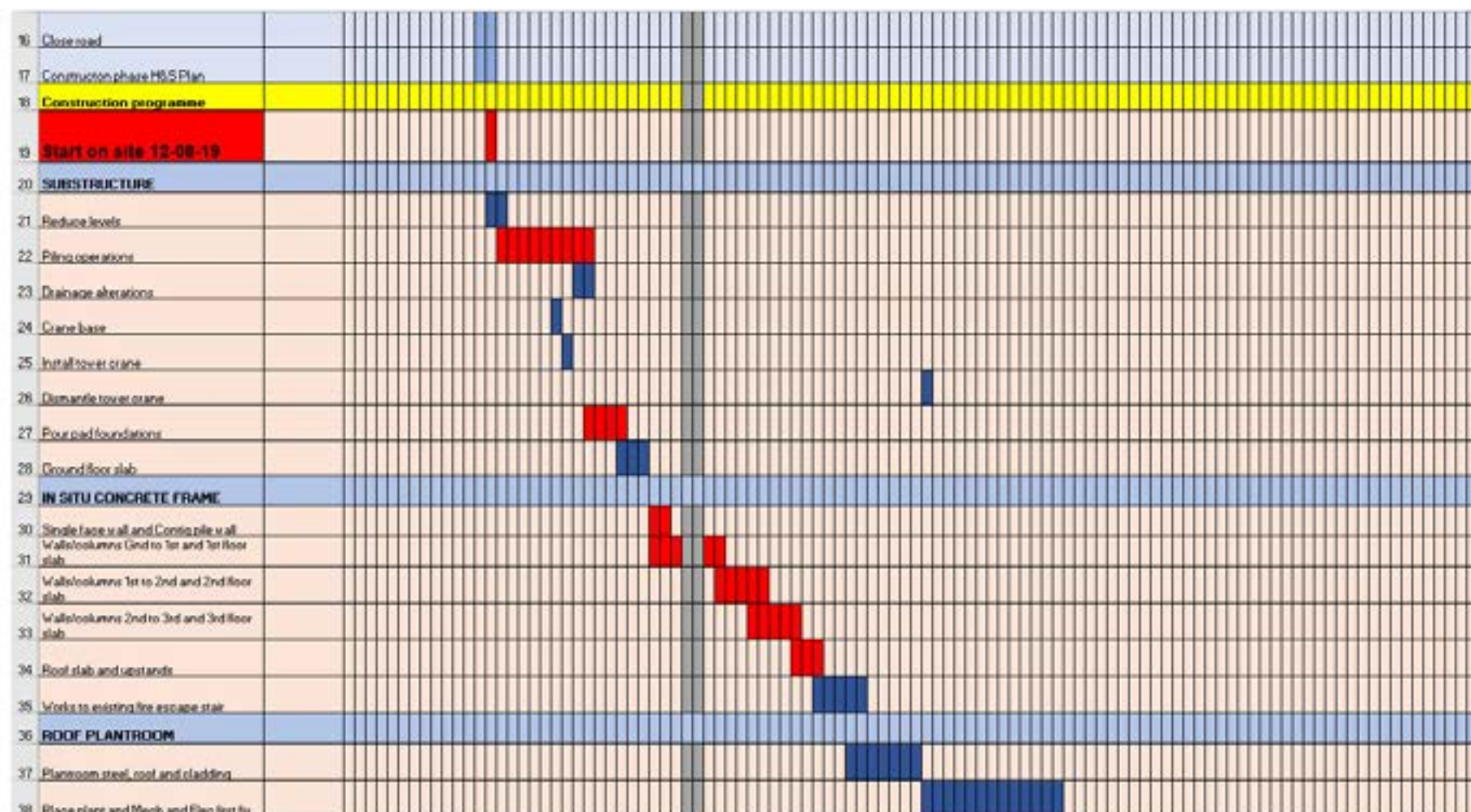
Drainage can be completed in tandem with the ground excavation, yet the surplus piping on site indicated that it wasn't all completed. This piping wasn't discarded in a corner but almost central to the site overhanging the excavated lip.

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Site Visit 1- October 23th 2019

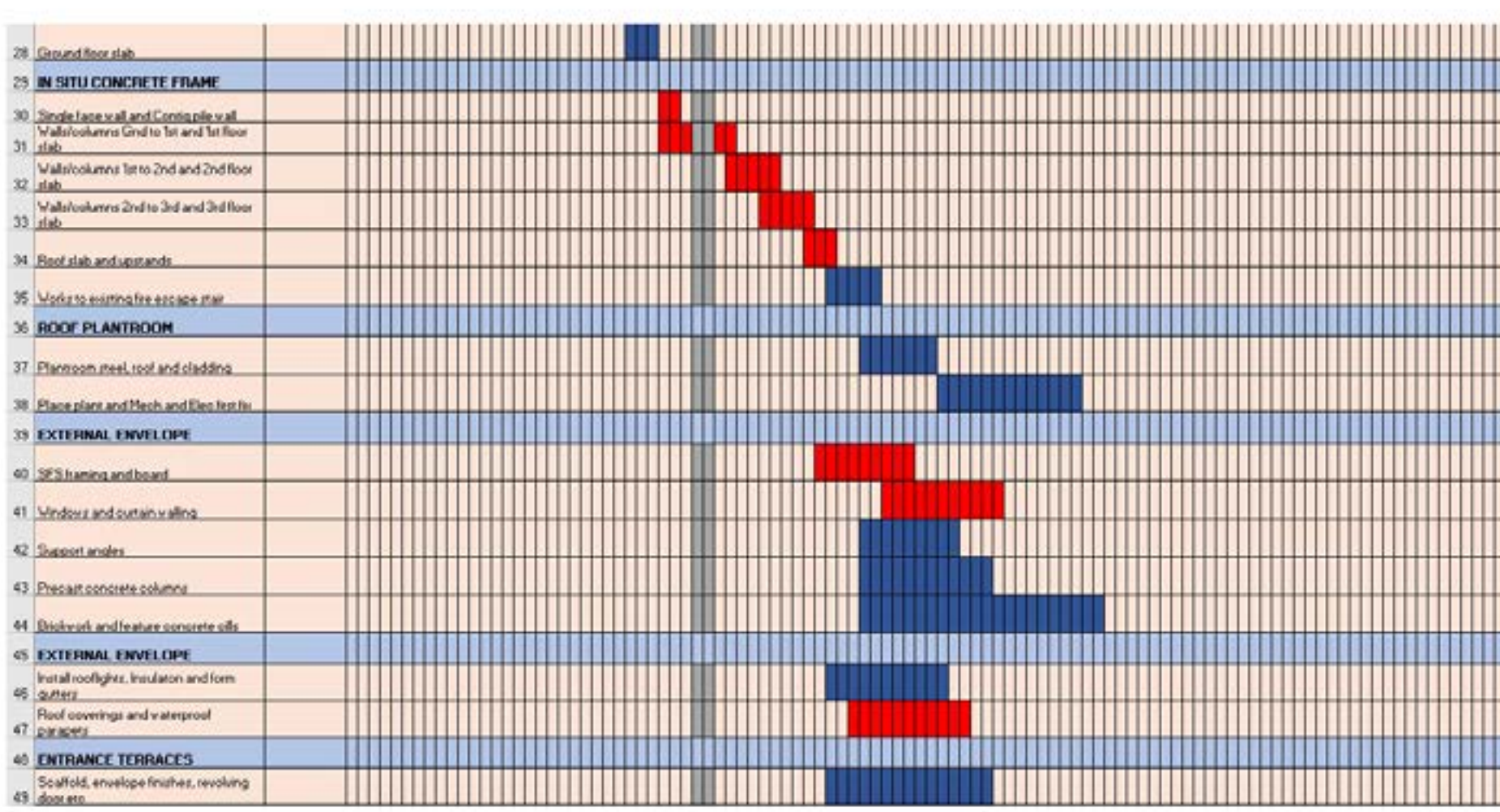


Additional Site Notes-

The 2000sqm² area would be home to lecture theatres for seminars, lectures and symposiums spread over several floors, balconies of seating, a cafe, meeting rooms for more intimate one-to-one discussion or presentation sessions, and offices for large business conglomerates on the fourth and highest floor.

This building was vital in retaining the good name of the university, and could keep up this reputation with efficient design delivered by the completion date of December 2020.

The building would reduce its emissions and carbon footprint through the pouring of in-situ concrete on site to reduce embodied energy in the transportation of pre-cast concrete blocks, and contained no costly air conditioning, but instead thermal massing for the retention and expulsion of heat during the day and night respectively.



By the end of the week on this visit the pad foundations should have been poured when in fact, the ground hasn't even been excavated for their insertion yet. Work cannot begin on the columns until this is done, which is still a couple of months away but the team have no time to waste and the clawing back of this lost time is necessary to meet the impending construction deadline.

Construction Drawings in this Section-

NTUEIC_EVA_00_ZZ_DR_A_0002
NTUEIC_EVA_00_GF_DR_A_0100
EIC-MMD-V1-FN-DR-S-0001
18-02-01



Site Logistics Plan (Vettori)
GA Plan- Ground Floor Plan Draft (Vettori)
GA Foundations (Mott Macdonald)
Topological Survey (ESS)

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Site Visit 1- October 23th 2019

Key:  Standpoint of photograph in relation to site.
 Direction faced.

View Direction:

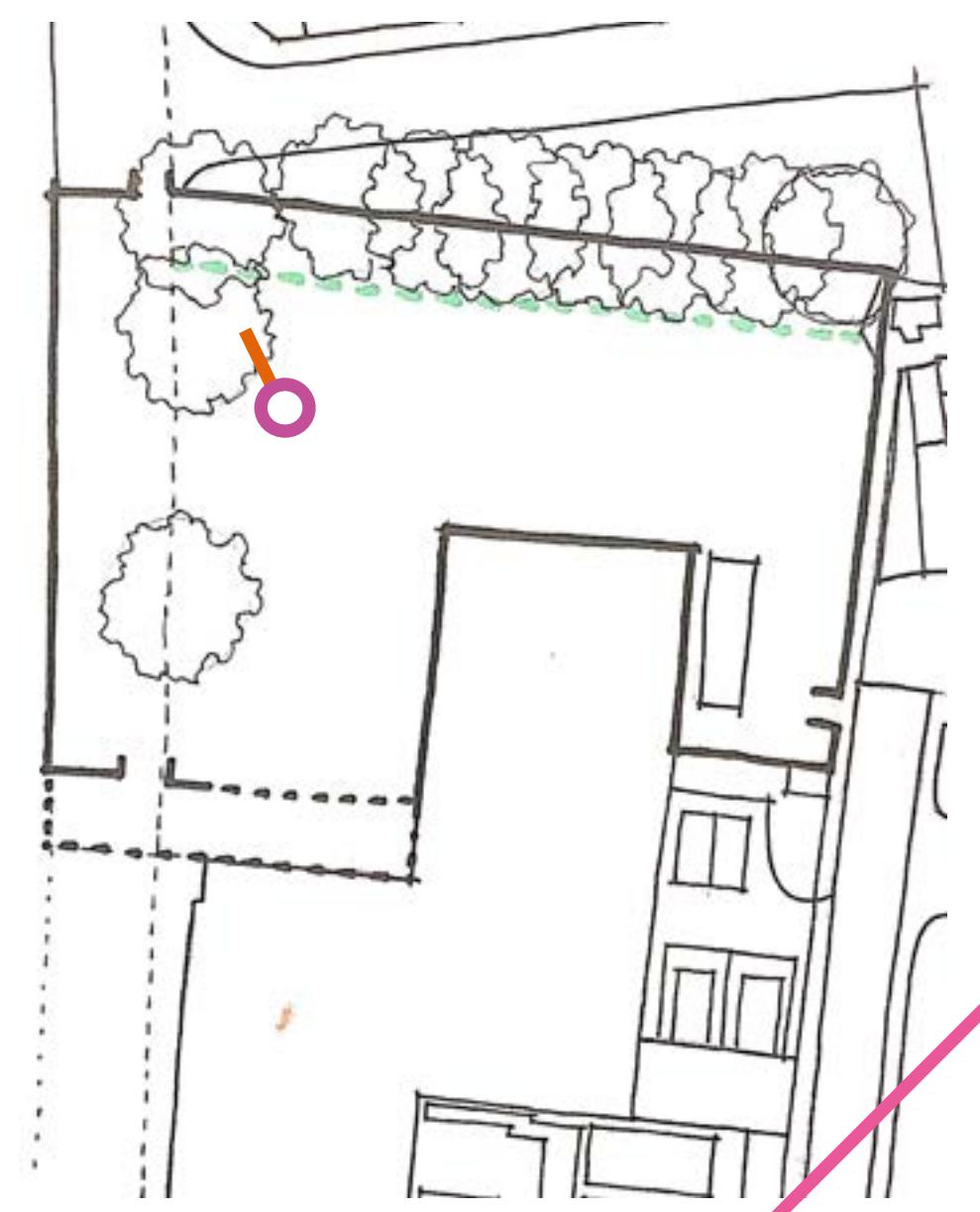


Fig 2.3: View Direction (Beeley, 2019).



Fig 2.4: Foundation and Railing (Beeley, 2019).

The MDF site surround houses spare materials such as concrete reinforcement and timber for the protection of trees.

This reduces the risk of components being knocked down into the pad foundation pit causing injury.

Peckafil surrounds the concrete works. this material is easily pliable off of the surface of the dried concrete, as it is ribbed and bendable like plastic.

Safety precautions met, to avoid workers falling from ground level into the pad foundation pit, which is still being slowly cutaway.

Temperature on site: 3°
Weather Conditions: Overcast/Fair
Workers on site: 9
Site Managers: 1
Site Engineer: 1
Whom watched the proceedings and ensured that constant work-flow was maintained without technical fault.
Labourers/Supervisors: 7
Three of which were moving steel reinforcement components, one was operating a digger, another supervised as he removed existing Dryden foundations, and the last two were doing maintenance on the concrete and its reinforcement to the rear of the building scheme.

Baring in mind however construction in the most part had to come to a halt as we entered and explored the site, meaning jobs had to be altered, postponed or breaks taken.

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Site Visit 1- October 23th 2019

It must be very important to leave adequate room for the accumulation of materials. Deliveries are always arriving late or the shipment itself could be incorrect. Storing items of no use for one wastage haul to decrease internal energy in transport is just one reason. Another may be, and such is true in the case of this project, that the site and elements on it have caused a shift in the running order of the construction schedule. Materials sourced and delivered may not need use until replacement jobs have been carried out. And of course, it is better to know the materials are readily available on site as oppose to them being late when they are needed.

View Direction:

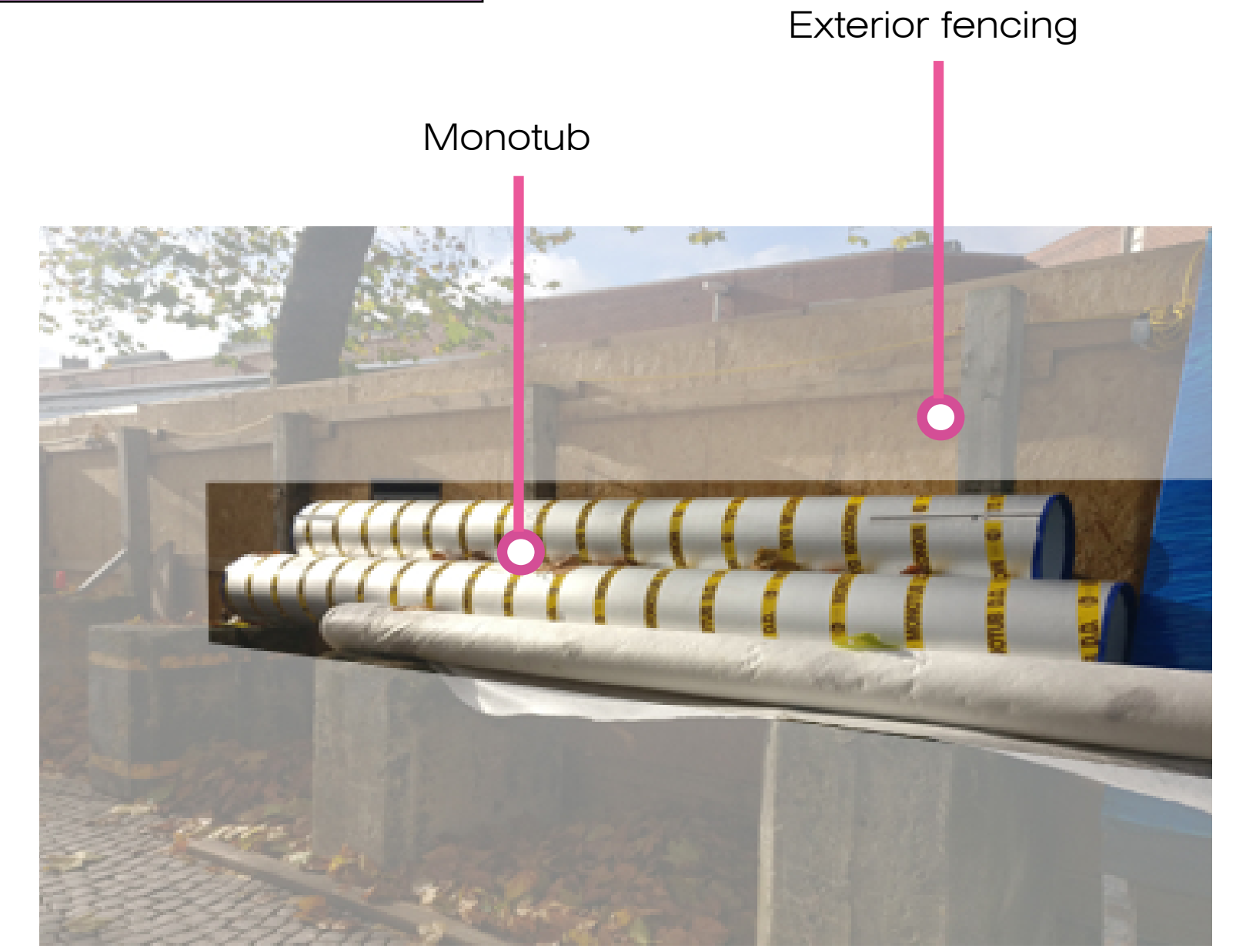


Fig 2.5: Monotub (Beeley, 2019).

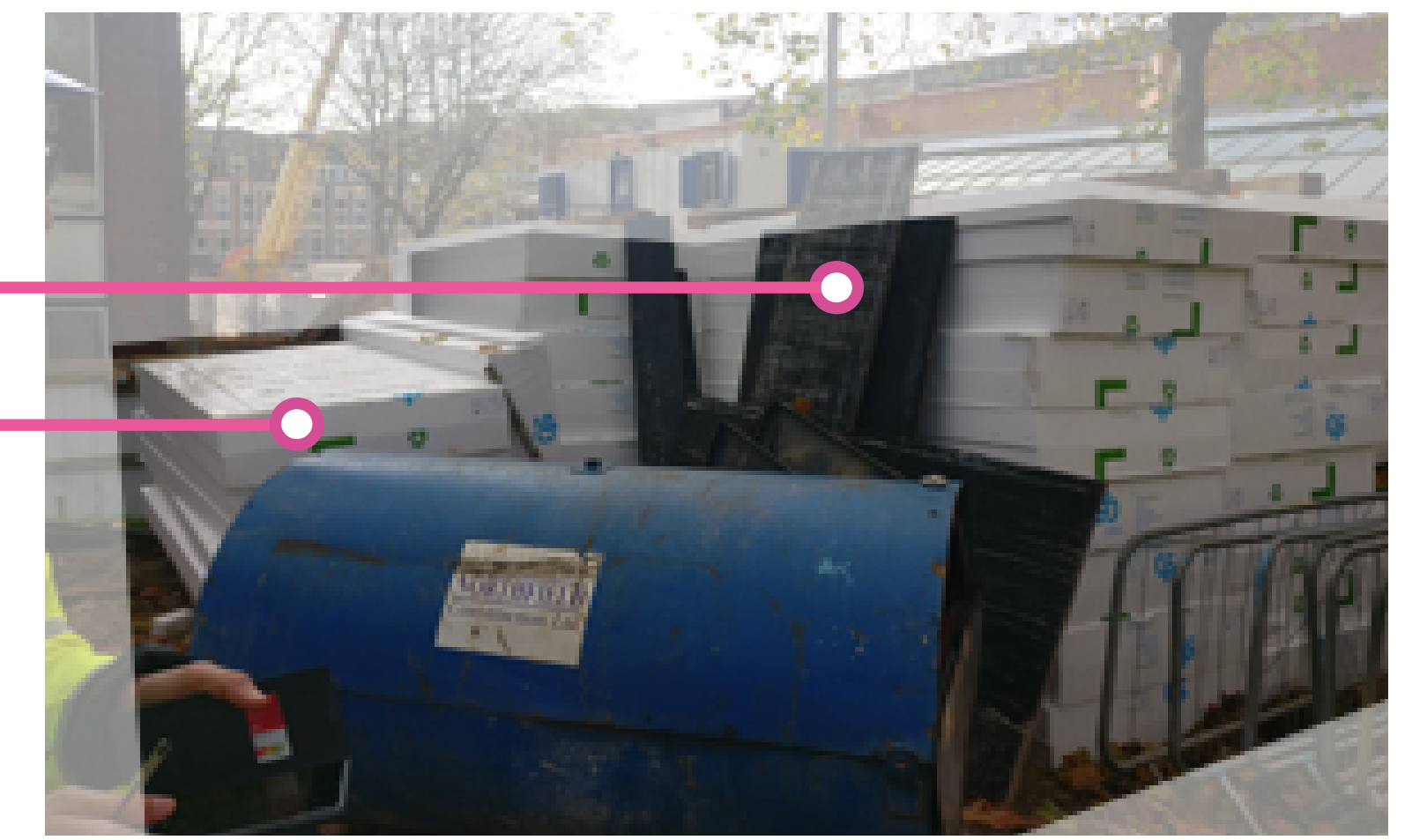


Fig 2.6: Insulation -(Beeley, 2019).

Peckafil

Insulation

Monotub

Exterior fencing

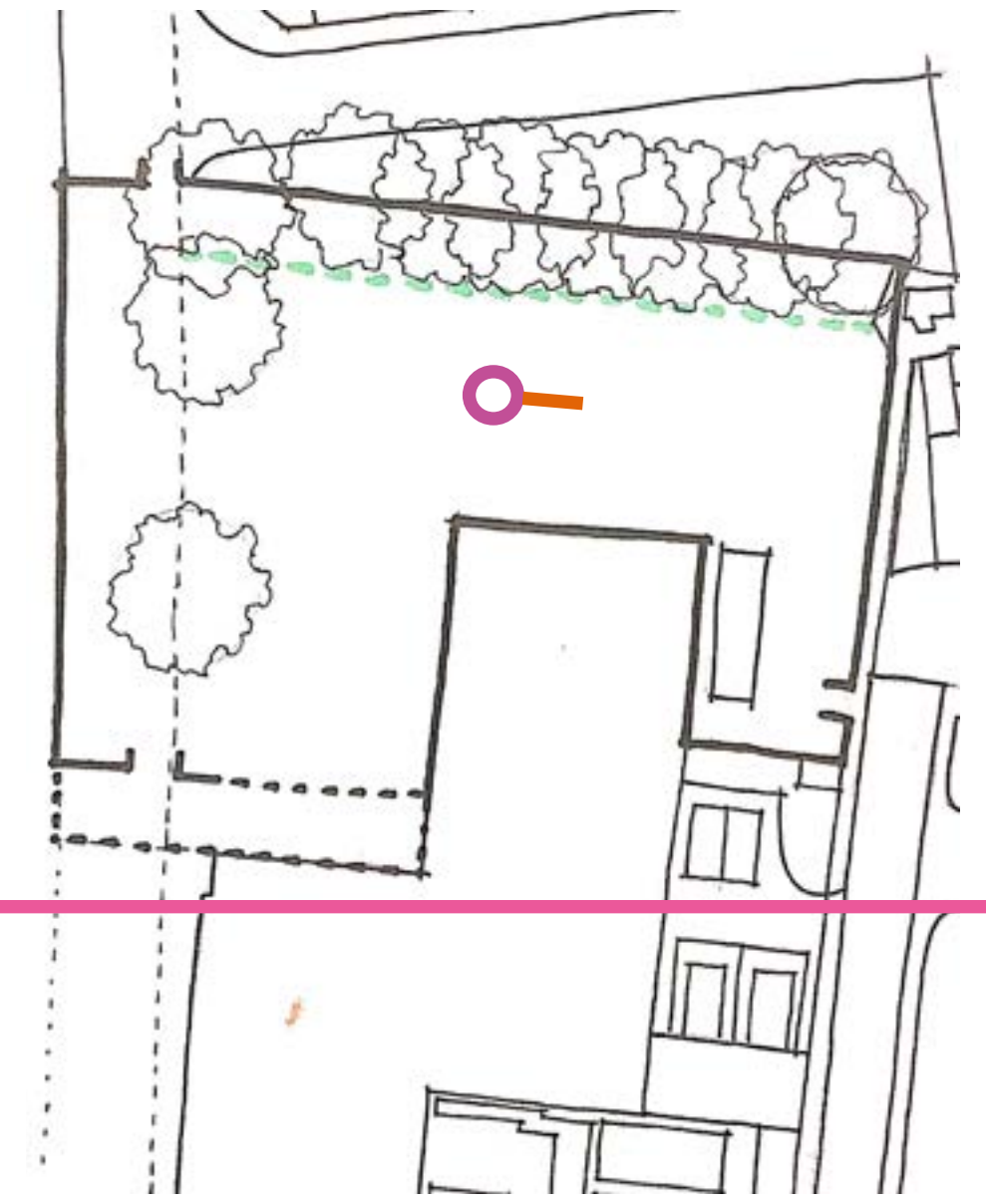
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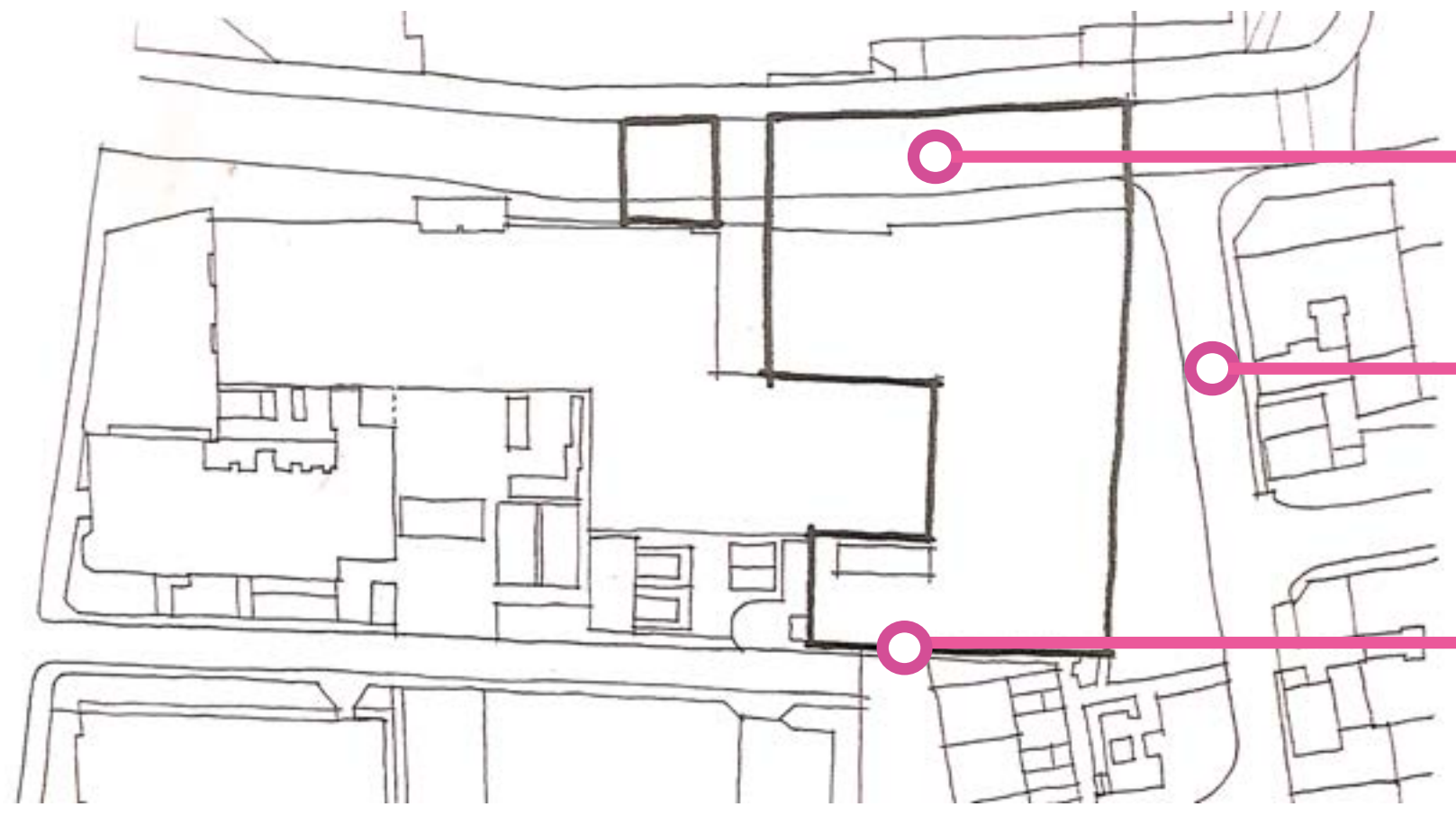
Site Visit 1- October 23th 2019

View Direction:



Seen from both the inside and the outside was continual work in painting the MDF barriers white. Done as a means of enhancing visibility and make the site seem cleaner. However, any dirt and materials that do dirty the surfaces will make the site look clumsy implying the final structural product may be also.

The transportation of machinery and vehicles onto site has to be well considered as the only vantage/ way-point onto the site is via Dryden Street.



Dryden Street

Dundas Close

The gate positioned at the end of Shakespeare Villas is for foot traffic of workers back to the canteens and offices only, convenient for the workers, but not for vehicle manoeuvring.

Fig 2.5: (Beeley, 2019).

Dundas Close

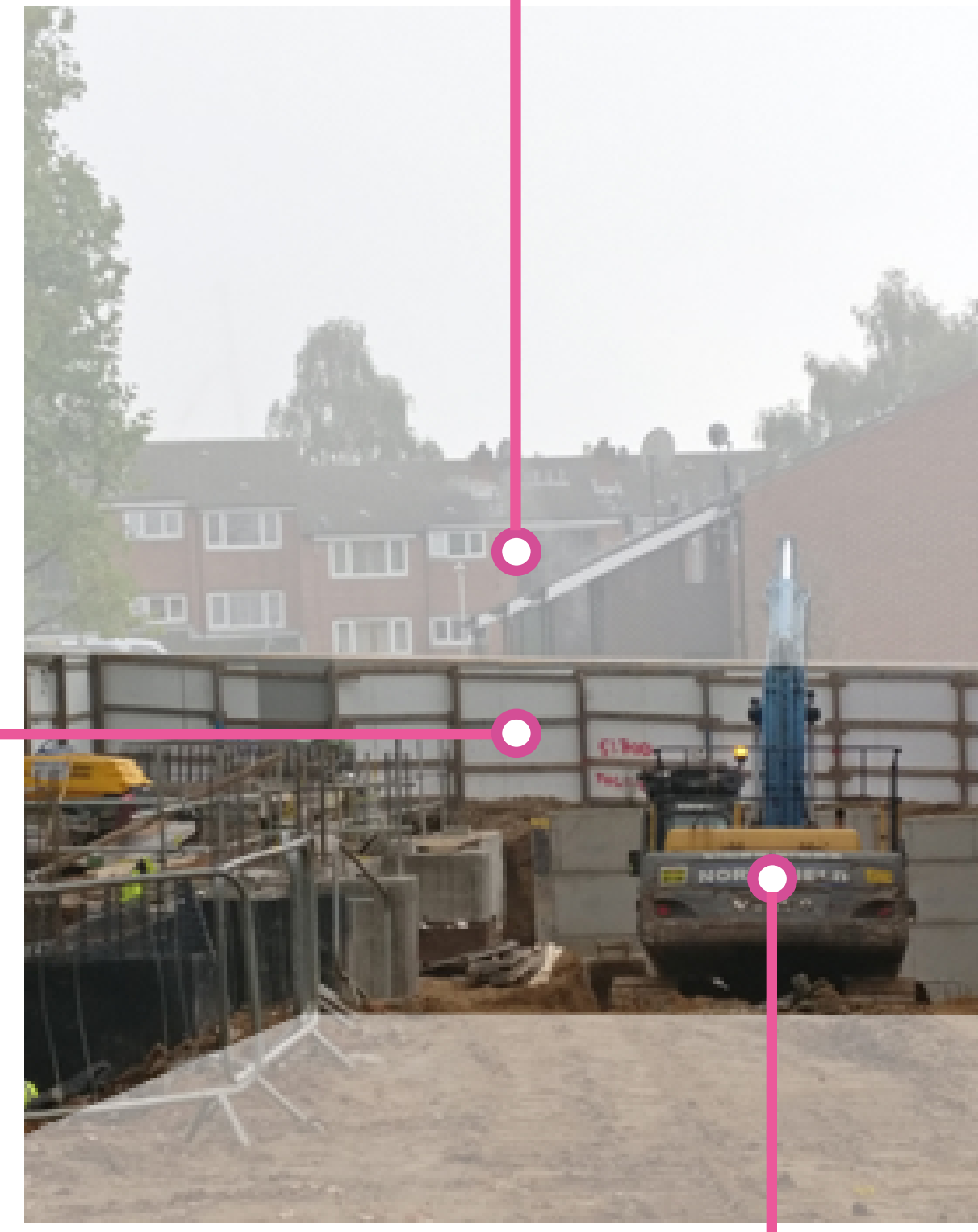


Fig 2.5: (Beeley, 2019).

Small diggers for the removal of topsoil. Easy to manoeuvre in and around site in this early stage whilst the land is flat, as the true ground floor and foundations haven't been excavated for positioning.

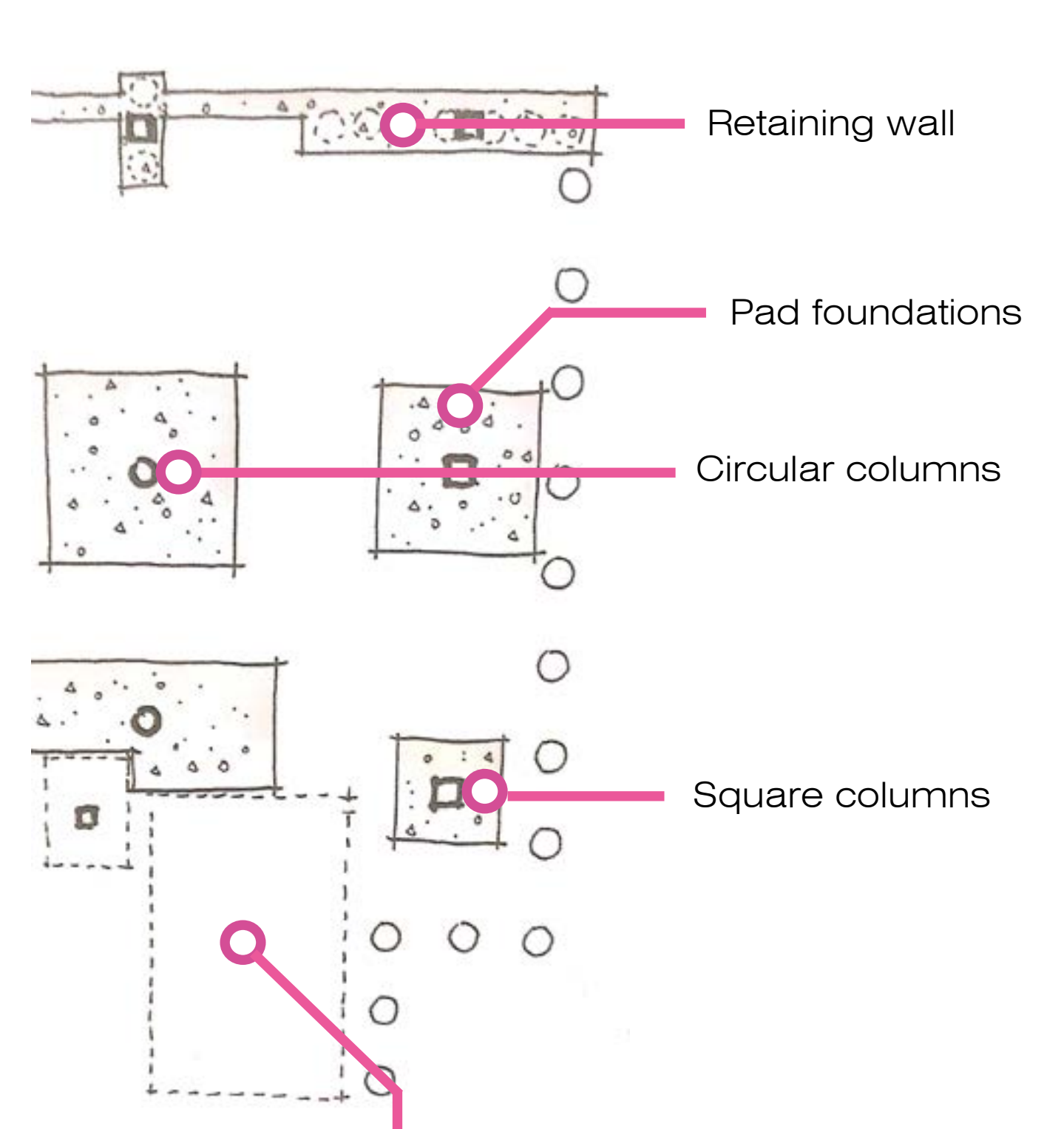
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View Direction:



Retaining wall

Pad foundations

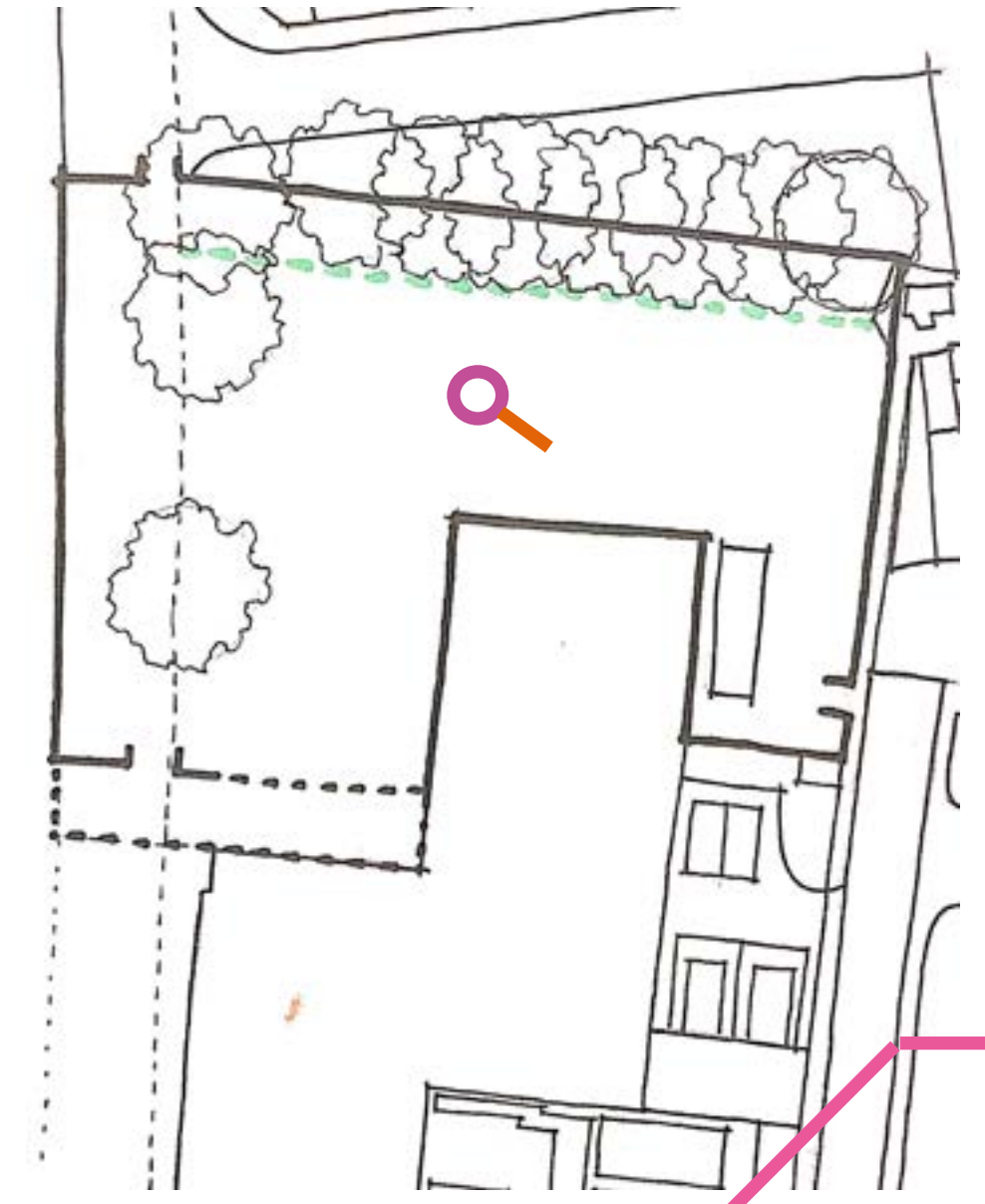
Circular columns

Square columns

Fig 2.5: (Beeley, 2019).

The dashed lines depict the location of the foundation remnants. These of which are being removed to account for the level change. The strength of the material poses a problem under time constraints, I could see the contractors struggle in breaking it up piece by piece.

View Direction:



Existing Dryden Building foundations.

Fig 2.5: (Beeley, 2019).

The changing of component heads to suit the material that needs to be broken or transported. Costs time due to the fact no more that one vehicle can fit in this gully.

Kingpost Wall




Fig 2.5: (Beeley, 2019).

The crane base is to be filled with concrete to support the weight of further elements that will be fastened on-top to extend it's height and capabilities.

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One disadvantage of the site in terms of shape and location is that some jobs are dependent on the completion of others to start. The capabilities of the machines in this confined space are diminished. The project is in danger of falling behind.

Thinner foundations with intermittent contiguous plies.

View Direction:

Bushes with no potentially destructive roots.

Trees with roots that exceed site restraints to the edge of the foundations.

The spatial void between the supporting wall and interior wall could have many functions including ventilation thoroughfare, although I was informed it is simply disused space in the design at ground level.

Block-work, insulation, grey brick and plaster.

Interior wall retained by contiguous pile foundation.

Continuation of work on the reinforcement rods as you approach Dryden Street.

Dried concrete foundations, peckafil removed. Working toward the site and new build entrance, reducing travel distance in the long run. Working in the same manor the excavators can. From one end to the other finishing at their only exit.

Fig 2.7: Ground Floor Foundations (Beeley, 2019).

Fig 2.8: Contiguous Piles (Beeley, 2019).

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Site Visit 1- October 23th 2019

Section line

View Direction:

Concrete

Horizontal rods

Fig 2.9: Rebar in Concrete Beam (Beeley, 2019).

The size of these meshes would imply that they are for significant concrete elements, such as the large pad foundations, lift core or crane. The quality of the material is seen through its silver colour, and its sheer scale through the workers in frame. They are also much more regular in shape, with one sitting inside the other to retain space. This implies that measurements and precision are key for their use. Meaning construction completion is on the line when it comes to installation and accuracy.

Vertical rods are bent around the horizontal using a blunt tool such as a hammer as oppose to welding. Both of which cause a lot of noise, but the advantage of more traditional tools being it removed the need for electrical outlets, and removes that field of risk.

Reinforcement cages

Workers on site move construction elements to save economy and time over vehicular collection. The regular nature of the cages implies these were delivered by a chosen sub-tractor, pre-made in a specialist warehouse.

Fig 2.10: Reinforcement Mesh (Beeley, 2019).

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The combination between a horizontal and vertical reinforcement structure means that forces of compression and tension on both access will be counteracted. Any diagonal forces exude, will be conserved by the equivalent x and y component of the force.

Concrete

Primary binding

Secondary binding

Fig 2.11: Reinforcement Corner (Beeley, 2019).

Extra attention and reinforcement for the vertical columns, as the main force at play will be that of gravity exerted downwards, strength in the vertical is essential. The layers of iron rods locks into position to prevent them from expanding outward and away from each-other decomposing the structural integrity.

View Direction:

Column reinforcement

Stony earth provided excellent drainage, allowing for work to continue throughout the winter months.

The protrusion of the rods close to the embankment of the topsoil and pavement is quite dangerous.

At some stage these will be bent around the interior mesh using hand tools and blunt force.

Reinforcement mesh

Peckafil

Fig 2.12: Peckafil (Beeley, 2019).

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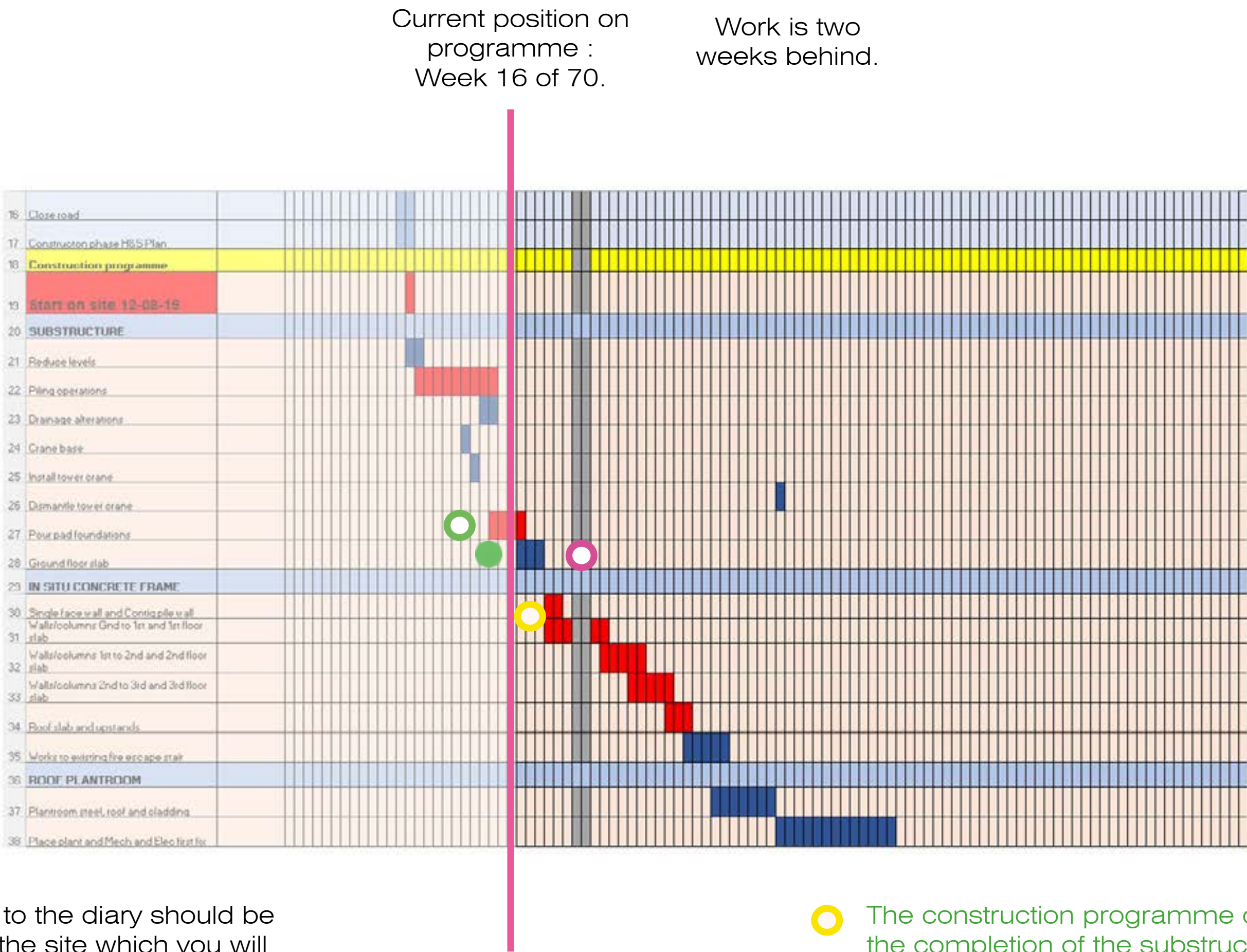
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It is no surprise the pad foundations are not complete. In fact minimal change has actually occurred on site that is visible above the ground. The addition of piling at the base of the curved facade, currently topped with a steel reinforcement cage is one of the only changes visible. Not including the beginnings of some formwork in the from of docker shuttering and monotub.

The ground floor slab according to the diary should be just starting. On the evidence of the site which you will later see in my analysis pages, it is not, although the plans implore several individual slabs that surround each on site column. Questions are then raised as to the reason and logic behind the construction of pillars before the pad foundation excavation.



Holiday leave is essential for these workers whom work long shifts under the constant pressure of the impending deadline, and are also physically drained through hard labour. This two week period however a time in which nobody is on site, could fall victim to anti-social behaviour graffiti or trespassing as many empty construction sites do. In the likely event of this a security spec will be implemented to ensure there are neither thefts nor damages done to the property.

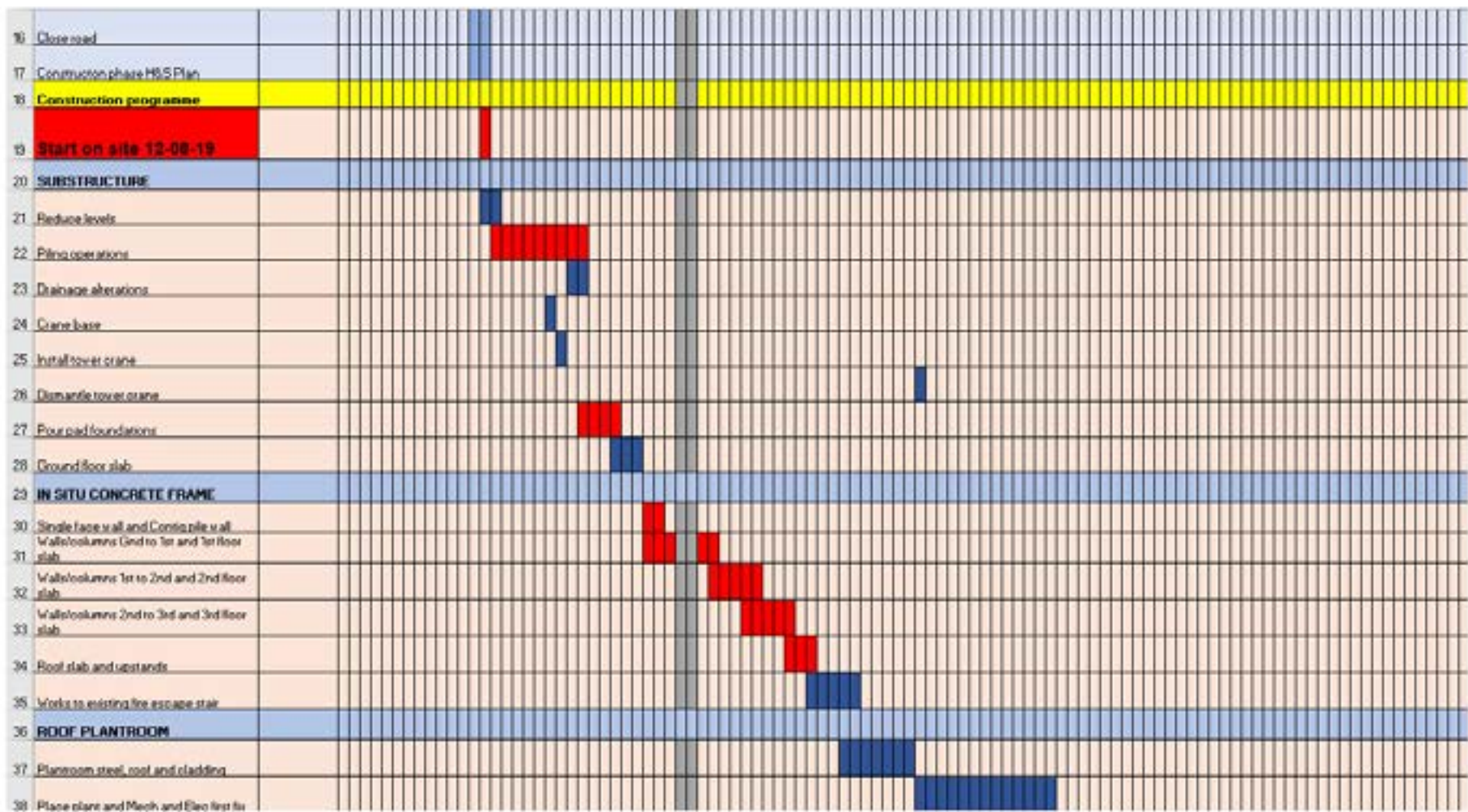
The construction programme catered to the fact that the completion of the substructure; the pouring of the foundations, could be done whilst columns were being added to potentially finished bases. If all of them were poured on the same day this information is pointless, but at least the steel fixers could insert the rebar to at least encourage the process to continue.

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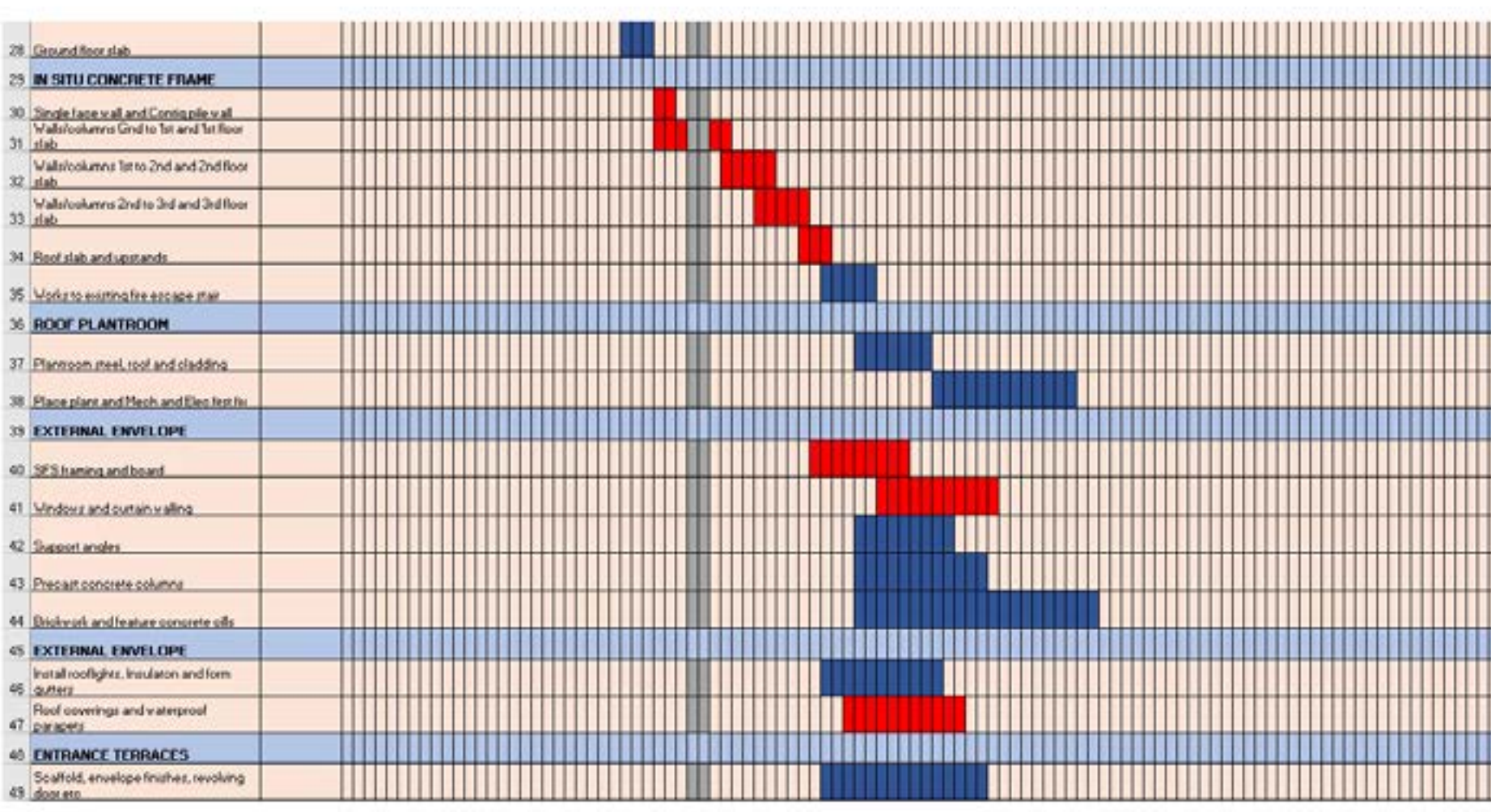
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Site Visit 2- November 13th 2019



Additional Site Notes-

The crane base in the corner is finished and can now begin to lift and transport loads and constructions made for higher positions to be raised up, despite the work on it being ongoing. A poured concrete base which was originally a hole on the first visit houses the crane base bolts keeping it rigid and upright. The continual work on the conti-wall and columns on Dundas Close are strengthened by the compaction of earth against it. This is in preparation for the pouring of the concrete wall base that sits within, which shall later house blockwork and insulation on top. Budgeting issues came as a blessing in disguise as piles underneath some of the steel reinforcement were unable to be carried out, probably due to the cost of the specialised digger transportation and rental. This meant the task in essence could be completed early, through simpler means of concrete pouring buying some time. Other costs could be reduced through additional mass concrete pouring to create a thicker ground slab without the need of artificial insulation.



The site manager and other roles of authority on site admitted that they were two weeks behind and finding it difficult to substitute jobs for ones that require previous over-run tasks to be finished in order to start, due to the relatively early and crucial stage of the build they are in. Their aims were to finish the floor slab and all non-intrusive columns to first floor height.

Construction Drawings in this Section-

NTUEIC_EVA_00_ZZ_DR_A_0002
8388-T-01
EIC-MMD-V1-GR-DR-S-0013

EIC-MMD-V1-GR-DR-S-0013

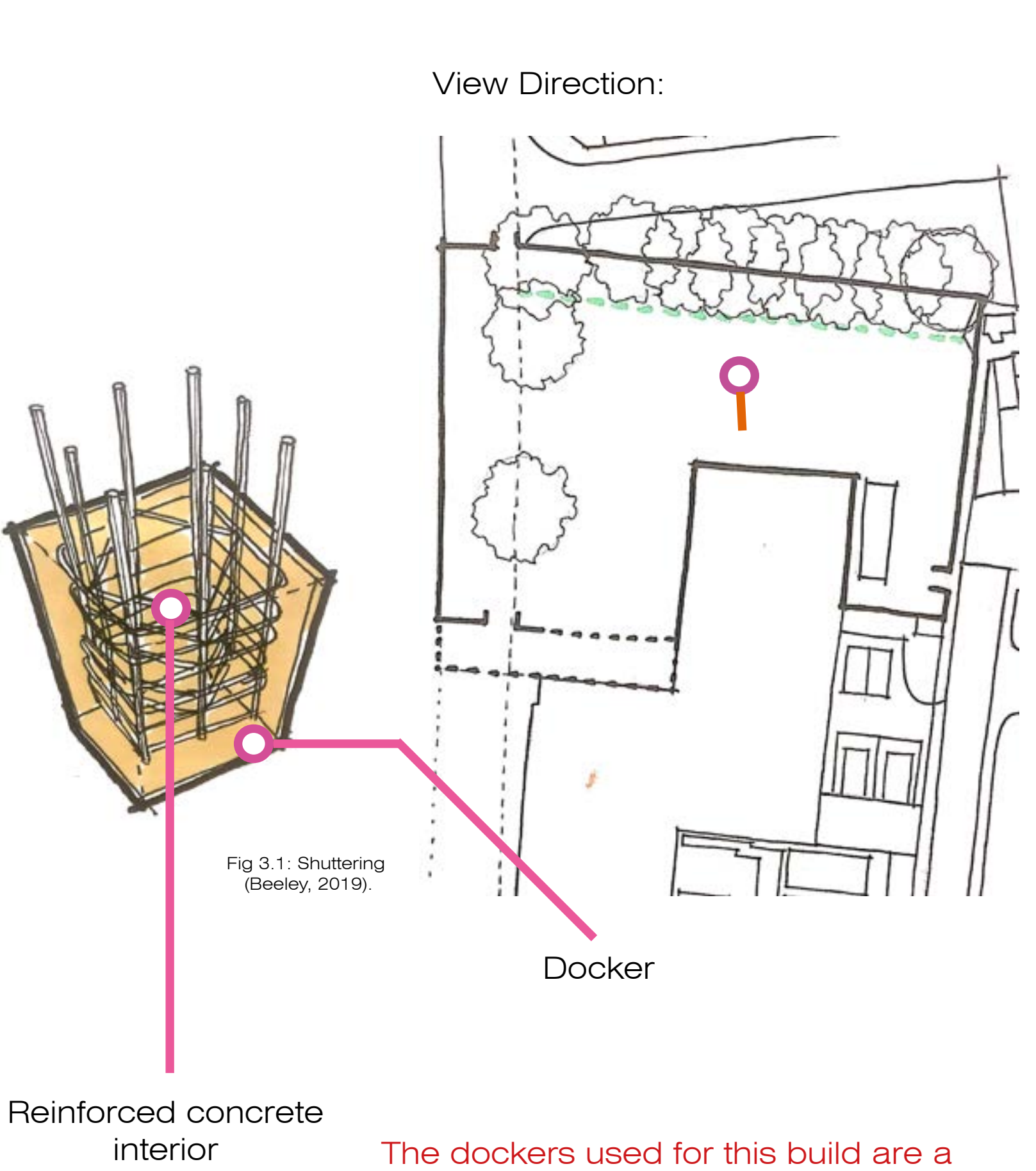
Site Logistics Plan (Vettori)
Tree Survey Plan (FCPR)
Section A0- Ground Floor Details (Mott Macdonald)
Section D0- Ground Floor Details (Mott Macdonald)

Site Visit 2- November 13th 2019

Temperature on site: 6°
Weather Conditions: Fair/Bright
Workers on site: 11
Foreman: 1
Site Engineers: 2
Whom watched the proceedings and ensured that constant work-flow was maintained without technical fault.

Labourers/Supervisors: 8
Three of which were joiners, three steel fixers and two digger drivers inter-dispersed and doing different jobs to counteract the fact the team were behind schedule.

This as I discussed, led to conflicts of interest in terms of which jobs should take priority in the absence of ability to perform the job intended on time sheet.

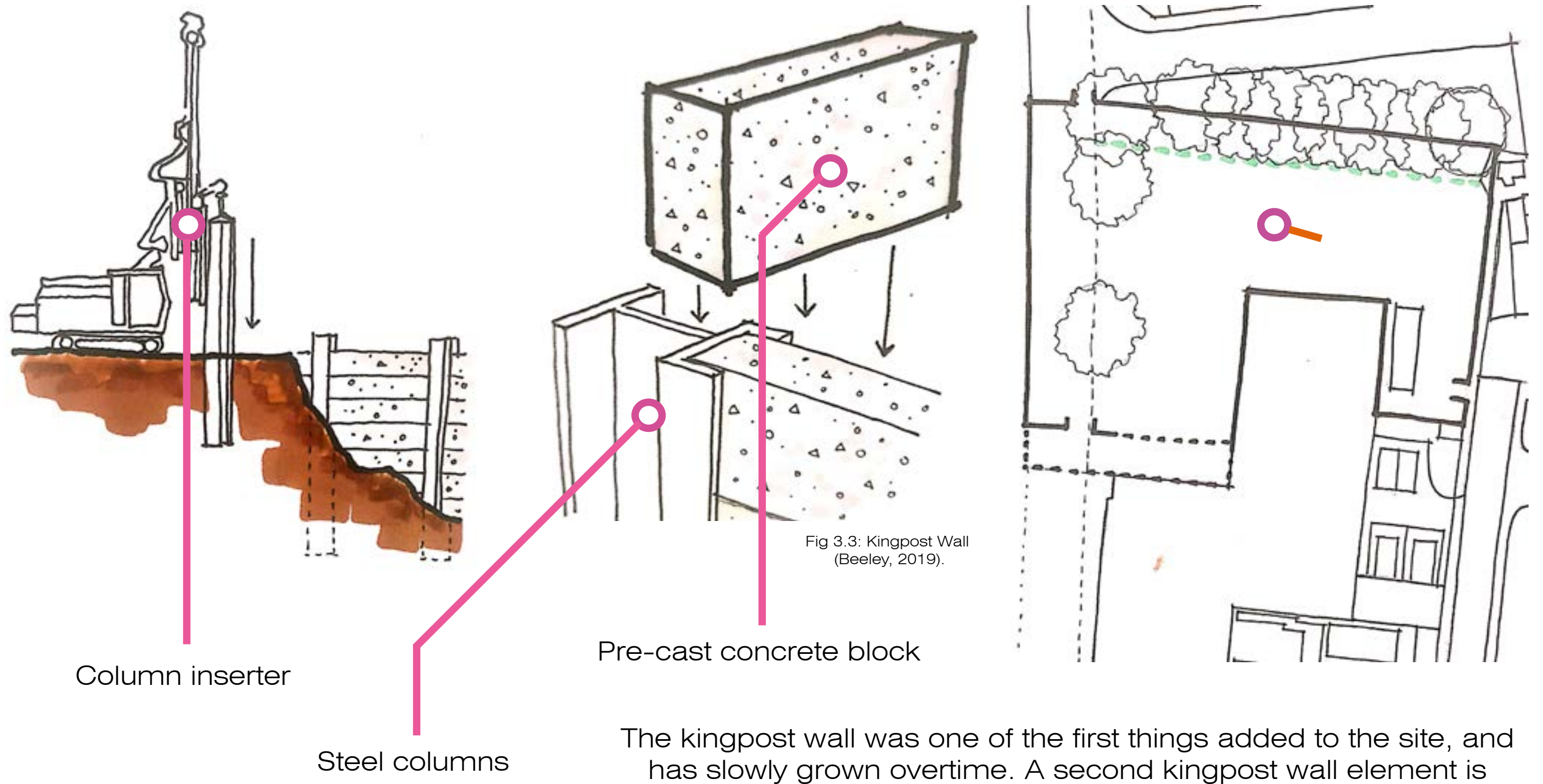


The dockers used for this build are a lot more strenuous in their erection and dismantlement than monotubes, which are made of insulation-like spongy material that can be cutaway. Whereas the docker requires the unscrewing of bolts and other attachments limiting time.



Column dockers retain the structural integrity of the column inside, acting like a mould which is bolted together until the concrete has solidified.

Site Visit 2- November 13th 2019



The volume of each of the blocks is smaller, meaning the drying time of these pre-cast blocks is significantly lower than when pouring large pad foundations and columns on site. All things considered however, it's still to some extent a lottery as to whether the tradesmen you pick are good enough.

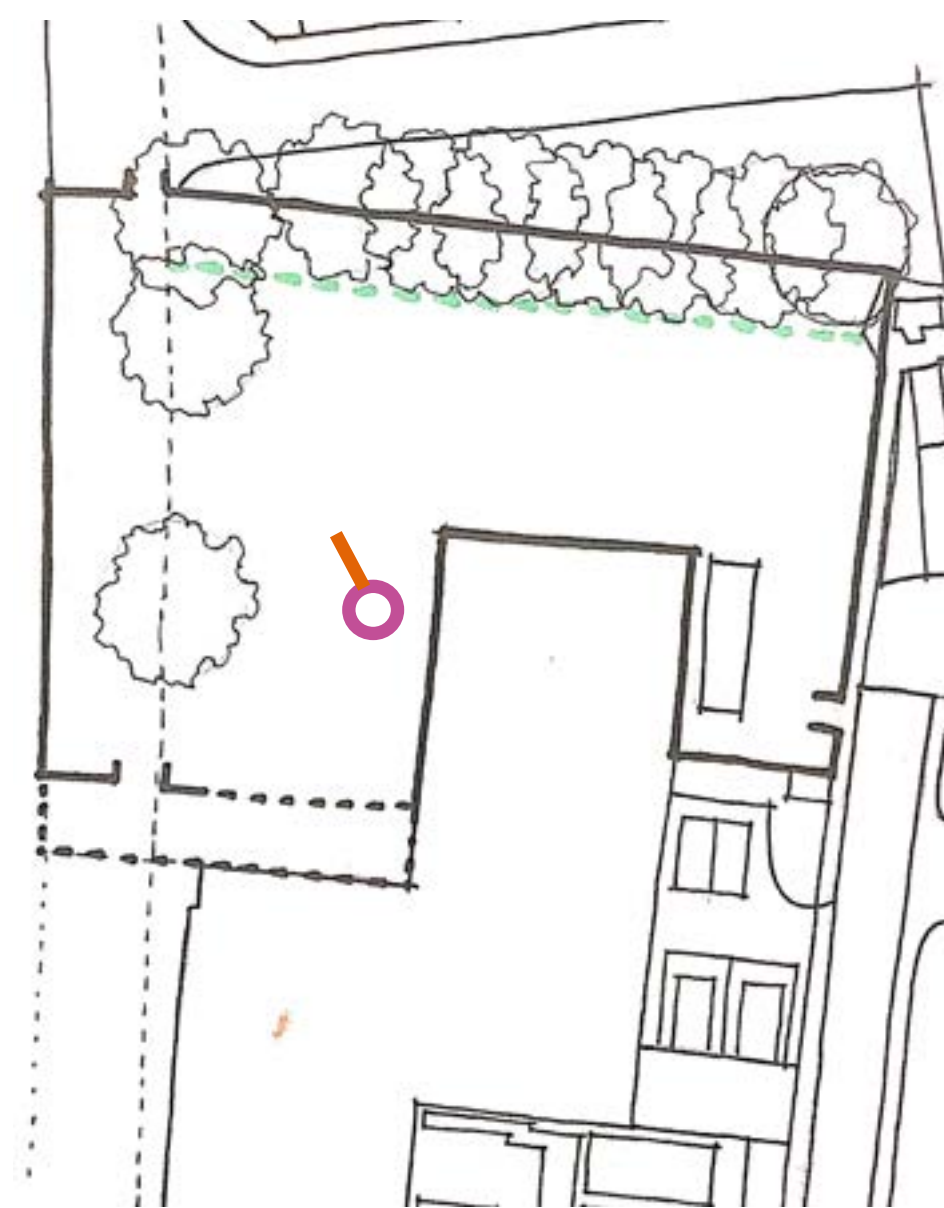
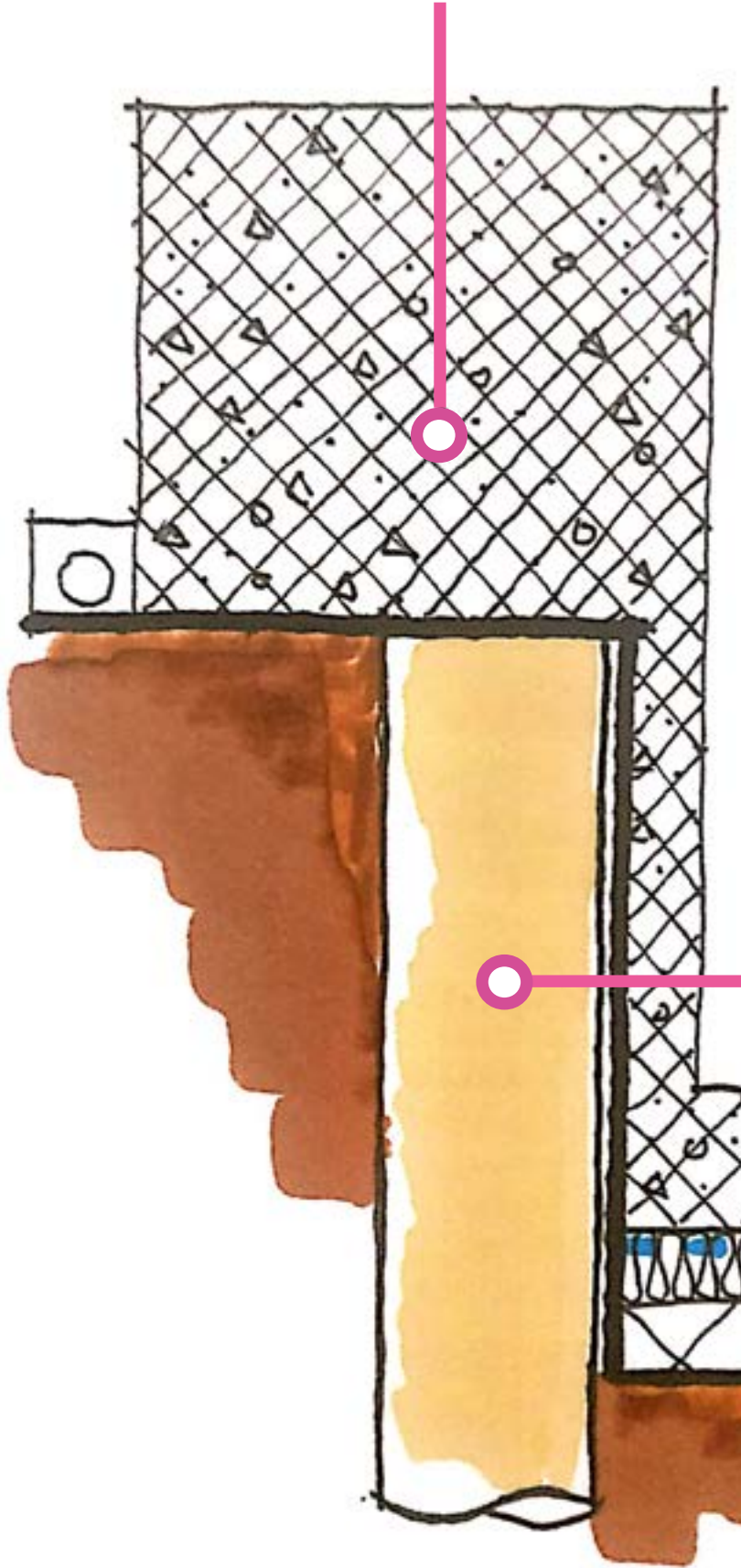
The kingpost wall was one of the first things added to the site, and has slowly grown overtime. A second kingpost wall element is being positioned by this new business centre entrance. One of the only reasons it is possible to create this form of structure is because of the loose soil. And the concrete blocks that feature within and slide down the channels in the steel are the only concrete elements not poured in-situ/on site. This is because the steels, the concrete blocks and machinery used to bring these components together are owned by a company recruited for this work, whom operate by strict dimensions in their product. Through good quality research into various services and their feedback you can almost guarantee the delivery will be on time, and the insertion, quick too.



Site Visit 2- November 13th 2019

Concrete waterproofing. Necessary due to the lie of the building with the context of the topography, the majority of which can luckily drain to a water table 16m below the ground. Flooding due to soil type is rare.

View Direction:



The shape and size and materiality of the pile is a trademark of the contractor and the machine they use to excavate its housing.

Land drain

Hydrophilic (water permeable) membrane to allow for the flow of water out of the building through the land drains. Exceeding the capacity of these draining systems would cause flooding and increased amounts of pressure on the concrete above which may result in it cracking.

Fig 3.5: Pile Section (Beeley, 2019).



Fig 3.6: Curved Foundation (Beeley, 2019).

The diggers are beginning to struggle in traversal, having to navigate around the reinforced concrete in order to return to the road.

Reinforcement mesh

Site Visit 2- November 13th 2019

The largest site threat is this line of trees by the rear of the building. The extent/spread of their roots are dashed in red. The space between the building interior and pile foundations on this side also seemingly acting as secondary defence in the case the roots spread further.

View Direction:

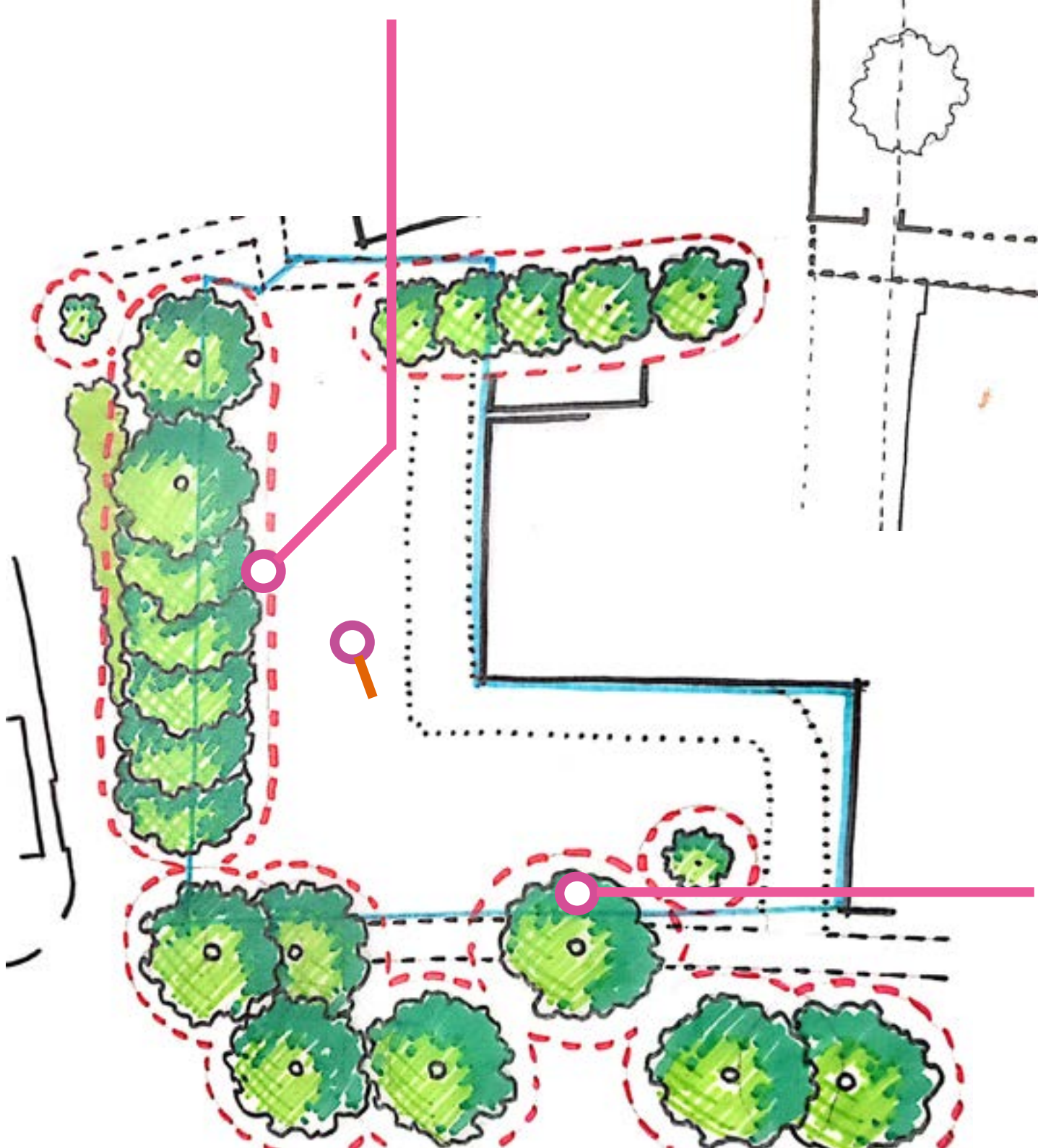
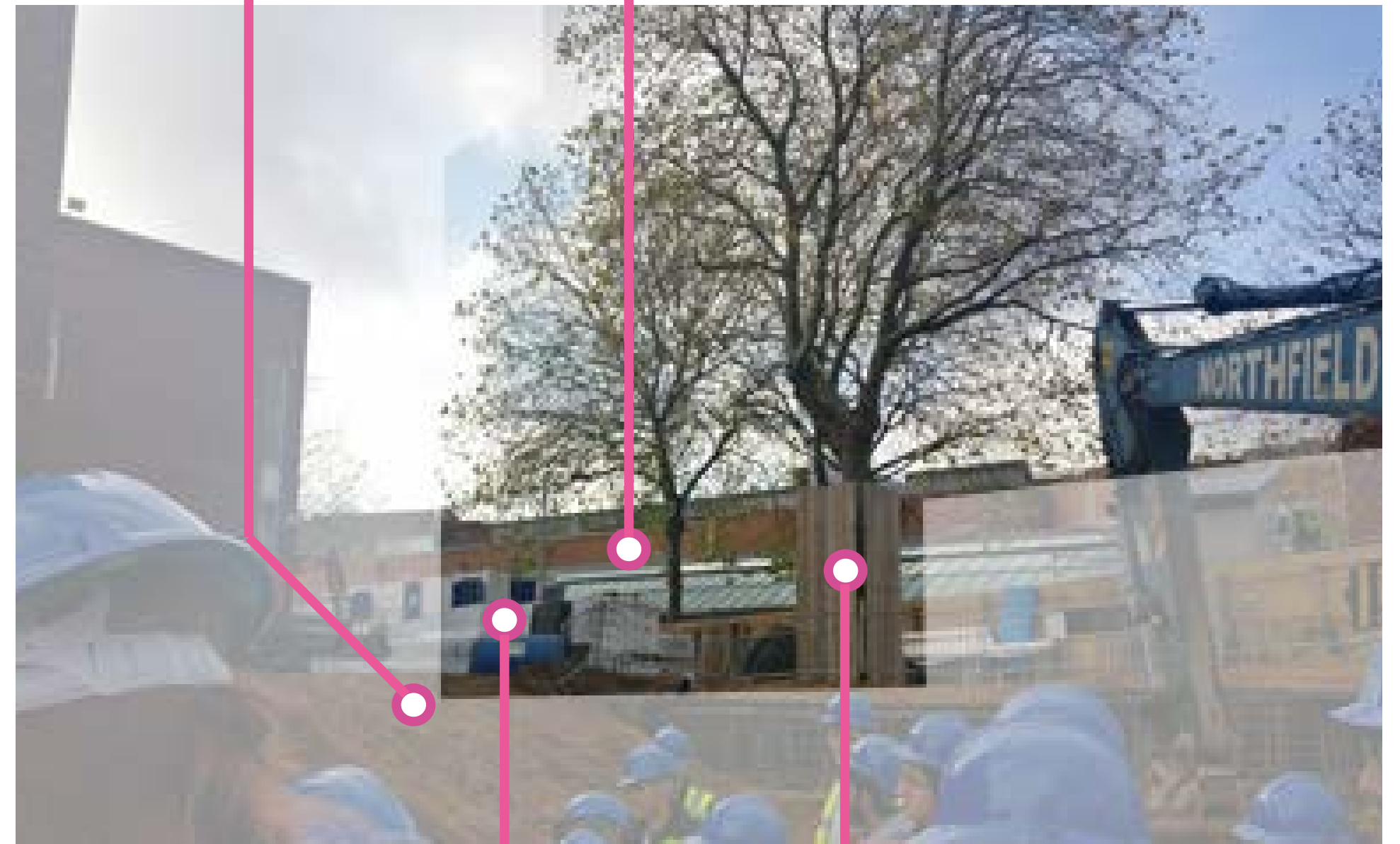


Fig 3.7: Root Radii (Beeley, 2019).

This tree line is surrounded by a kingpost wall located outside of the building, the tree accenting this exterior space.

Level change

Bonington Shops and Cafe

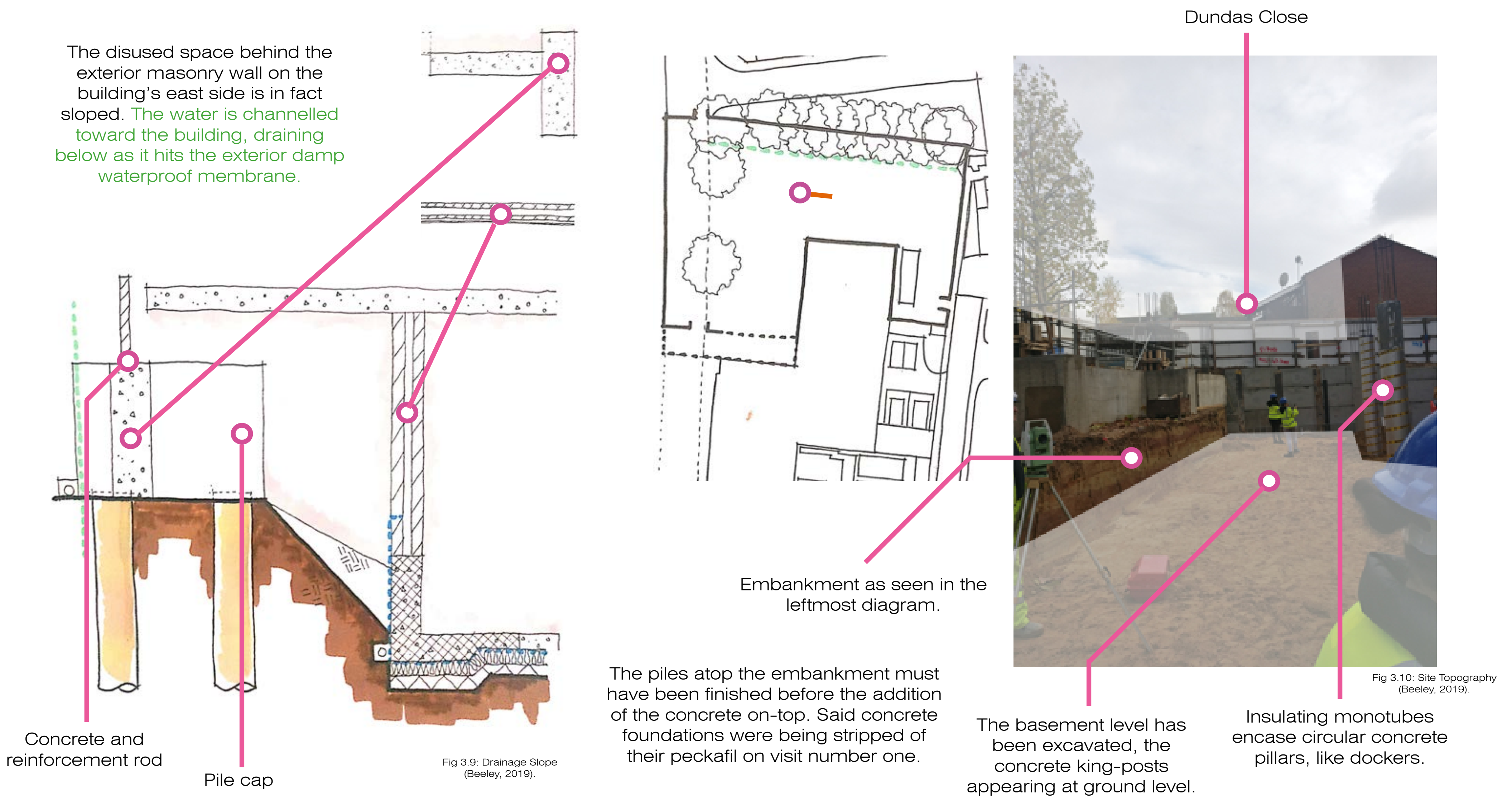


Insulation

I believe the use of these tree supports is to retain them during periods of drilling and excavating when the ground and tectonics; and thereby the tree roots, are disturbed. There's no immediate threat to them in the fact that this space before planning approval was simply a plot of grass and earth. No jack-hammers had to remove roads or rocks, yet despite this, as is natural, foundations had to be dug and filled which required ground disturbance. The hefty use of piles around the building's perimeter won't have aided their stability.

Fig 3.8: Protected Trees (Beeley, 2019).

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Site Visit 3- December 4th 2019

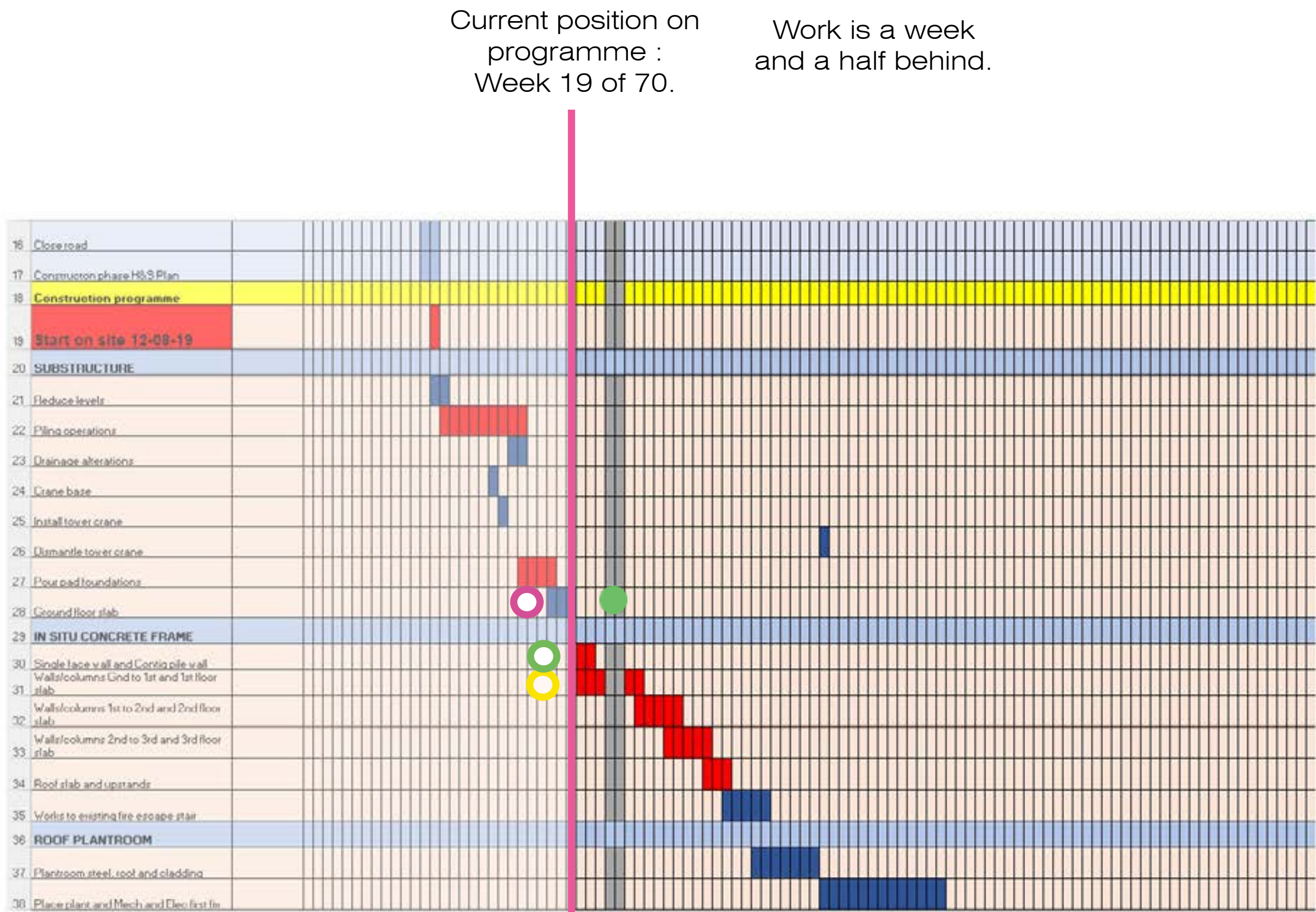
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- The ground floor slab has not yet been finished but there are plentiful interesting developments. The pouring of pad foundations is almost completely finished with that of the lift core also being poured, its rebar insulation all around the side capped for safety. Not only have the pad foundations been poured but they have set, meaning monotubs and docker shuttering can begin to cast columns on top. This must have been one of the aspects and jobs capitalised on by the team in order to offset their losses and shortcomings. It is at this time that the ground floor slab is two weeks behind.



- The conti-pile wall adjacent to Dundas Close has seemingly stopped dead in its tracks in terms of progress. The peckafil that adorned its left side is still there, despite the concrete being dry. This shows that the focus has been somewhere else. The fact it is there in any amount is evidence of good improvisation on the site managers part, seeing obstacles that effect the programme, and taking an alternate route has meant this conti-pile is way ahead of its time.

- These columns have once again been pushed forward in the programme leaving the daunting prospect of the ground slab in the wake of the traders and masons on site. Or at least those of which that are concrete specialists.

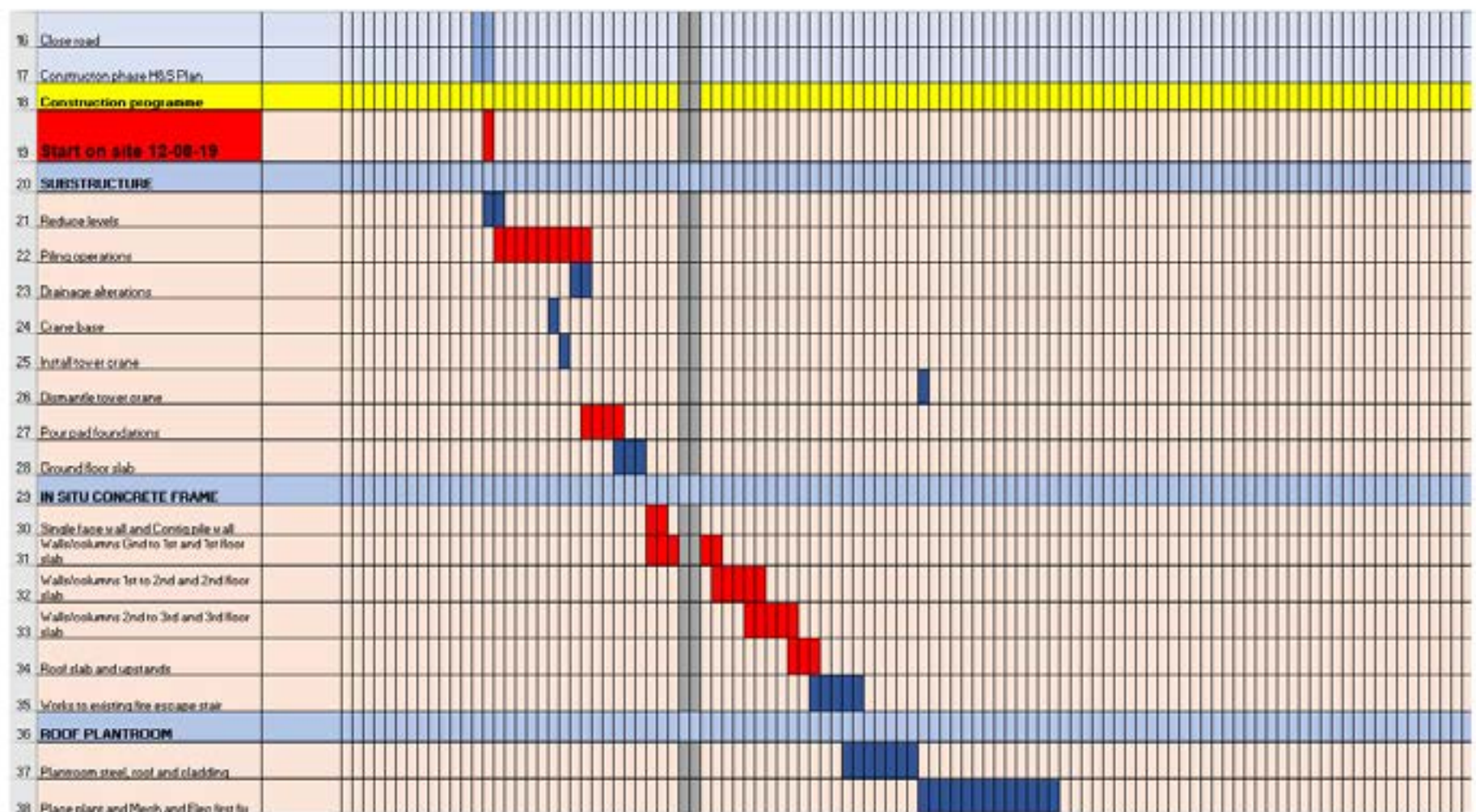
- The prospect of leaving work unfinished or leaving the site at a loss or unreachable checkpoint could be frustrating and damaging towards the workers as they spend their Christmas with their families. Anxiety over time constraints and the recovery task that befalls them must make it hard to sleep and unwind during their holiday period.

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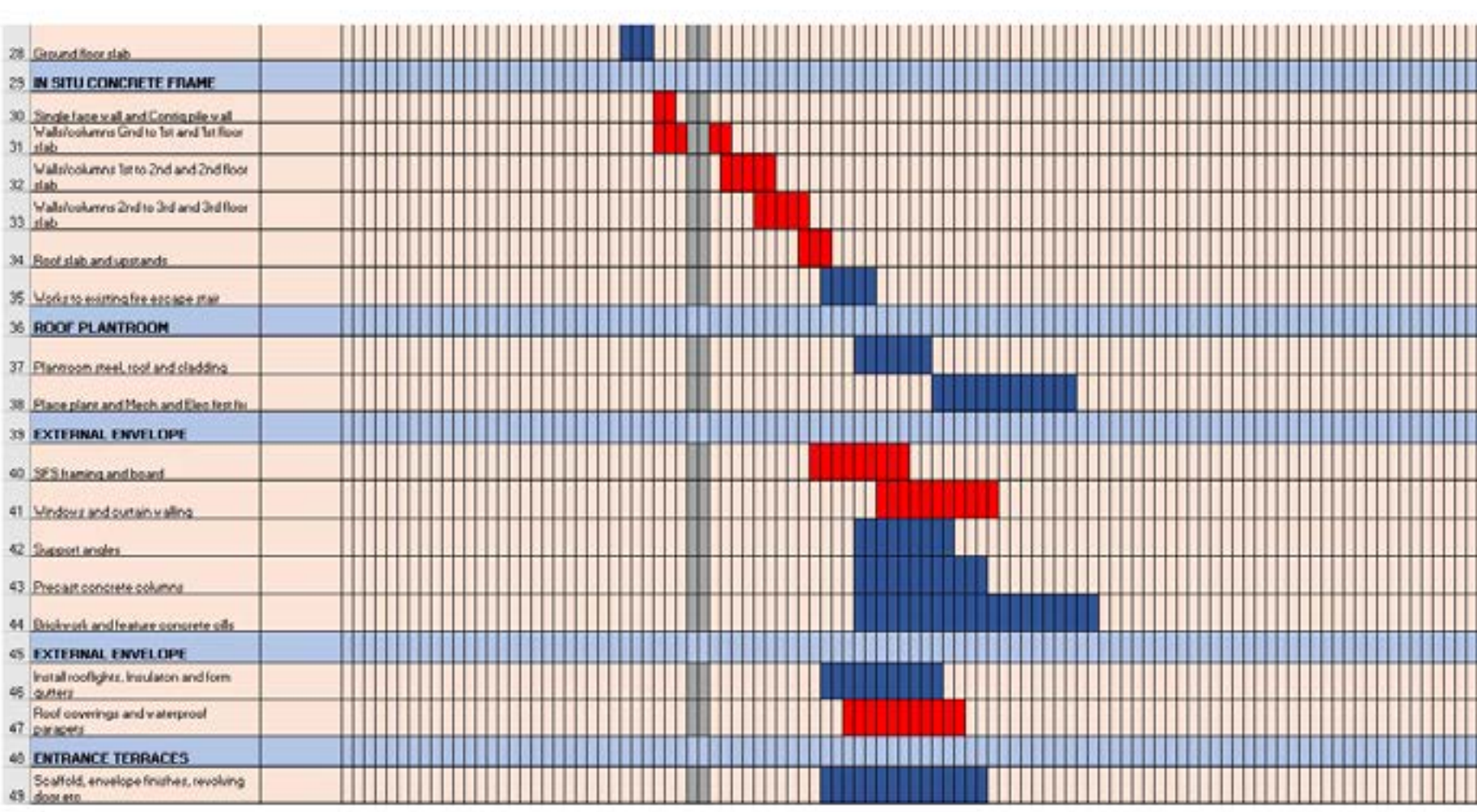
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Additional Site Notes-

One of the biggest setbacks was the need to change the lift core specification i.e.: its dimensions, materiality and/or component producer. Which set the team back a week, due to the group meetings, and knock on effect the subtle changes in lift core dimension or position would have on the rest of the scheme. This may have meant plans and sections had to be redrafted and amended to ensure the core fit its new surroundings. The build was at this point a week and a half behind which lead to the executive decision to hire a group of subcontractors, specifically concrete based to complete the floor slab whilst other works were going on. Additional mistakes came in the form of the intended fire escape routes in which one of the extended routes around the back of the lecture hall to a door that was restricted in swing by the existing wall of the Dryden building. This lead to some tweaks in plan, but not as drastic as those made as a result of the lift core changing.



It was at this point as-well that the asbestos from the crumbling Dryden steps became problematic in its scale. A sample was sent for analysis and it was determined that it was chrysotile asbestos. As the depths of the site increased and the materials were delivered and distributed around site close to where they would be applied, the scene got quite chaotic, with notices, signage and barriers ensuring with more hazards came more safety measures to combat them.

Construction Drawings in this Section-

NTUEIC_EVA_00_ZZ_DR_A_0002
EIC-MMD-V1-FN-DR-S-0001

Site Logistics Plan (Vettori)
GA Foundations (Mott Macdonald)

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Temperature on site: 5°
Weather Conditions: Frosty
Workers on site: 10
Foreman: 1
Site Manager: 1

Labourers/Supervisors: 8
At least three of these labourers were pouring the last of the pad foundations to the back of the site. The scissor lift seen to the left houses a man that is in the process of removing the shuttering from the reinforced concrete column. Other workers on site are shifting materials, capping rebar and working further with reinforcement mesh in various locations.

With the complications that revolved around the lift core still evident in the project's position in relation of their plan, additional private hire contractors aid the completion of any and all concrete works on site. None of which were present at the time of the visit, but have been working on site over a few days prior.



Levelling of the ground and the establishment of floor level left masses of swept up top soil.

Rebar with plastic mushroom caps

Cement aggregate

Scissor lift

Pad foundations

Shuttering/docker

Fig 4.1: Site Materials (Beeley, 2019).

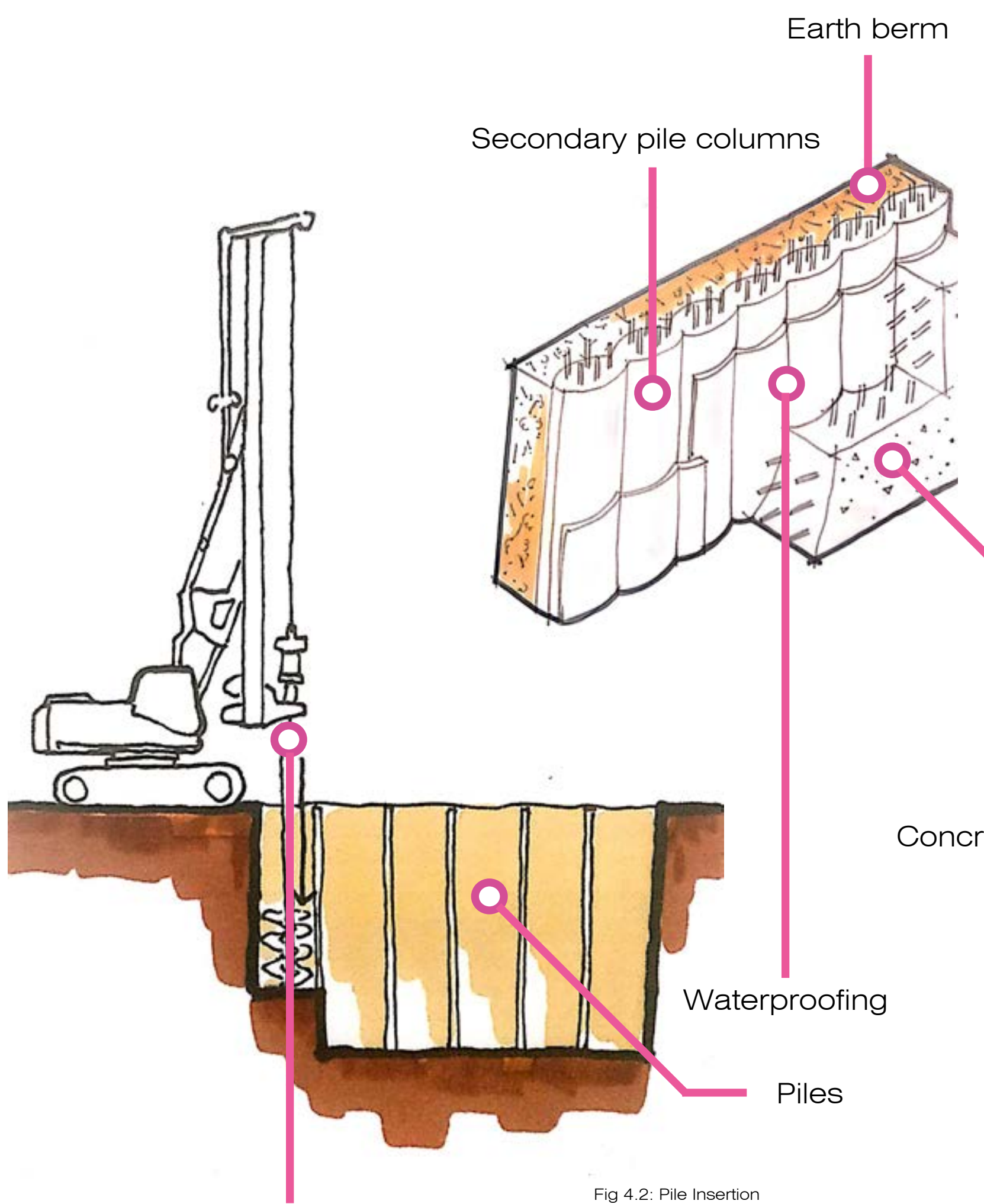
The time pressure that they are under is shown through the sheer amount of supplies and materials. The fact they have now employed additional people will put the tools and equipment now readily available into practise potentially mitigating further losses in time.

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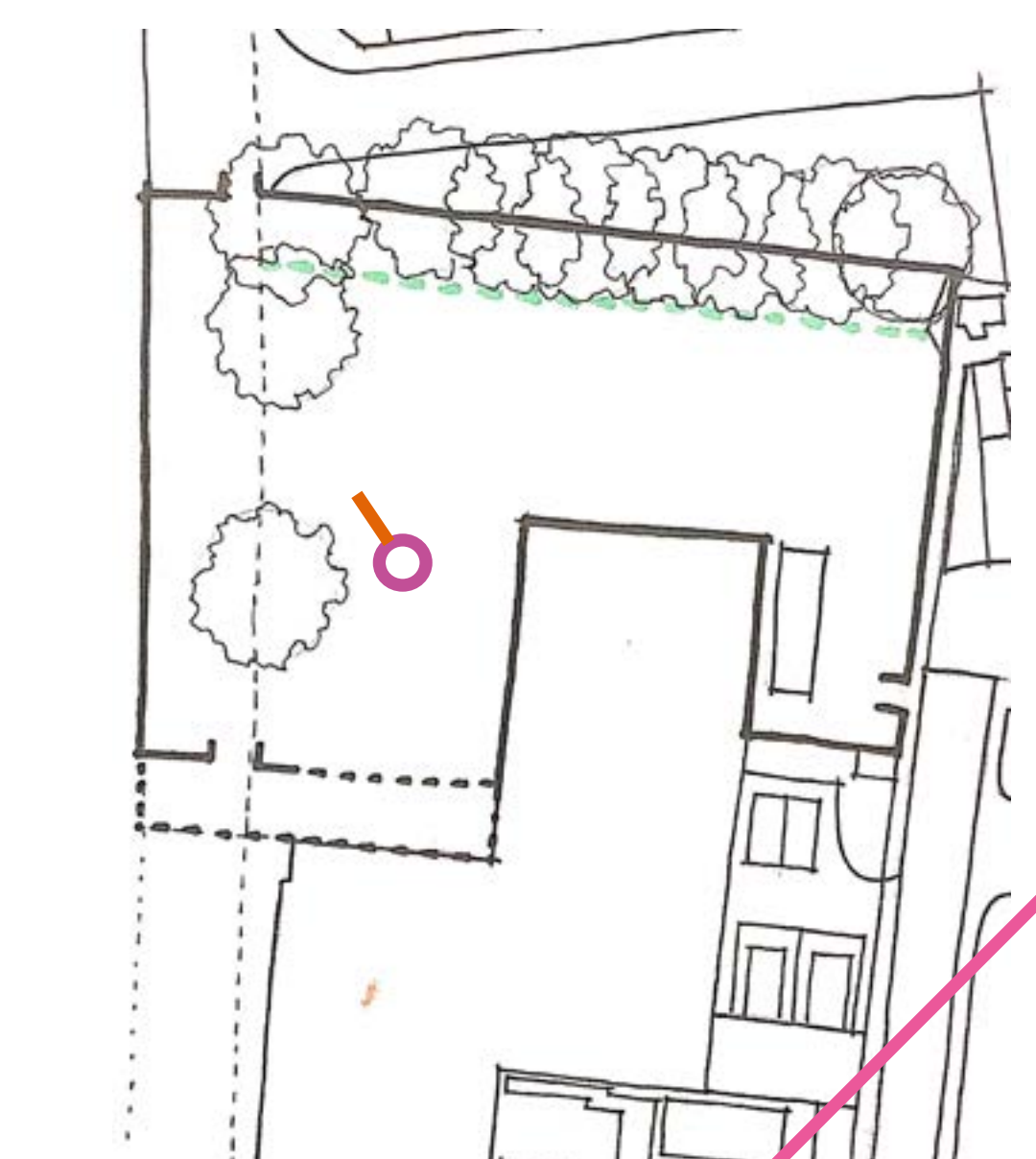
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Hydraulics for noise and vibration reduction

Fig 4.2: Pile Insertion (Beeley, 2019).



Evidence of the beginnings of a retaining pile wall are shown here, the reinforcing mesh on top being the cap which will eventually enclose the whole wall structure. The pile columns themselves don't look like concrete, and in this case, could be a semi permeable material to encourage good drainage before the waterproof membrane covers this face.



One thing that does concern me is just how they're going to attach the waterproofing to this exterior, as bolts and rivets would surely weaken the structural integrity of the piles. The saving grace is the layer of in-situ concrete to be cast onto this retaining wall.

The liquidity of the earth especially around this area disturbed me when I saw the proximity of the digger and its arm to the edge of the bank.

Fig 4.3: Pile and Cap (Beeley, 2019).

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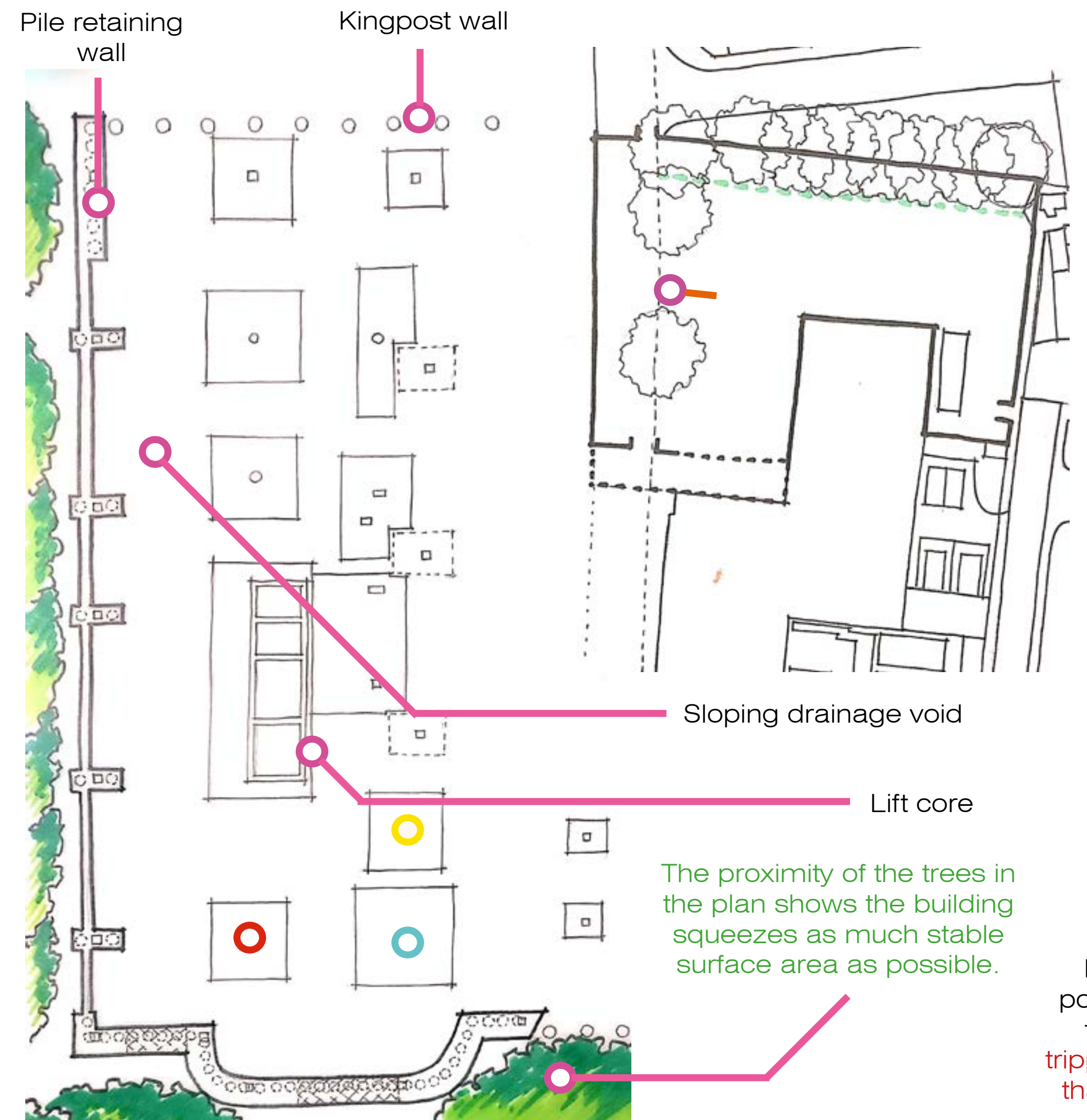


Fig 4.4: Site Slabs (Beeley, 2019).

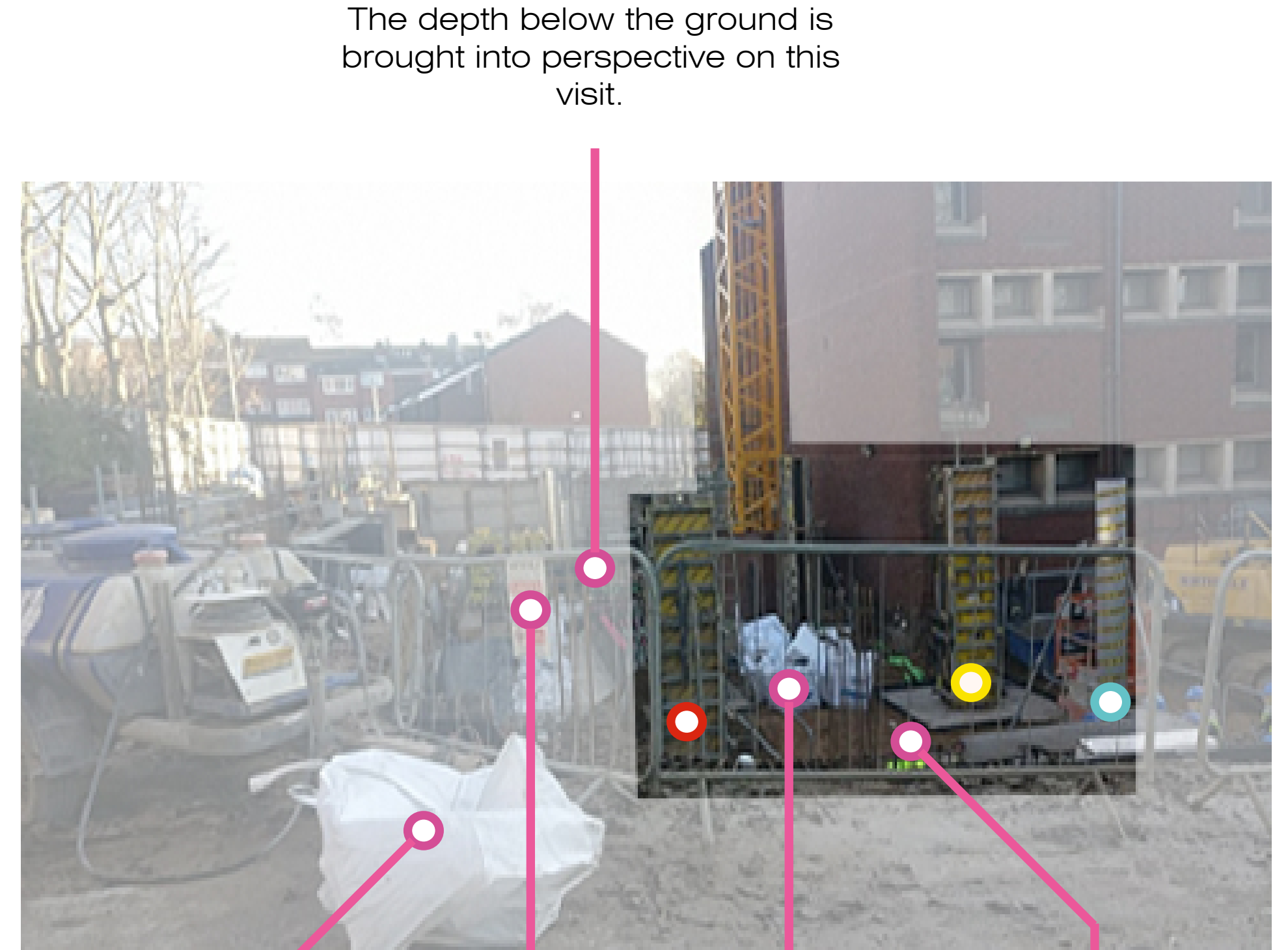


Fig 4.5: Column Types (Beeley, 2019).

Cement aggregate

Some protruding rebars from the concrete base of the lift shaft begin to bring the building masses into three dimensions.

Health and safety information posters more frequent as the site fills with materials. The risk of tripping or knocking into something that now possesses the space is much higher.

The shuttering and form-work extends over to the site entrance. The concrete pad foundation bases are finished in the most part, with some being poured on site on the day.

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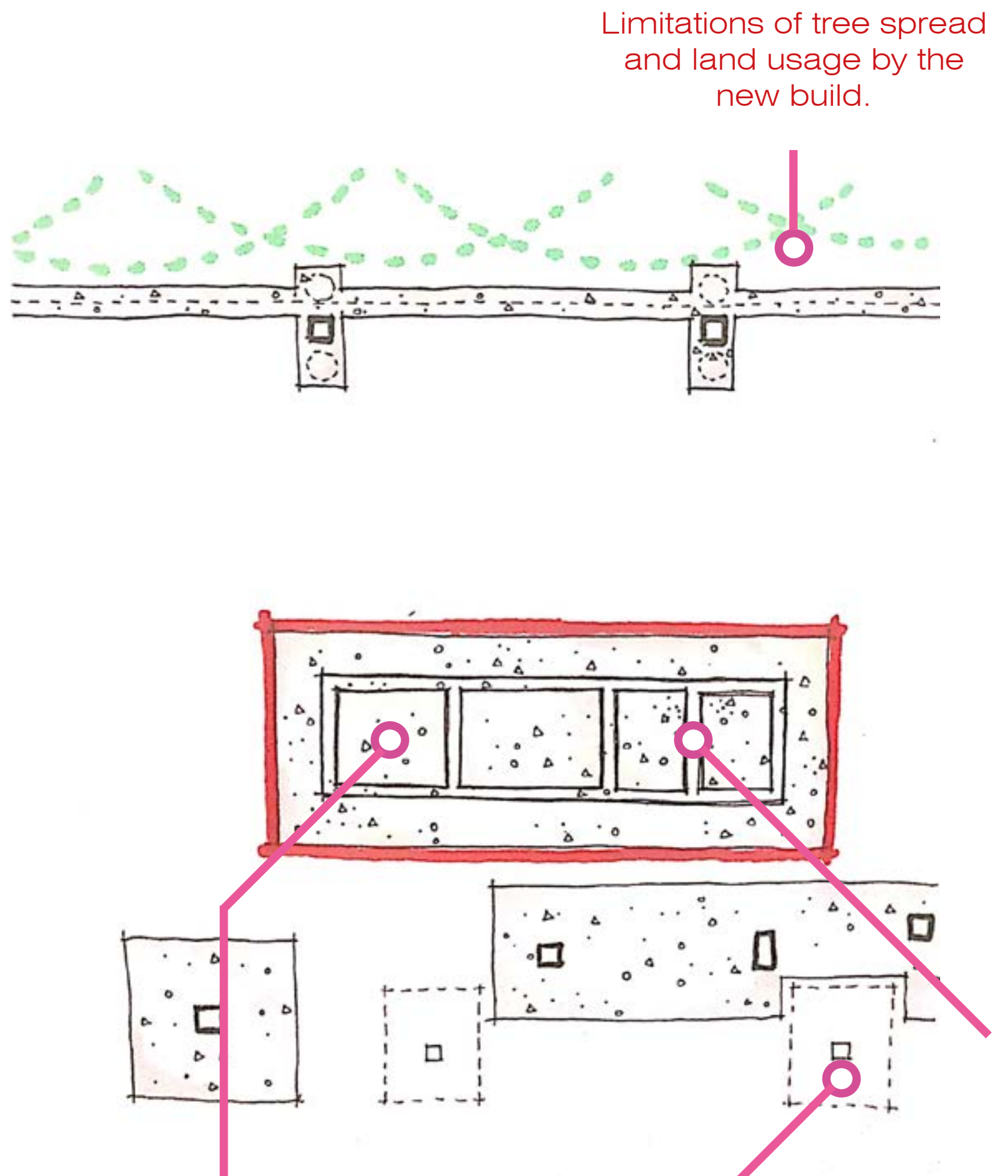
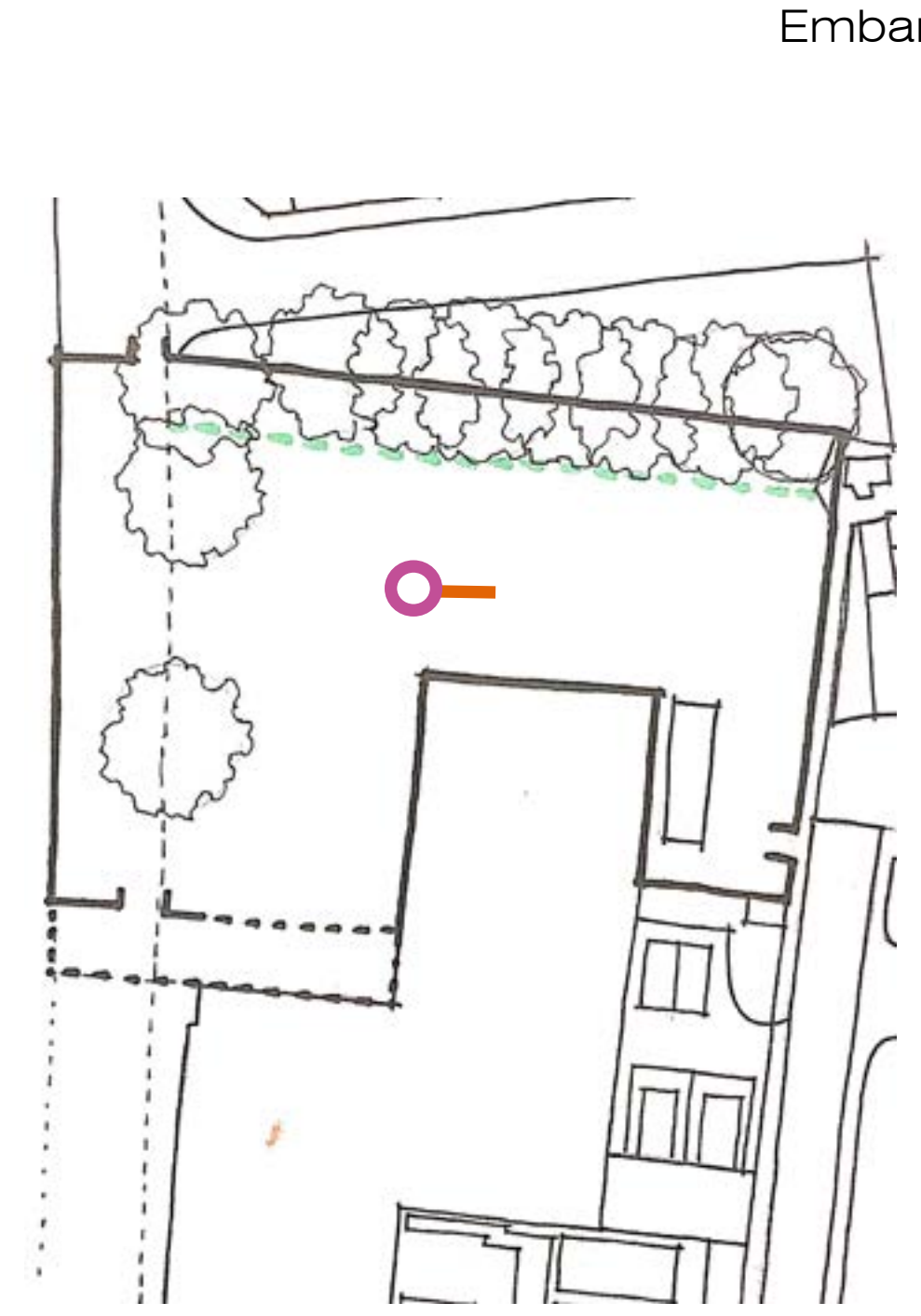


Fig 4.6: Slab Materiality (Beeley, 2019).



Deeper recess for the lift shaft takes into account the mechanics and motor functions of the lift and the fact it must come flush with the floor. By burying the central hearth of the building it becomes a lot stronger, it becomes its own foundation.

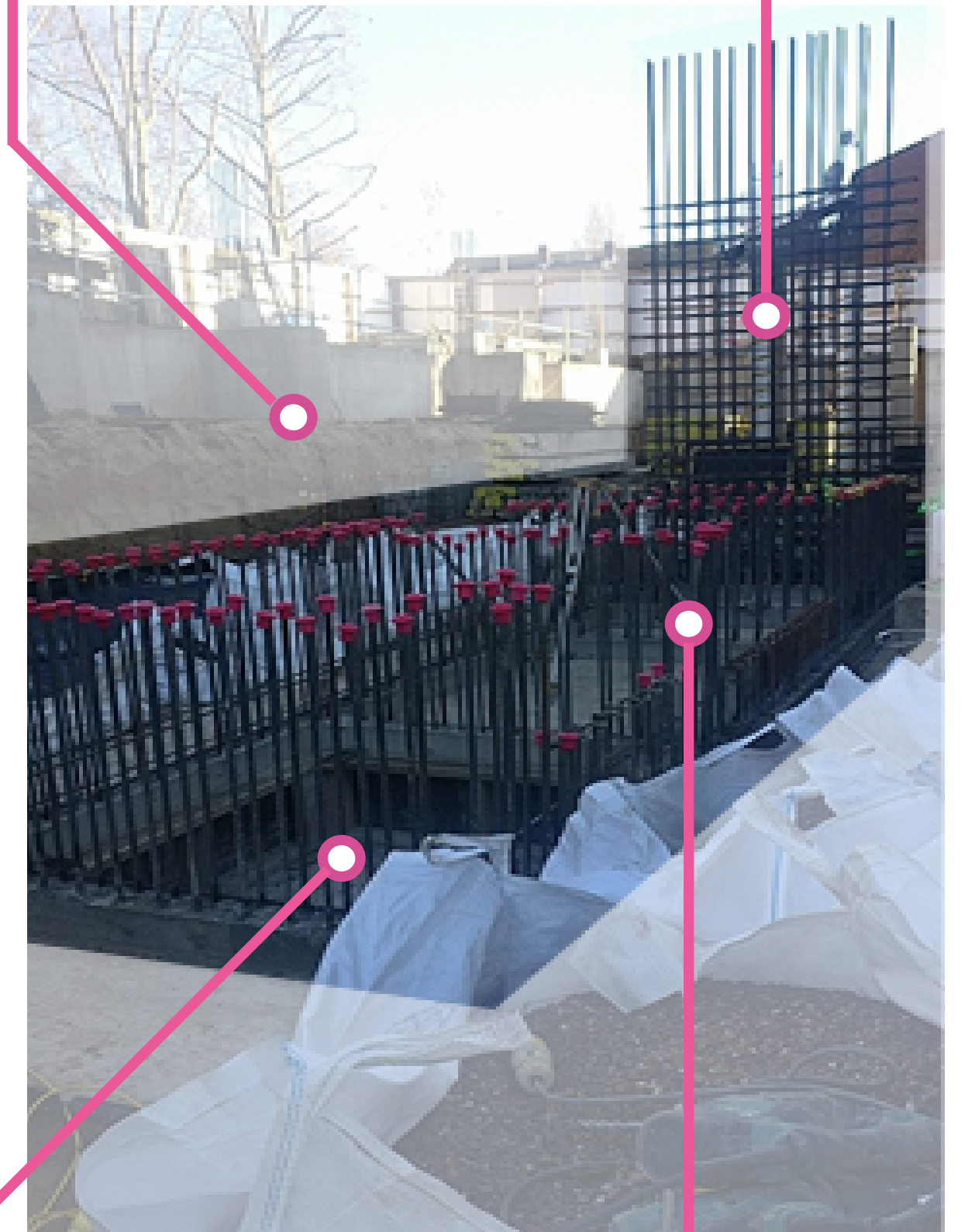


Fig 4.7: Rebar and Cap (Beeley, 2019).

The mesh system here works like a marker for the position of Dryden centre's ground floor. The logistic and method behind the convergence of these two buildings is the expansion of a community and set of values, allowing the pupil of Nottingham Trent to feel invited.

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In this case, the capping of what could be seen as a conventional retaining wall, contains a ground plate bolted into its top, and another tier of rebar for continual growth.

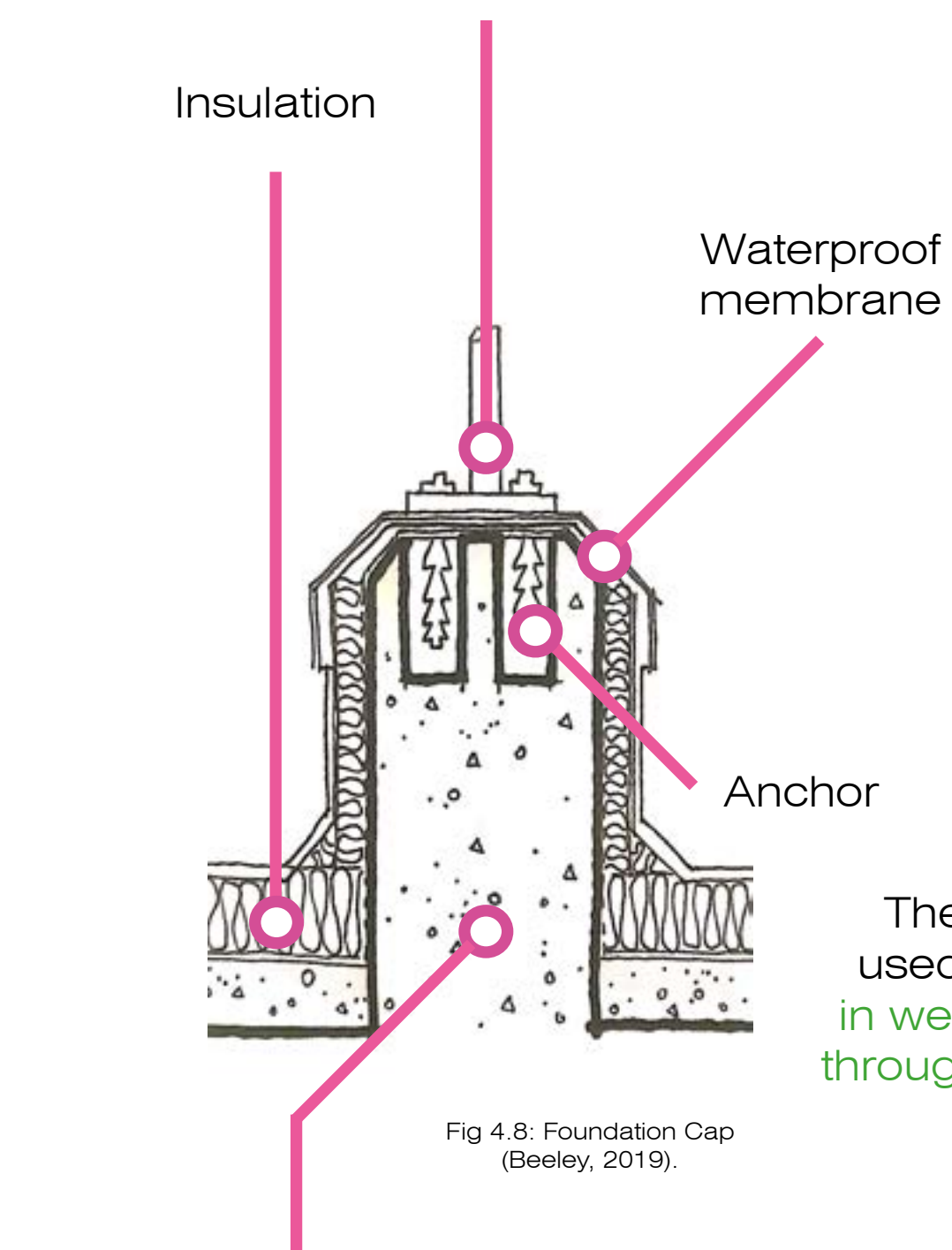
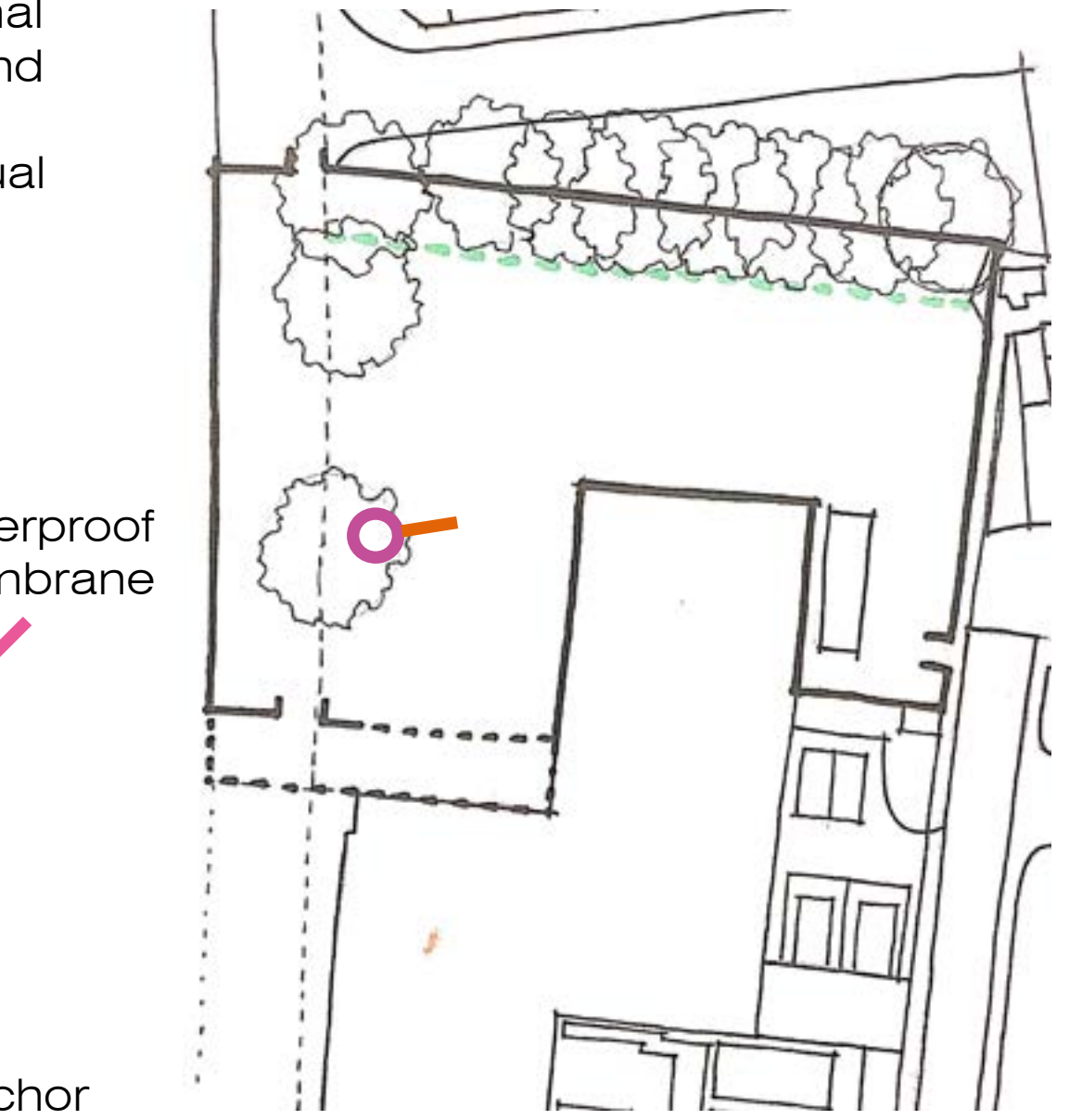


Fig 4.8: Foundation Cap (Beeley, 2019).

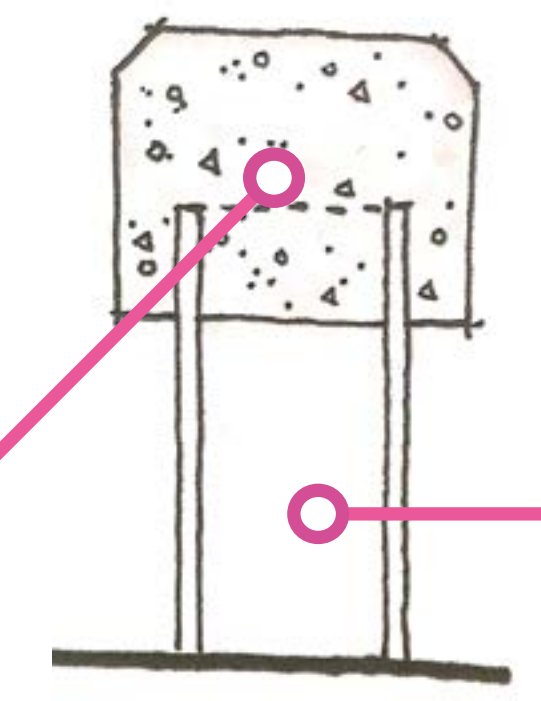


The example of techniques used in this project go further in weatherproofing the building through the addition of insulation and a DPM.

Capping prevents cold bridging across kingpost and retaining wall techniques, acting as a thermal retainer.



Fig 4.9: Transforming Site (Beeley, 2019).



Rebar mesh atop a pile retaining wall.

Down-piping for the flow of water and drainage.

In this form caps can protect against flooding and rising sea levels, but not in a way in which the water cannot seep through and effect the material's structure.

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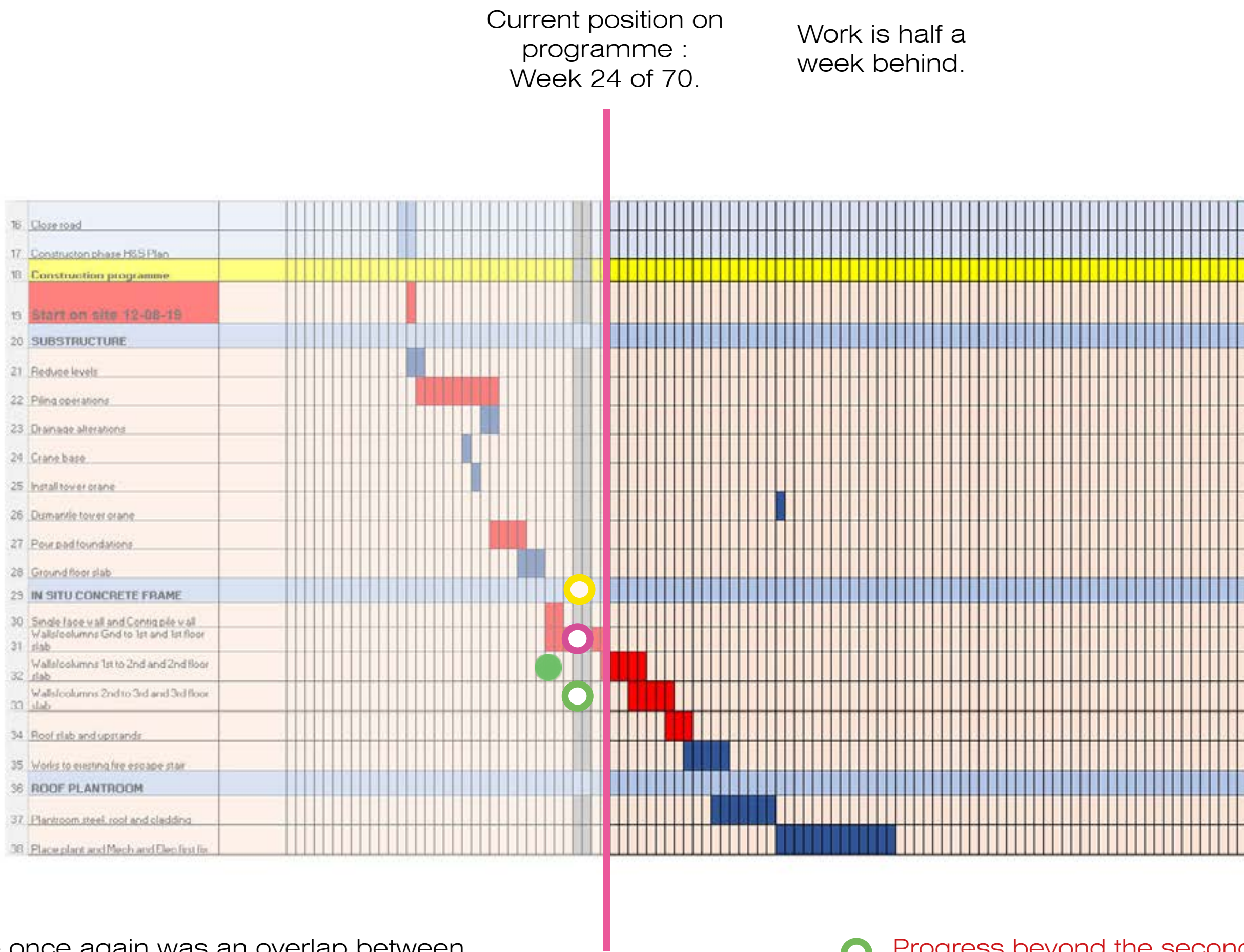
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Hopefully the time off at Christmas will have rejuvenated the construction workers and managerial staff. If not then the existential dread of the lose of construction time should increase productivity. The arrival of more workers from Northfield should lift spirits, and reduce individual workload, with the one caveat that distraction as bodies rack up on site becomes more likely. As does injury due to concentration lapses.

Anticipated on the programme once again was an overlap between the construction and installation of walls, columns and slabs on levels 1 and 2. The slab closest to the Dryden building had not yet been poured, however, to compensate, at the rear of the scheme parallel to Shakespeare Villas, two storeys were completed instead of one, along with floor slab.



Current position on programme :
Week 24 of 70.

Work is half a week behind.

With the second floor slab in place there are limitations to progress again, but not when it comes to column placement. With a fully functioning crane, columns were lifted onto the second storey and attached almost like climbing formwork in its steady progression upward.

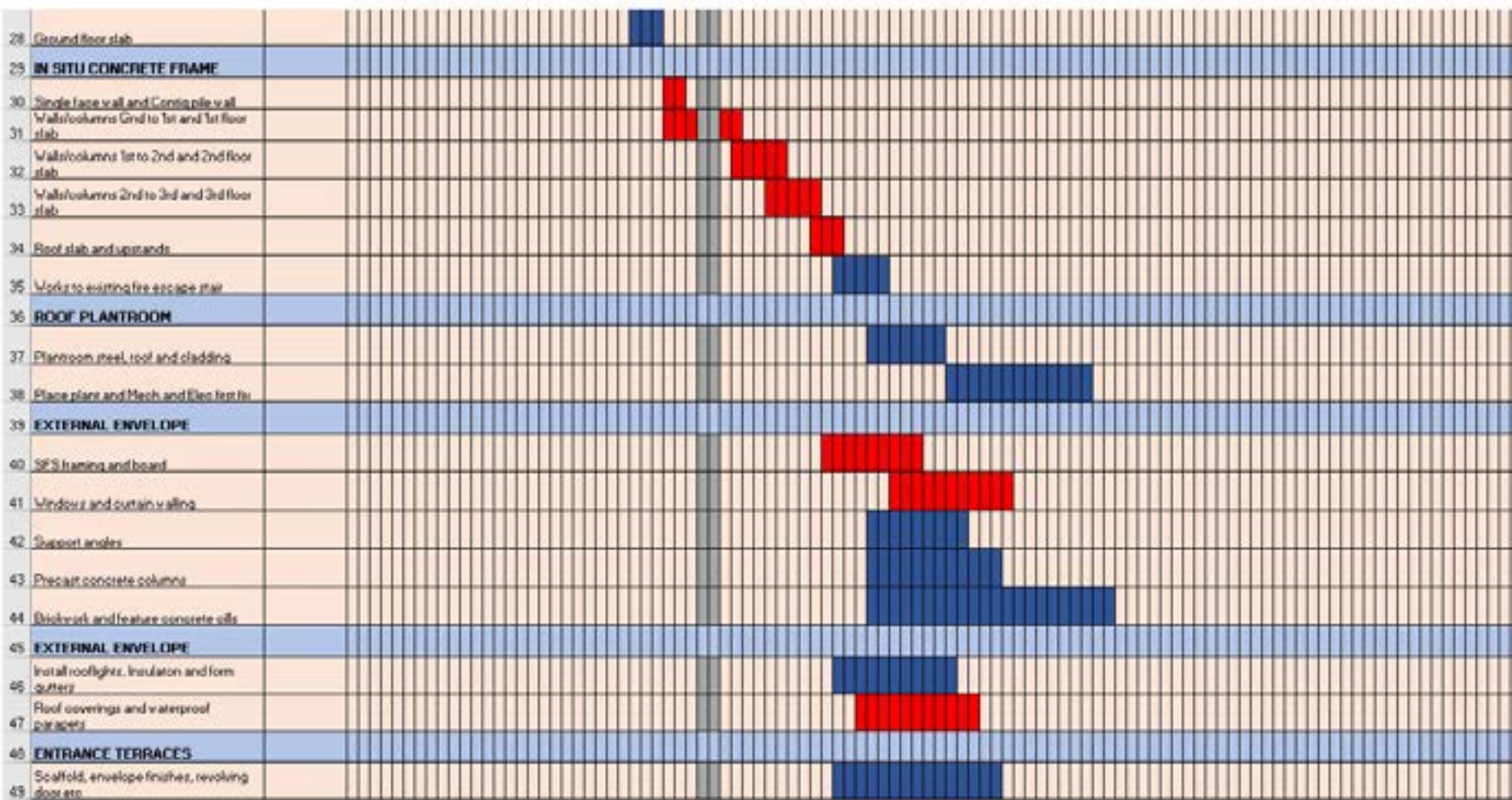
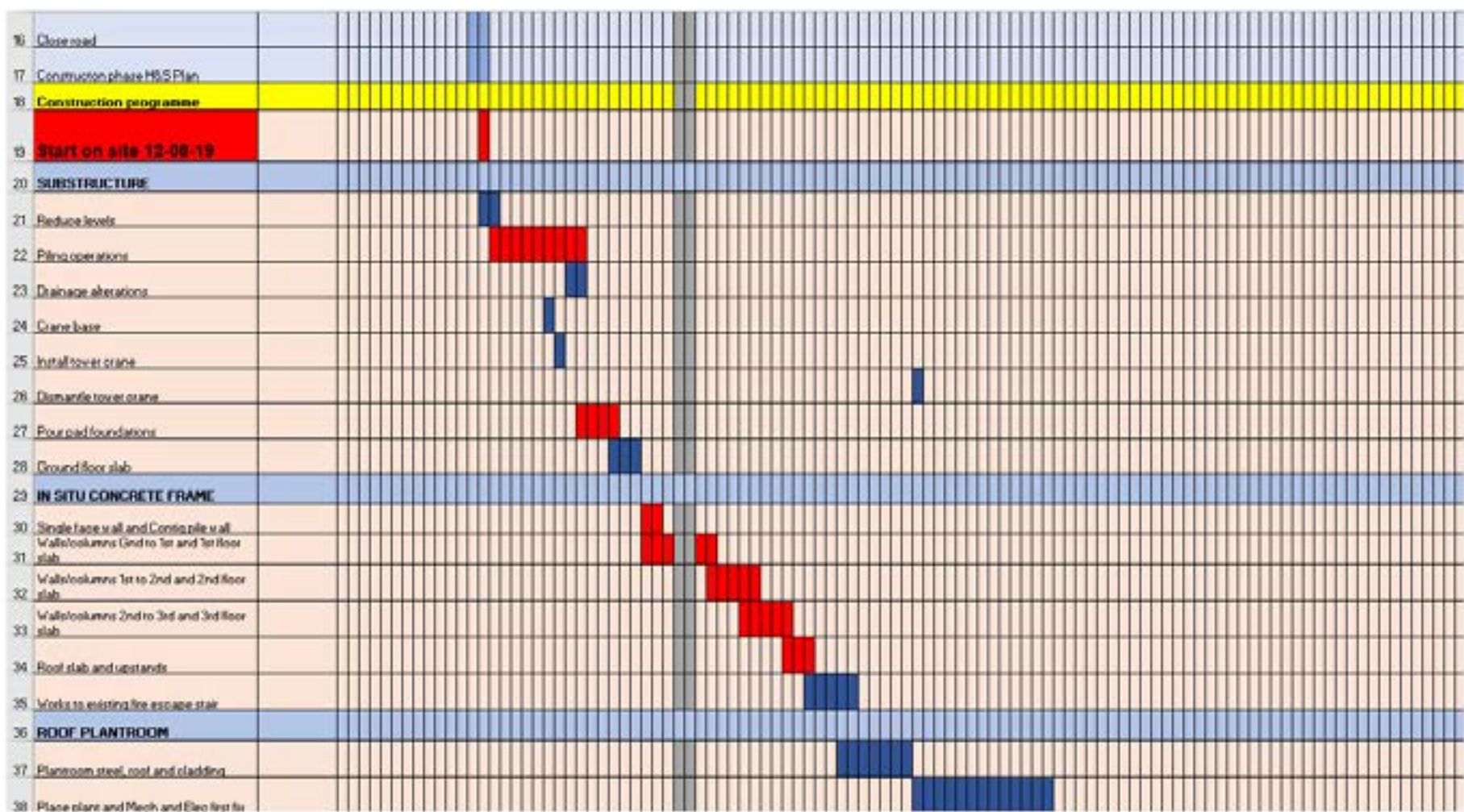
Progress beyond the second floor wont and shouldn't be started until both the first floor is completely finished, and the majority of the second floor is finished. The scheme is approached as terracing levels getting lower as you move towards Dryden Street.

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Looking ahead, this stage of the project can begin to build rhythm due to the repetitive nature of the column placement and slab pouring atop. Which can either benefit the workers or they will eventually fatigue due to the repetition.

Additional Site Notes-

With the entourage of assistance in the form of concrete workers, the ground floor slab is to finally be poured as of this day. Minimal work needs to be done on any cylindrical columns on site, as they are made into intriguing features through them being exposed in the completed building fabric. As the scale of the build increases in verticality the crane becomes more and more difficult to retrieve once its finished lifting columns and other structural components. Reliance on human strength could be quite demanding and slow in comparison to the remote controlled non-labour intensive crane operation. Trespassers on site have been non-existent since incidents around the period of the first visit. The asbestos has also almost been eradicated through reporting, analysis and professional handling over the course of a few weeks.

Construction Drawings in this Section-

NTUEIC_EVA_00_ZZ_DR_A_0002
NTUEIC_EVA_00_GF_DR_A_0100
NTCEIC_EVA_00_ZZ_DR_A_0310
EIC-MMD-V1-GF-DR-S-1006

Site Logistics Plan (Vettori)
GA Plan- Ground Floor Plan Draft (Vettori)
Detail Sections (Vettori)
Ground to First Floor Column
Reinforcement Details (Mott Macdonald)

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Temperature on site: 7°

Weather Conditions: Cloudy

Workers on site: 10

Site Manager: 1

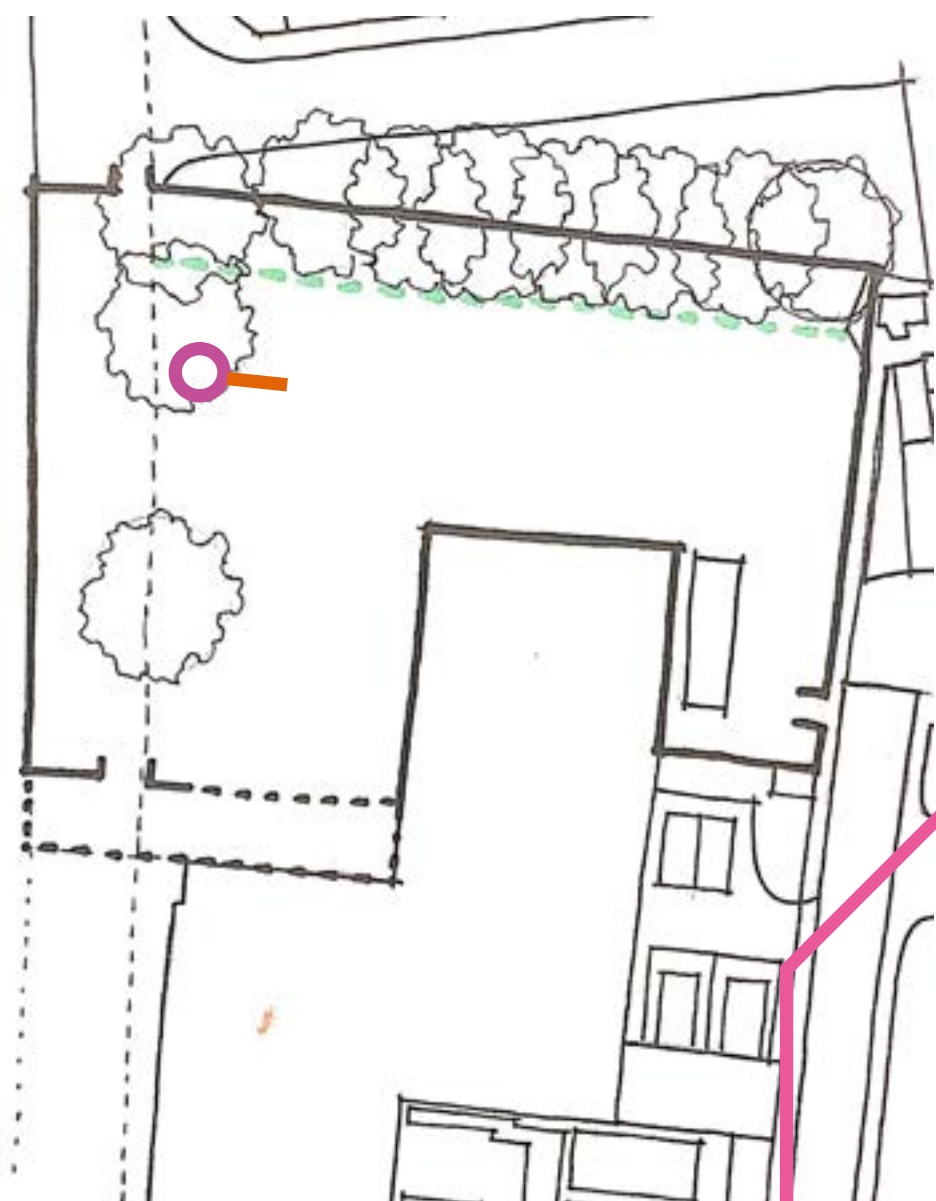
Medical Supervisor: 1

Labourers/Supervisors: 8

The site seemed relatively empty towards the back, as if with that work finished in creating the first floor and casting the next set of columns, attention must be shown to the foreground of the site. However amongst the vast amount of development that had happened since the last visit, **it was easy to miss people** like the banksman; responsible for vehicle maintenance and welfare on site, and the service manager who is also the medic in case of an accident in the workplace.

Significant events of the day also included the pouring of a ground floor slab towards the front of the building, **which required the shifting of material stacks. Work can't start in a lot of places on site until a significant tidy up has happened. Take for example the picture to the right, the embankment should be lined with a water proof membrane and two layers on blockwork with insulation in the middle, but the space in front of the wall is occupied by materials. This is probably as part of the construction programme, but will eat away at time later on regardless.**

View Direction:



Steel decking and makeshift wooden flooring

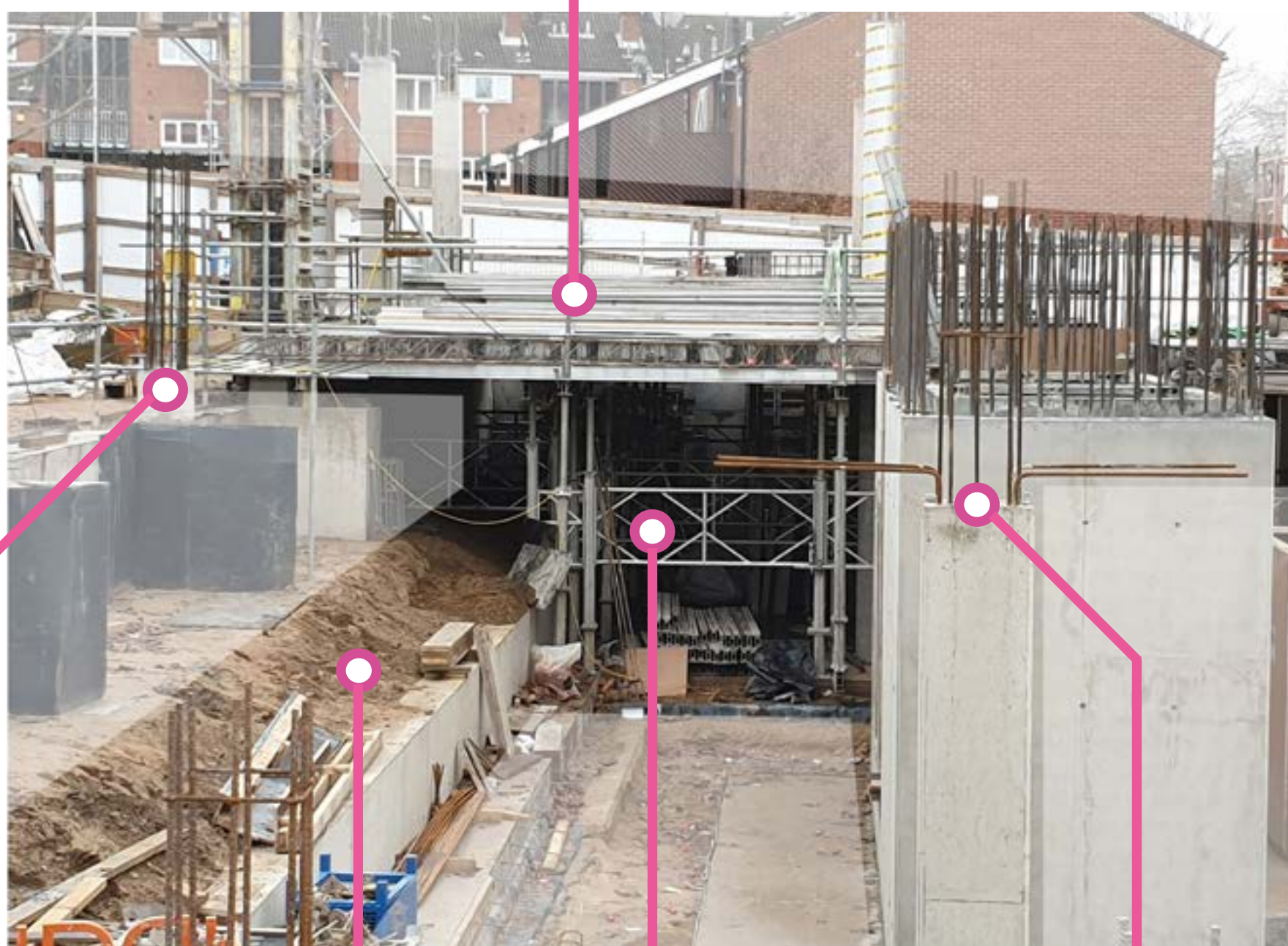


Fig 5.1: Steel and Floor Slab (Kentish-Brade, 2020).

Drainage bank

The columns that sit within the contiguous pile foundation wall are dry, and as such are strong enough to harbour the steel girders and columns to begin work on the first floor roof beside the footpath.

The rebars are ready to be set into some climbing formwork once the floor is in.

Steel scaffolding makes it quite difficult to access the back half of the site without potential injury. Storage of additional poles also restricts access.

The direction of the bent rebars shows a need for rigidity in those directions when it comes to the inclusion of a floor slab at that level. **The rebars will interlock with the reinforcement on the decking.**

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The pile work to the left of frame has now been completely encased in rebar reinforcement, and is ready to be poured and capped to distinguish a lip and flood-guard between the footpath on Dryden Street and the building itself.

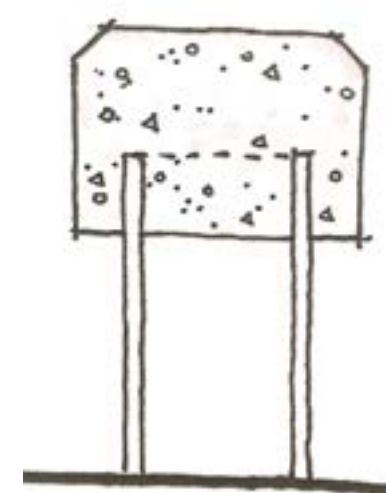


Fig 5.2: Simplified Cap (Beeley, 2019).

Waterproof membrane

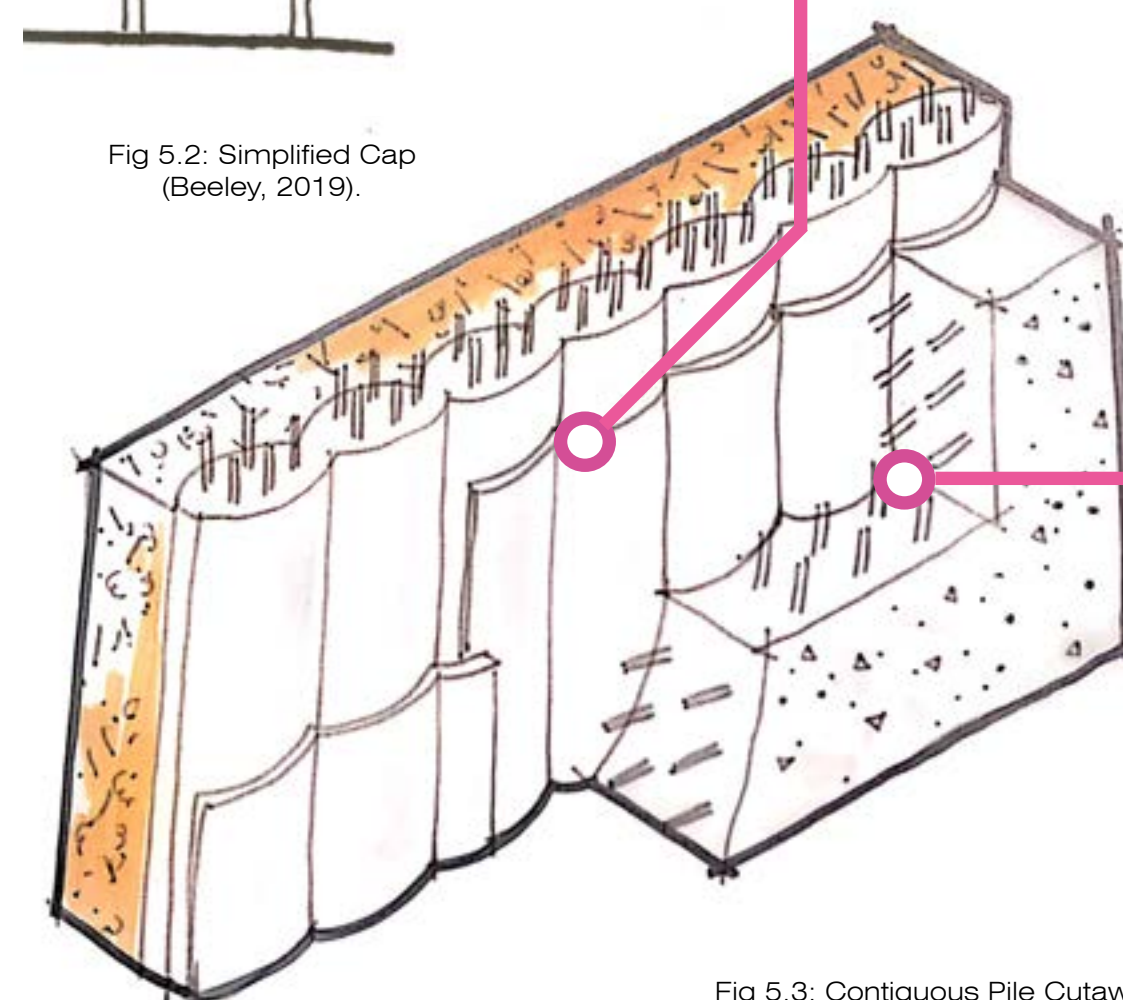


Fig 5.3: Contiguous Pile Cutaway (Beeley, 2019).

View Direction:



Section of rebar reinforcement within concrete

The open space used for small elements of **woodwork has only one caveat in the fact that weather could easily disrupt and fry plug sockets, extension cables, the tools themselves and the generators, on a count of there being no shelter.**



Fig 5.4: Workstation (Kentish-Brade, 2020).

Detail in quantity size and location are becoming more apparent as the site clears up into definitive zones with neat clusters or piles of regular materials fit for function, **Allowing for construction jobs to start quickly.**

A central space used to facilitate workbenches before the steelwork for the floor above is placed allows for boards to be cut for traversal across floors, as-well as to template the curvature of the lift.

The lift core has been plastered.

Even at this late stage some columns are yet to come out of their formwork moulds. As is the peckafil on the remaining foundations facing Dundas Close.

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Rebar connections, height, location on scheme, weight needing to be balanced, are all traits that make each column differentiate. Especially with pure construction forms like concrete do the reinforcements and retainers of strength just so vital.

View Direction:



Fig 5.5: Column Section (Beeley, 2020).



Fig 5.6: First Storey Columns (Kentish-Brade, 2020).

The crane require to transport formwork atop other rooms is remote operated. This reduces risk during ascension or return of falling off the ladder. Bad weather conditions could also effect the traction on the crane ladder and handrails, not limiting to the crane in fact, but all over the site.

The crane will eventually be removed from the site by another crane in small pieces, the base detached and brought as-well. There is of course a danger in the form of the construction's progress, as the buildings get higher the space becomes more taxing to get out of. Yet elements will still have to be carried up and down throughout the build.

Rebar still jettisons from the top of the current single storey lift core.

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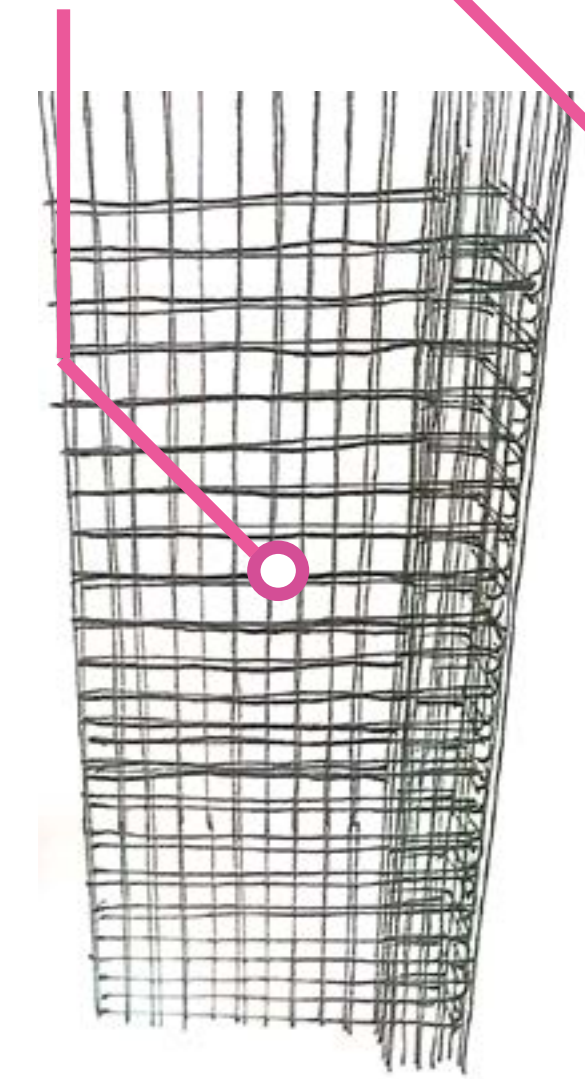
The addition of walls on the first floor level will be a long process possibly requiring climbing framework techniques. There aren't any slots in the columns as for insertion and a continuation of the kingpost walls seen around site.

Top view looking down into the column cavity at further rings of rebar. The wall elements bind themselves into the infrastructure, binding around the same vertical rebars as the columns.

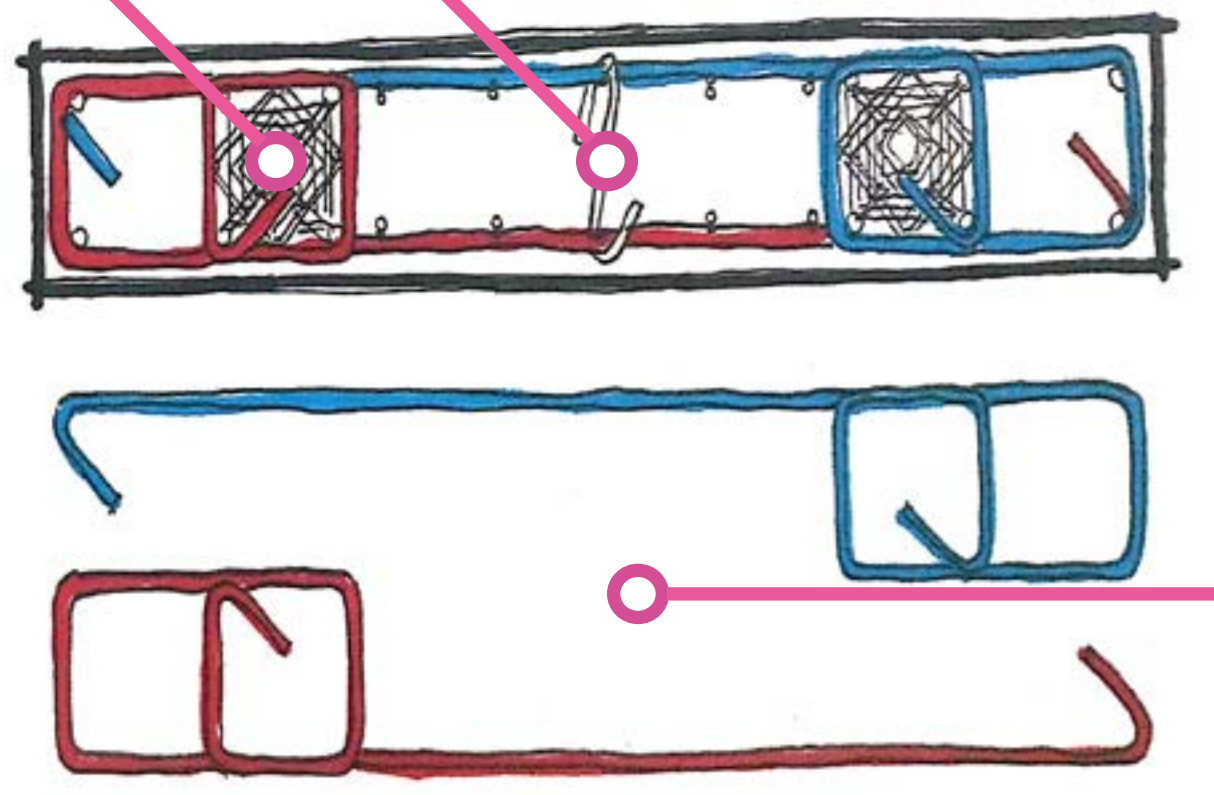
View Direction:



Metal mesh



Tie



Individual bent rebar elements within the wall



Fig 5.8: Mesh Walling (Kentish-Brade, 2020).

The dockers can be continually reused, dismantled and put back together proving a lot more environmentally friendly than synthetic mono-tubing, though requiring more effort.

Presence of plentiful equipment and uniform elements is reason for me to believe this is where the traders were working before their break.

Concrete wall reinforcement is seemingly less rigid than rebar due to its protrusion from the metal and the force of gravity.

Fig 5.7: Vertical Reinforcement (Beeley, 2020).

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Trace amounts of asbestos were found below the first floor very early on into the removal of the existing Dryden foundations. Regular checks were initiated to ensure a safe breathable environment underneath the first floor. The process involves the isolation of the area, clarity in the portrayal of it being a site containing asbestos. A report is sent and processed over three working days, at which point it is analysed and then professionally removed. Which doesn't cost your own workforce at least, allowing for work in other locations to continue.

There is also no evidence that the wooden soffit boards for high traversal are waterproof and safe in the elements. The logical explanation is that they have been treated to prevent instances such as crumbling under the weight of a worker passing over.

View Direction:

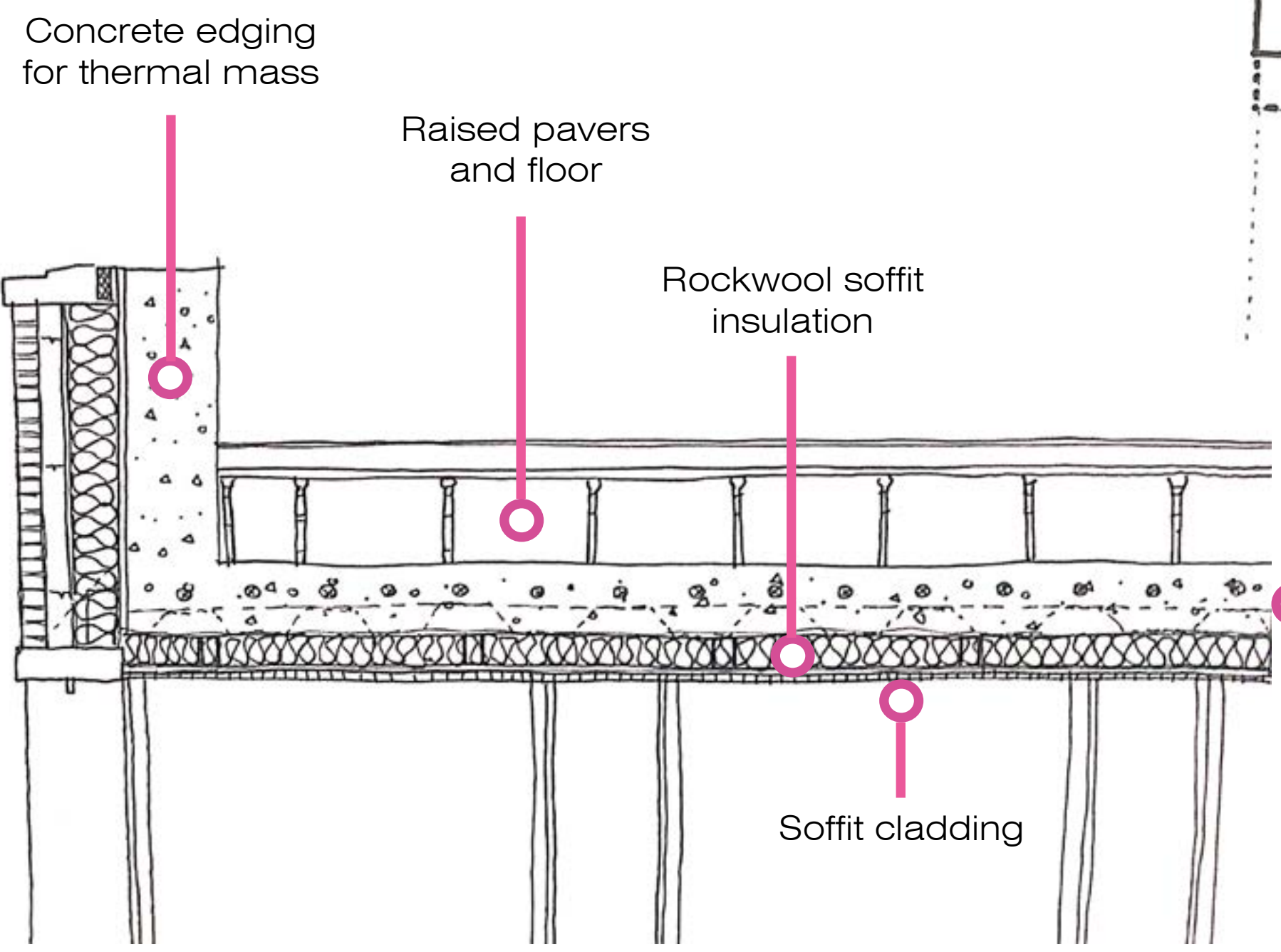
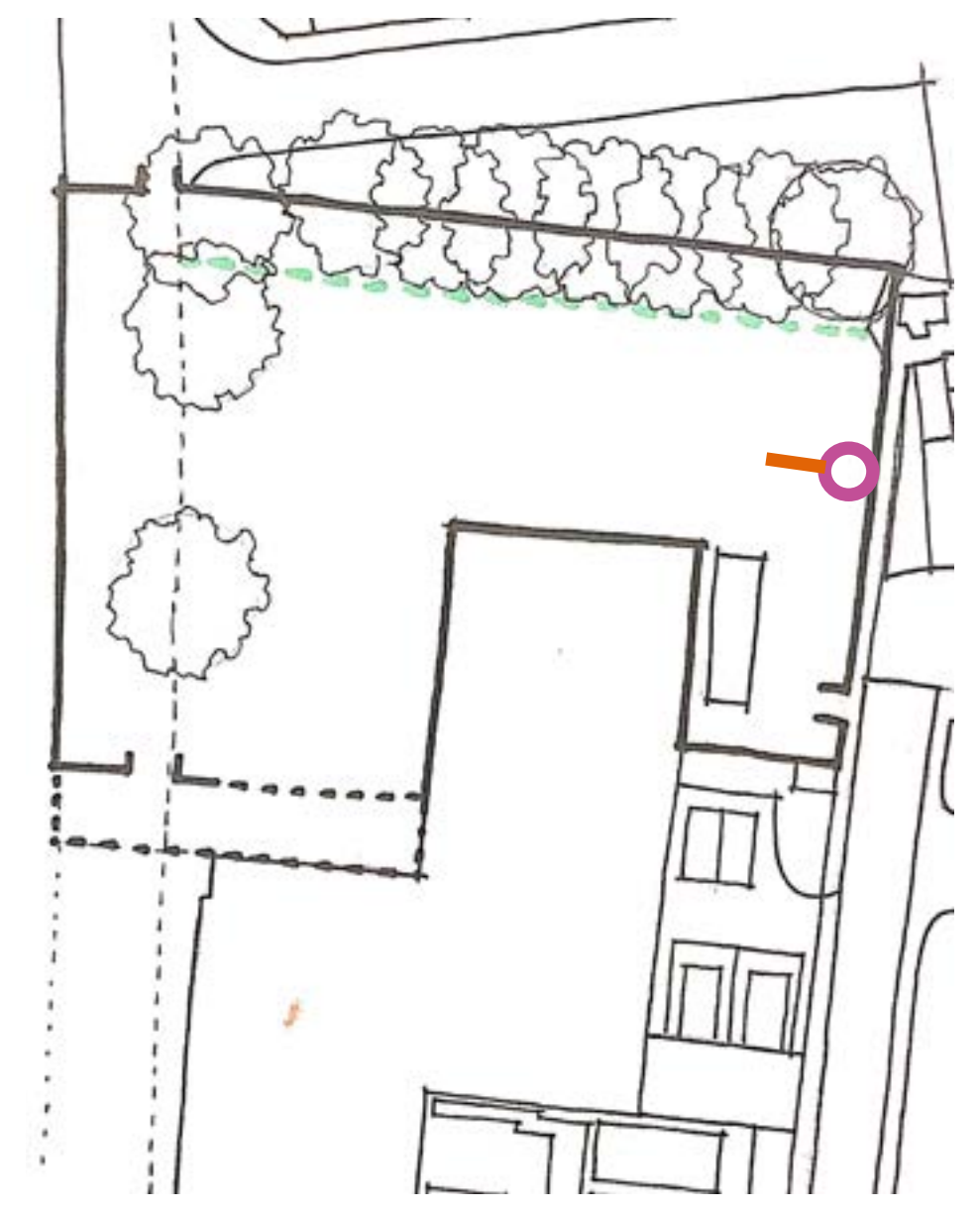


Fig 5.9: Flooring Section (Beeley, 2020).

Concrete atop a steel decking, steel beams below surrounded by insulation.



Fig 5.10: Flooring and Walls (Kentish-Brade, 2020).

Formwork panelling for various sizes of work. Detachable and interchangeable.

Evidence of kingpost wall construction method, the spaces between the buried steel beams and the concrete are relatively large, but will eventually be capped.

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The central workspace is ideal for visibility and access to this area of the site in which the intricacies of the revolving door are being considered.

View Direction:

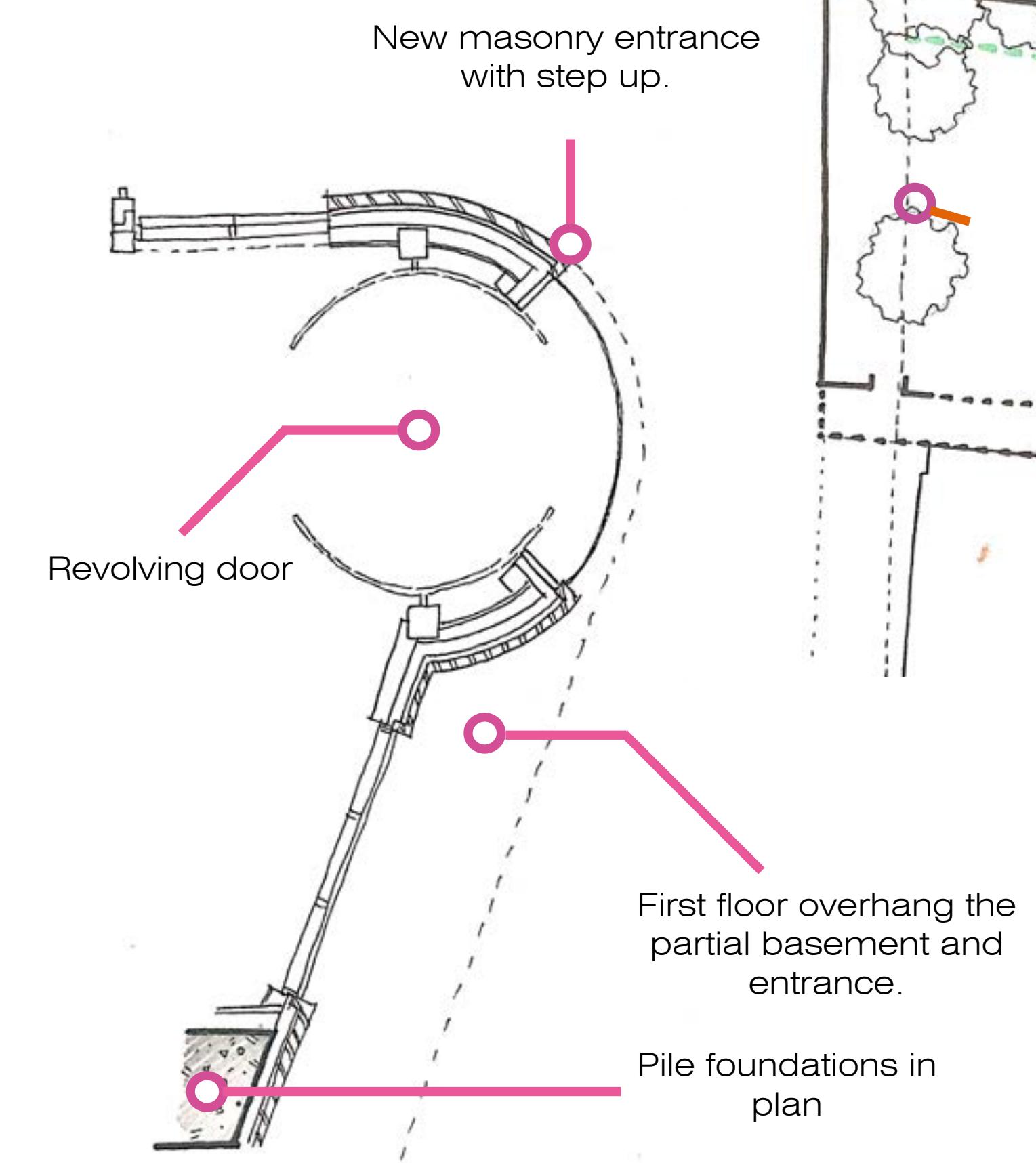


Fig 5.11: Revolving Door (Beeley, 2020).

An impactful and eye catching entrance is essential in providing the students with a fulfilling environment to learn, and to be desirable to business whom want to use the top floor letting spaces.

In order to be compliant with wheelchair accessibility regulations, a side door by the Dryden building can be used with a gradual slope that matches the front step in height.



Fig 5.12: Revolving Door Edging (Kentish-Brade, 2020).

Contiguous pile foundations

Softwood pieces to mark the revolving door area in three dimensions. These may house curved panes of glass or horse-haired edges to reduce the friction as the revolving door moves by.

Kingpost wall

Finished ground level square columns, these of which will be encased in plasterboard or another material for aesthetic purposes. The circular columns will stand as a feature.

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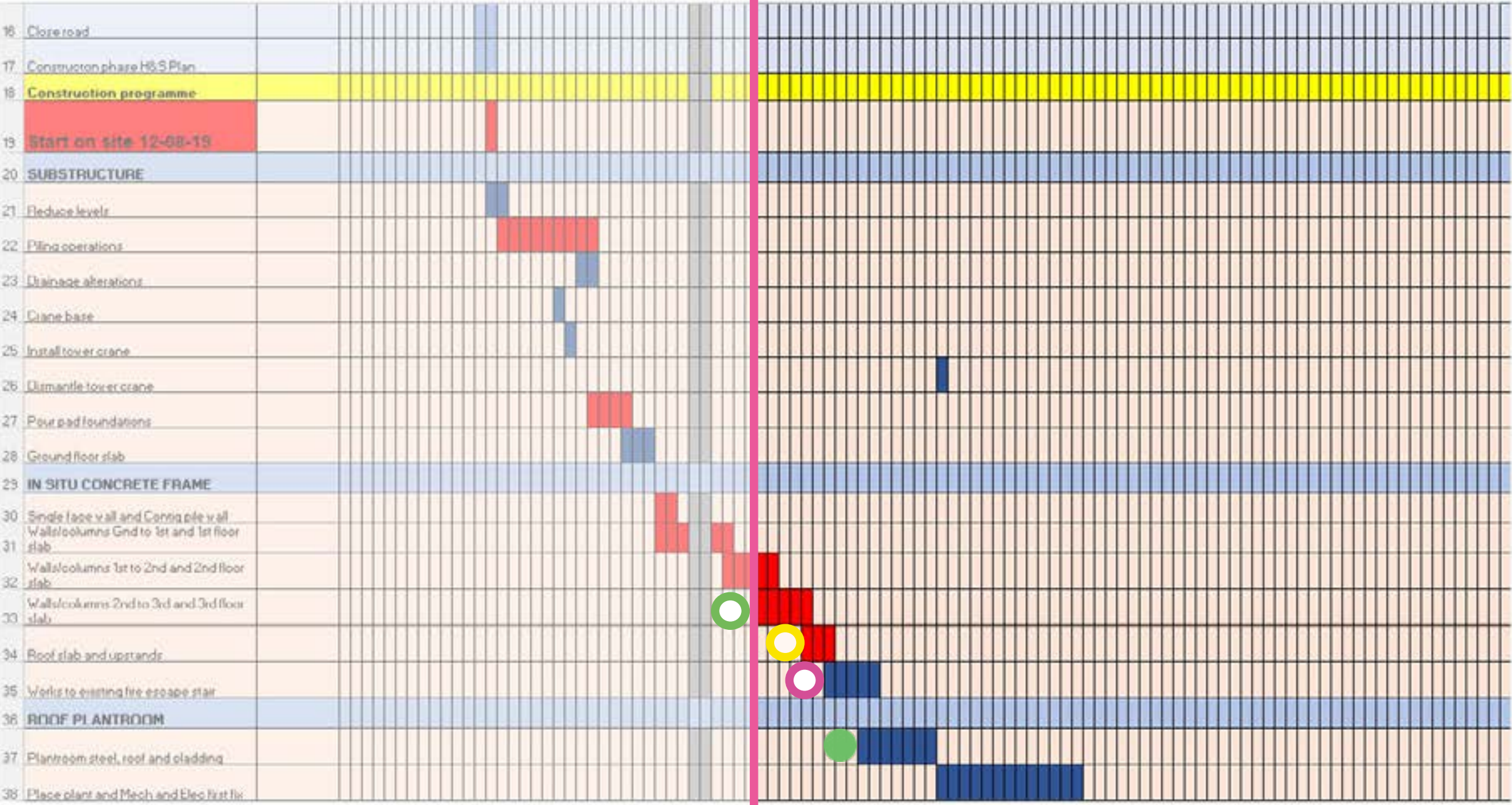
The progress once again seemed a little stunted from the top of the embankment on Dryden Street when looking at progress made vertically. The first floor had been extended towards the same street, but the roof slab above the revolving door was not yet poured onto its reinforced steel backing. In fact there was no steel system in that area at all, instead, workbenches for the construction of revolving door components. With the first floor unfinished, the second floor was unfinished.



With headway in the removal of both the existing foundations of the Dryden stairway and the asbestos that was found there made, the team can jump back into this area confident that they will encounter no further problems that will hinder their progress or cost them time.

Current position on programme :
Week 27 of 70.

Work is two weeks behind.



The roof slab and upstands are currently a pipe dream, but it is still a few weeks away. I would say this is the closest they've come to being on track so far, with the aim being to do the interiors of the bottom floor, now that the slab has been poured to a point at the turning of the Dryden building towards the street of the same name.



The arrival of the plant room stage will see the electrical and mechanical engineers jump into life as well as specialist tradesmen for installation of piping, electrical cables and sustainability systems.

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16	Closed
17	Construction phase MHS Plan
18	Construction programme
19	Start on site 1-2-2016
20	SUBSTRUCTURE
21	Reduce levels
22	Piling operations
23	Dewatering operations
24	Crane base
25	Install tower crane
26	Demolish tower crane
27	Excavate foundations
28	Ground floor slab
29	IN SITU CONCRETE FRAME
30	Strike face wall and concrete wall
31	Wall columns 1st to 2nd and 2nd floor slab
32	Wall columns 2nd to 3rd and 3rd floor slab
33	Roof slab and west ends
34	Works to existing fire escape stair
35	ROOF PLANTROOM
36	Plantroom steel, roof and cladding
37	Place stone and Merch and Elec first fix

28	Floor and floor slab	
29	IN SITU CONCRETE FRAME	
30	Strip/lap wall and Cornice pile wall	
31	Wall/columns 1st to 1st and 1st floor slab	
32	Wall/columns 1st to 2nd and 2nd floor slab	
33	Wall/columns 2nd to 3rd and 3rd floor slab	
34	Roof slab and upstands	
35	Works to existing fire escape stair	
36	ROOF PLANTROOM	
37	Place/rein steel roof and cladding	
38	Place piers and Mesh and Elec test pits	
39	EXTERNAL ENVELOPE	
40	SF3 framing and board	
41	Windows and outside walling	
42	Support angles	
43	Precast concrete columns	
44	Blockwork and feature concrete cills	
45	EXTERNAL ENVELOPE	
46	Install rooflights, insulation and form soffits	
47	Roof coverings and waterproof parapets	
48	ENTRANCE TERRACES	
49	Scaffold, envelope finishes, reviling doors etc.	

Site Logistics Plan (Vettori)
GA Plan- Ground Floor Plan Draft. (Vettori)

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Concrete slabs use for kingpost walls and flooring. The notches enable them to be interlocked and/or make them easier to lift using a crane, by obtaining a point to tie and winch by.

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Looking deeper into the connections between the framework and foundations, I came across ways in concrete structures to fuse structural elements in different planes. The starter bars act like a supportive steel beam when poured atop of, its origins being inside the column or wall component, providing extra stability. The floor slabs are regularly held by a lattice of steel beams underneath and are arranged like a chequered print.

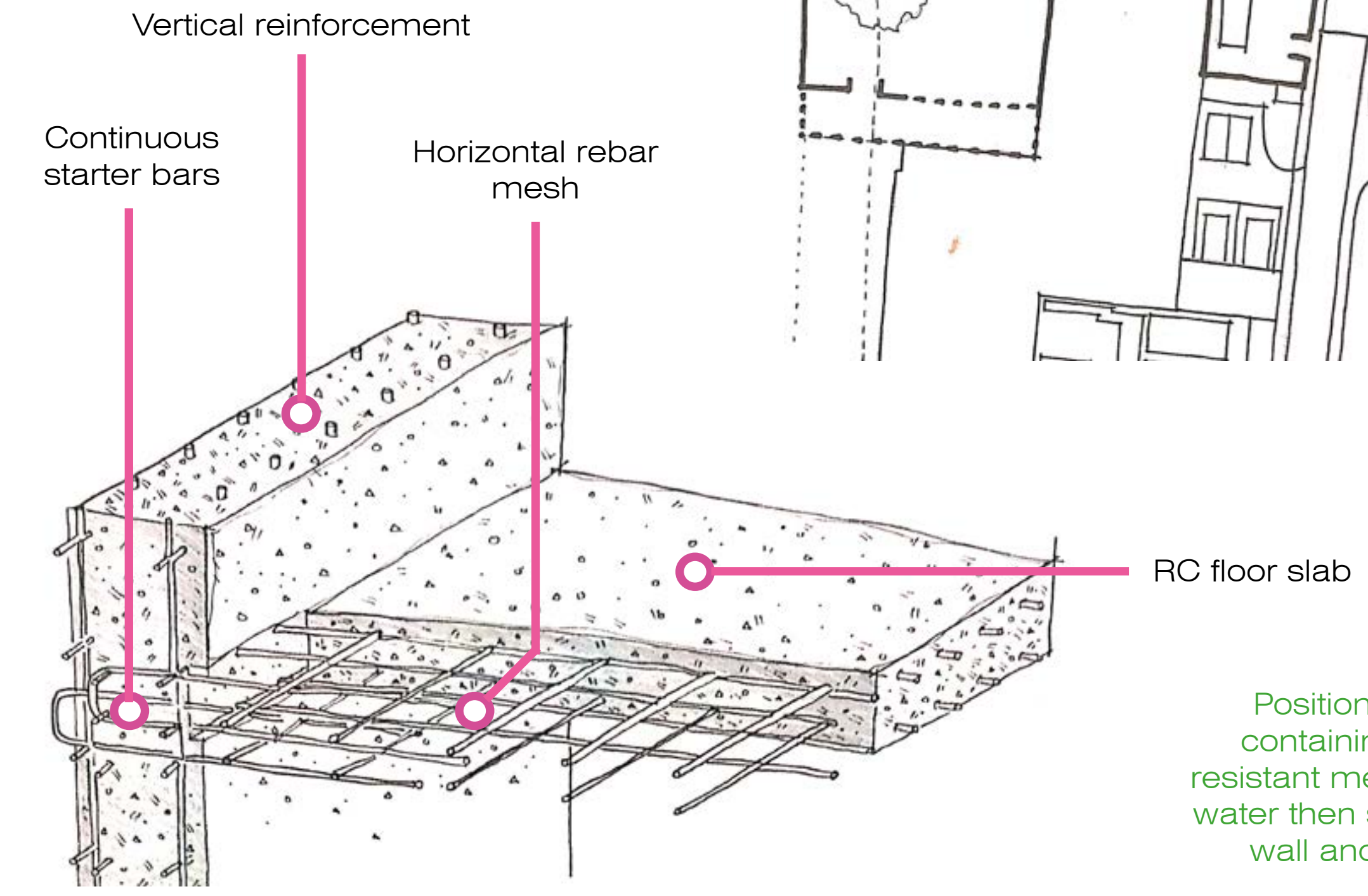
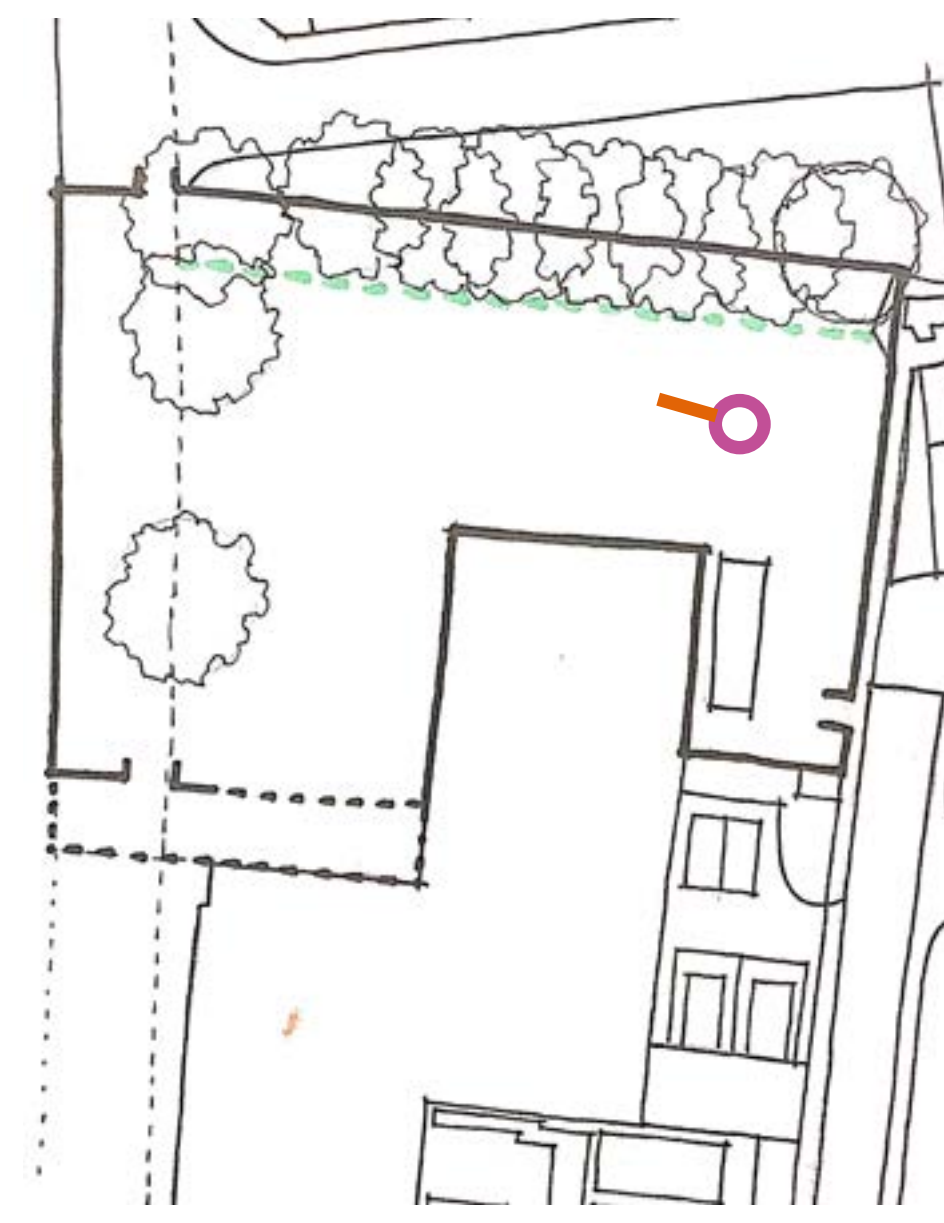


Fig 6.2: Starter Rebars (Beeley, 2020).

View Direction:



Unfinished ceiling, first floor base poured. Must be done by hand by concrete labourers.

Slit which will be covered and filled by insulation and grey brickwork, as a improvisational design continuation.



Fig 6.3: Earth Void (Beeley, 2020).

Contiguous pile foundation

Underfloor insulation, to be placed above the currently damp foundation slab. Internal works will be done including the fitting of the insulation in order to offset losses of time and get ahead in later aspects of work. This would first mean the area would have to be rid of its water, and made watertight, the main way in which water is entering is via the sloping void from the slit between the soffit and foundations above.

Positioning of internal blockwork containing insulation, with a water resistant membrane on the outside. The water then seeps into the ground by the wall and into a drainage system.

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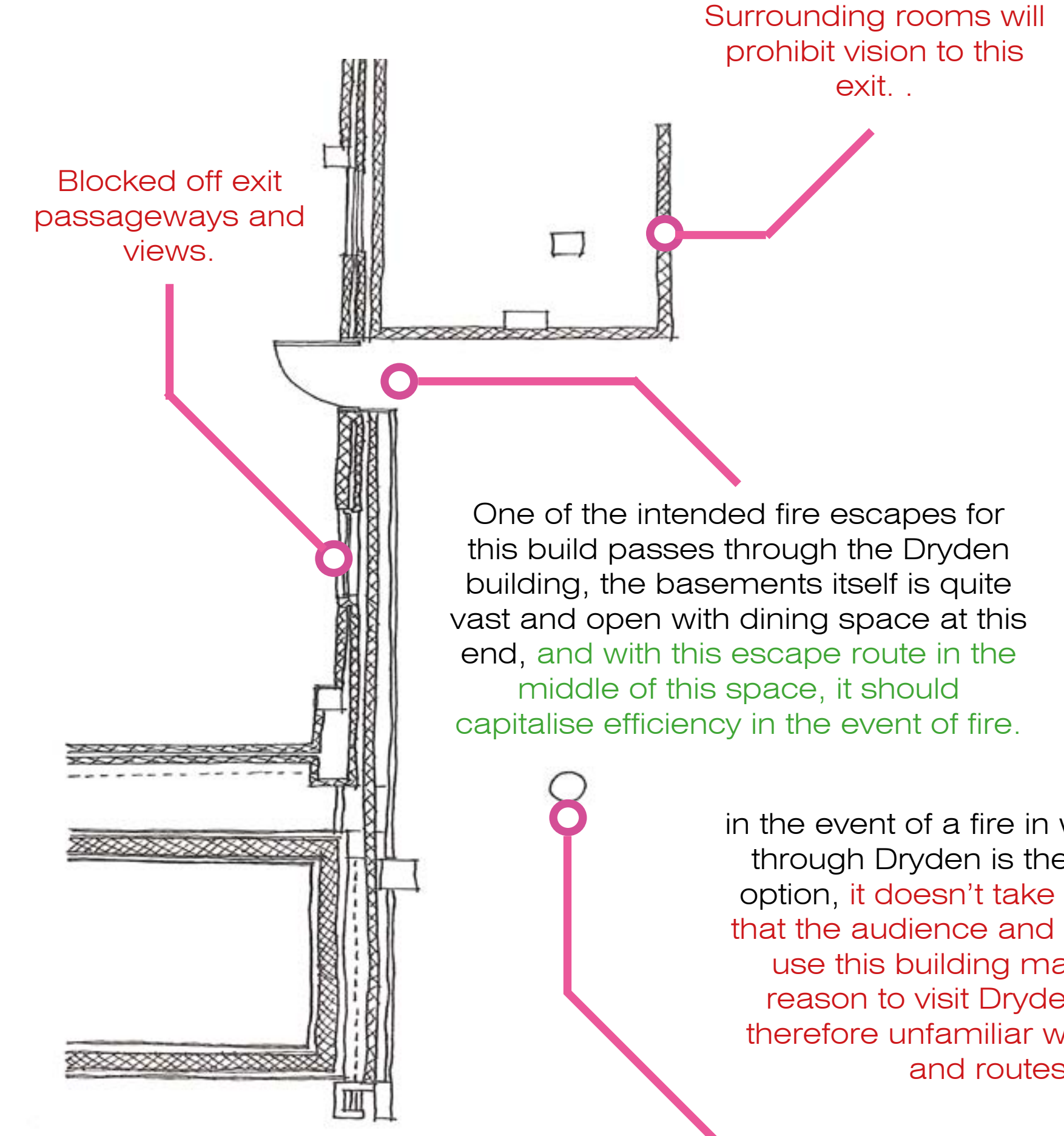
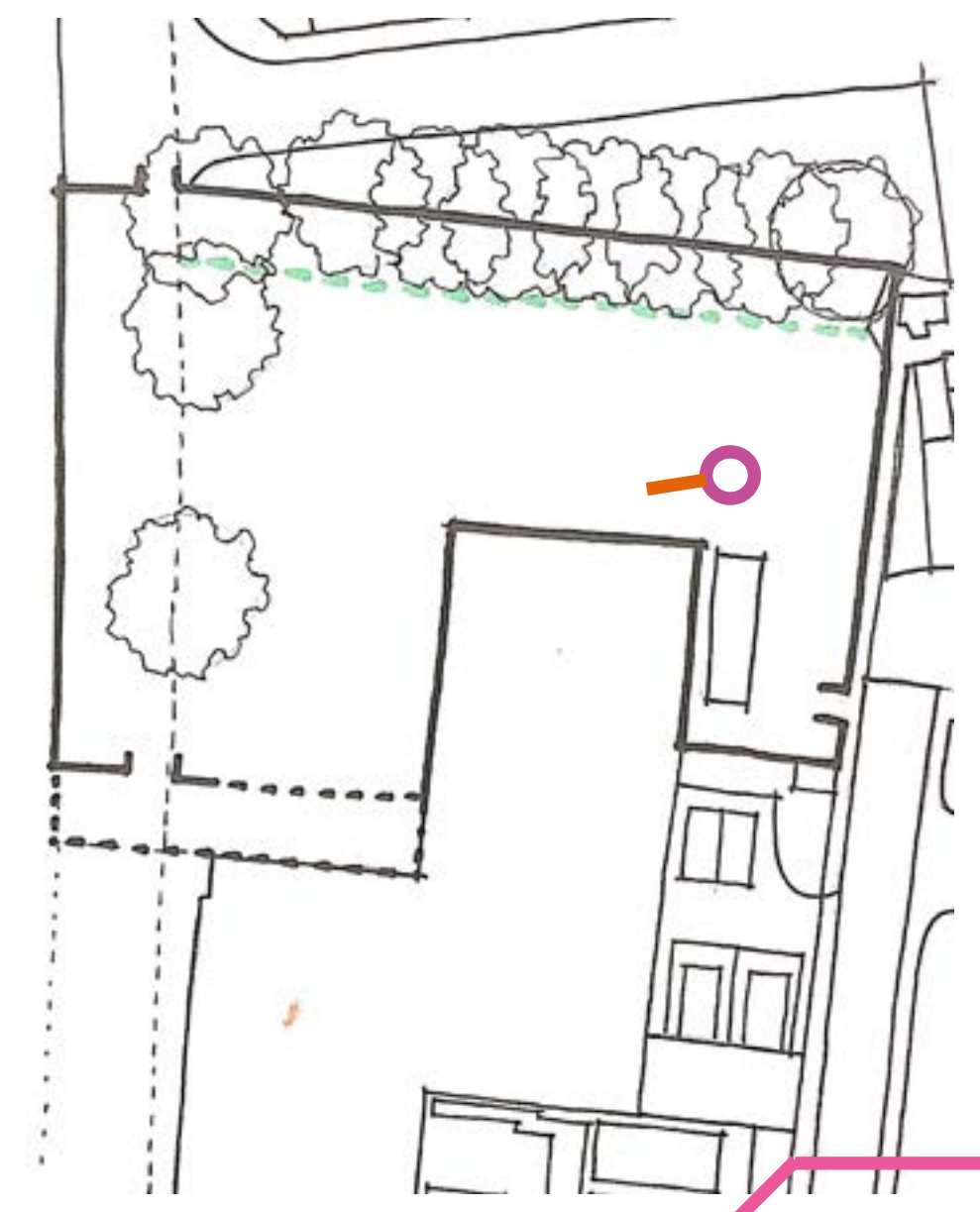


Fig 6.4: Dryden Detail (Beeley, 2020).

View Direction:



Site of asbestos in old Dryden staircase foundation.

Fire escape to Dryden



Fig 6.5: Dryden Fire Exit (Beeley, 2020).

Drainage is currently a small issue when the construction exposes materials such as waterproof concrete in their raw state. Although it's a positive the ground isn't absorbing it in..

Steel structure and scaffolding

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The urgency in completing this area as reported by the site manager stems from it essentially becoming a water basin. It is not the concrete I am concerned about, but the earth berm walls and exposed pile work that could slowly decay weakening the foundations, as a large pool sits just below it, seeping through the soil both downwards and horizontally. The addition of land drains will keep the earth firm for any masonry that goes on top.

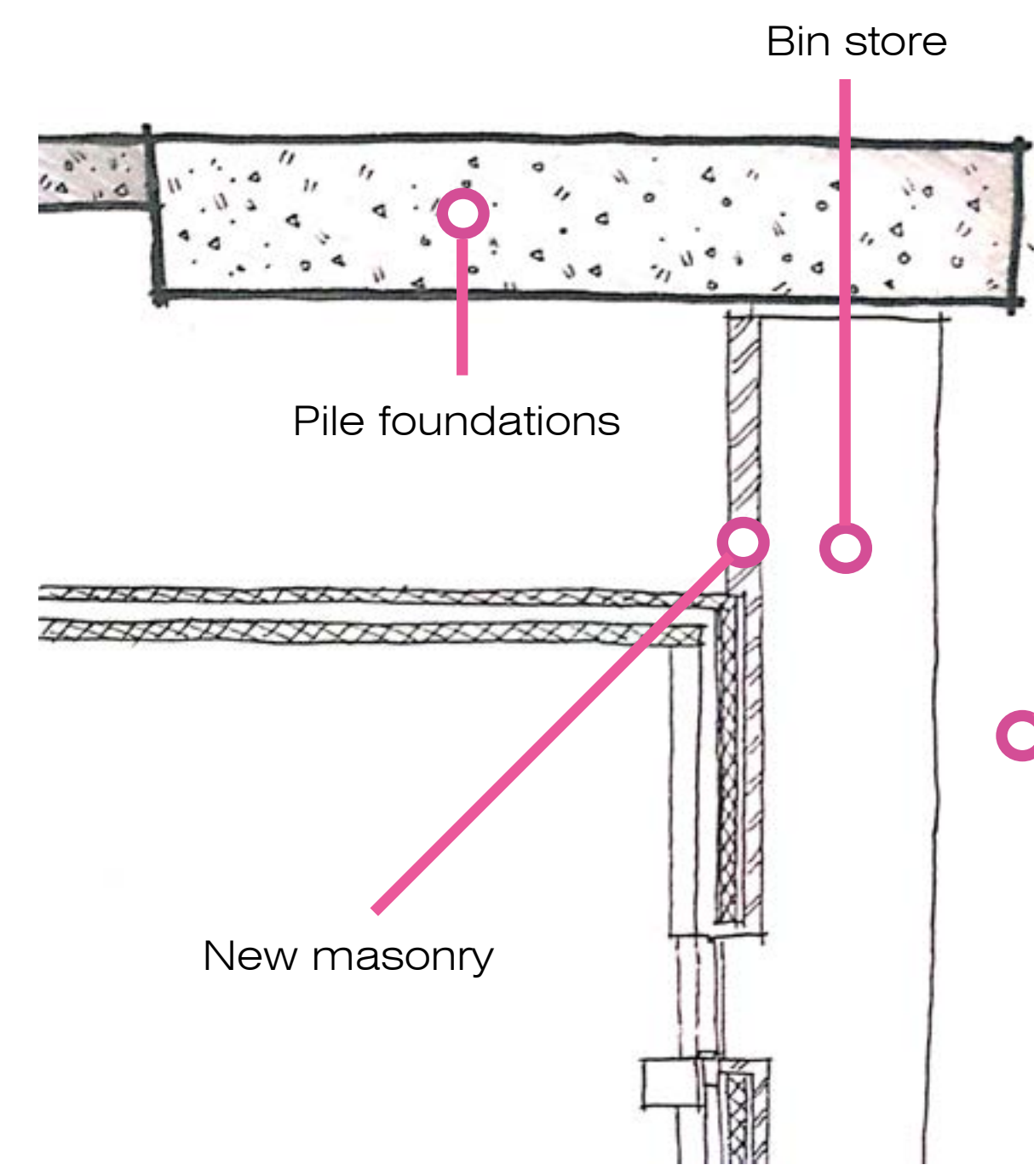
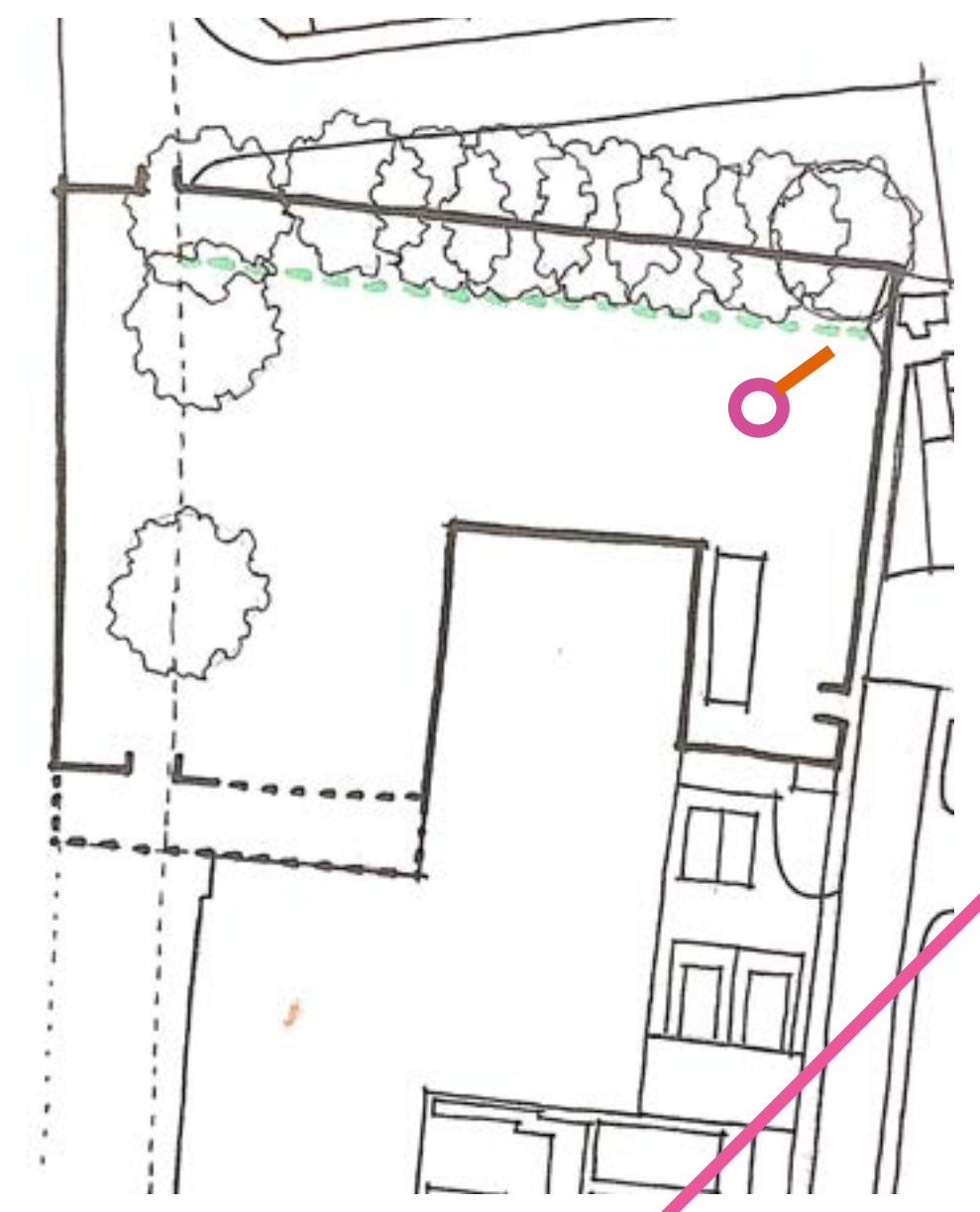


Fig 6.6: Back Alley (Beeley, 2020).

View Direction:



The back alley space is sheltered by the second floor overhang.

The seminar space on this area's edge will house exposed blockwork and painted plaster and be carpeted. Therefore to add these finished the walls and floor alike must be dry.

Exposed contiguous piles

Collection of rainwater muddied by the surrounded soil and level change embankment.

This space will be used for the storage of bins and other maintenance items out of the public eye.



Fig 6.7: Flooded Basement (Beeley, 2020).

Kingpost wall

Formwork for walls and floor slabs. This known void can be used as storage for the time being, although it will fill with water should the weather change. Damaging of materials could waste time in their reordering.

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One of the most relevant parts of the construction in terms of the Revit tasks I also need to produce. Much like the rest of the construction, progress is being made from back to front, that way space is saved and access out of the site is uninhibited. The framework beyond the lift core as seen to the right of the picture has poured concrete slabs on top, but they still have one more week of curing before they can be walked on. It makes sense; as the traders and team have done in this case, to acclimatise on jobs you can do with set concrete elements. While others are still curing and areas are inaccessible.

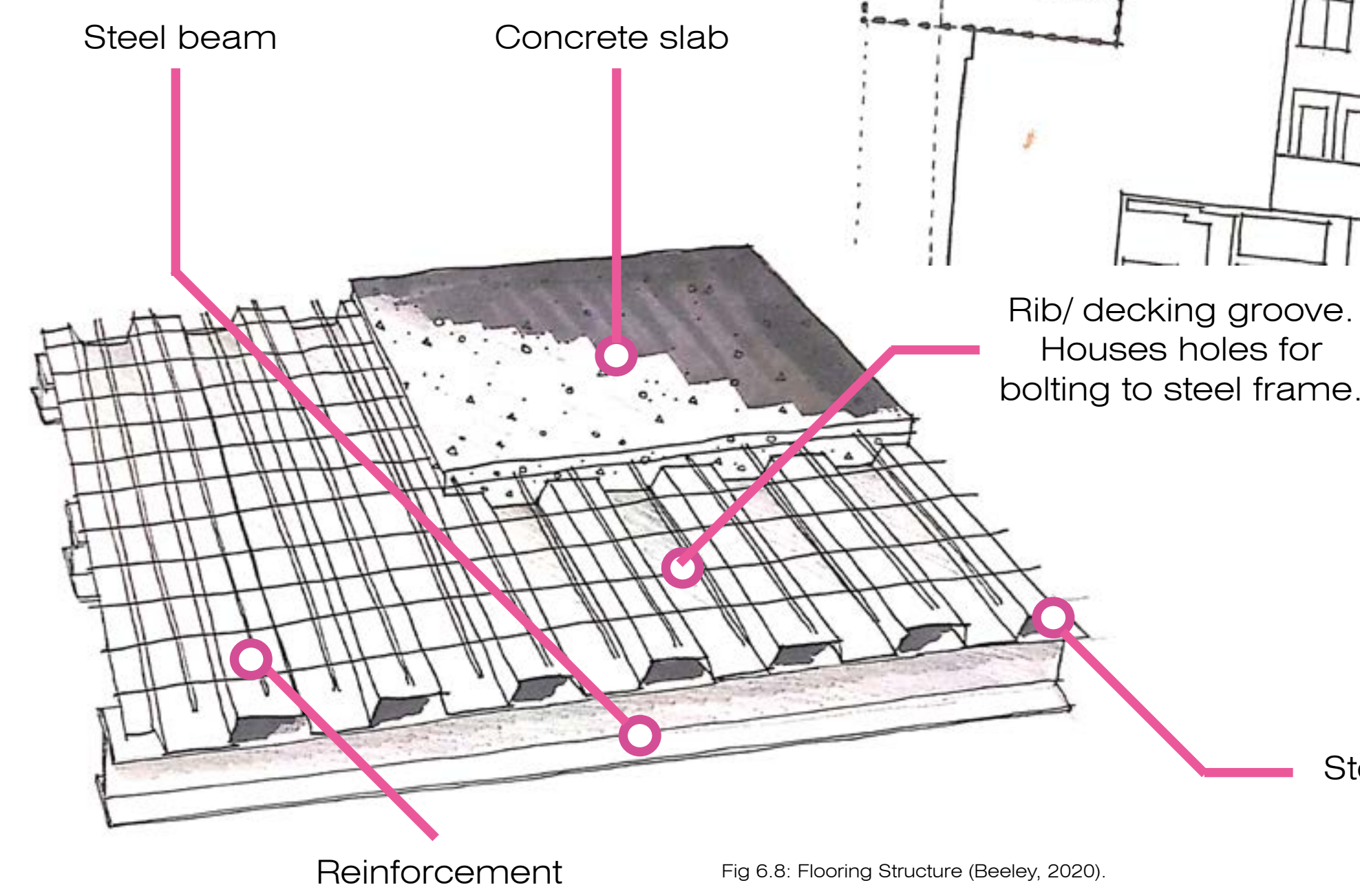


Fig 6.8: Flooring Structure (Beeley, 2020).

View Direction:



Rib/ decking groove. Houses holes for bolting to steel frame.

Beams that sit atop of each-other and decrease area needed to be covered by individual slabs are also perpendicular for strength.

Grid-like support beams between the columns prevent accidents in the workplace involving the dislodging of scaffolding columns. As these such columns aren't permanent on site or to the build. Due to the increasing amount of workers on site compared to other visits, care must be taken in navigating them.



Fig 6.9: Steel Decking (Beeley, 2020).

The steel decking runs perpendicular to the direction of travel of the steel scaffolds.

Natural lighting is seemingly lacklustre despite this being a public partial basement space, of which you enter straight through the revolving door or via the back.

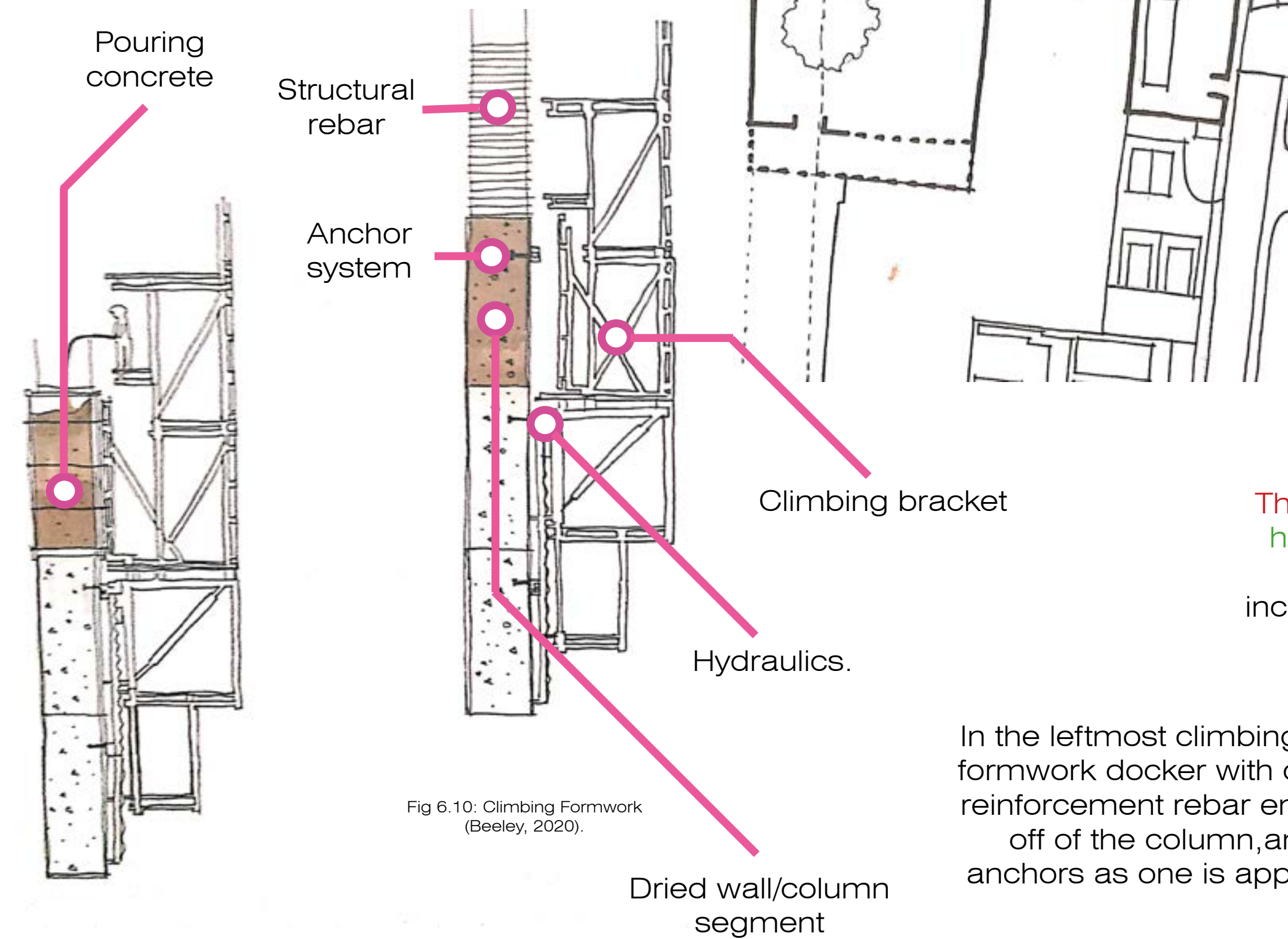
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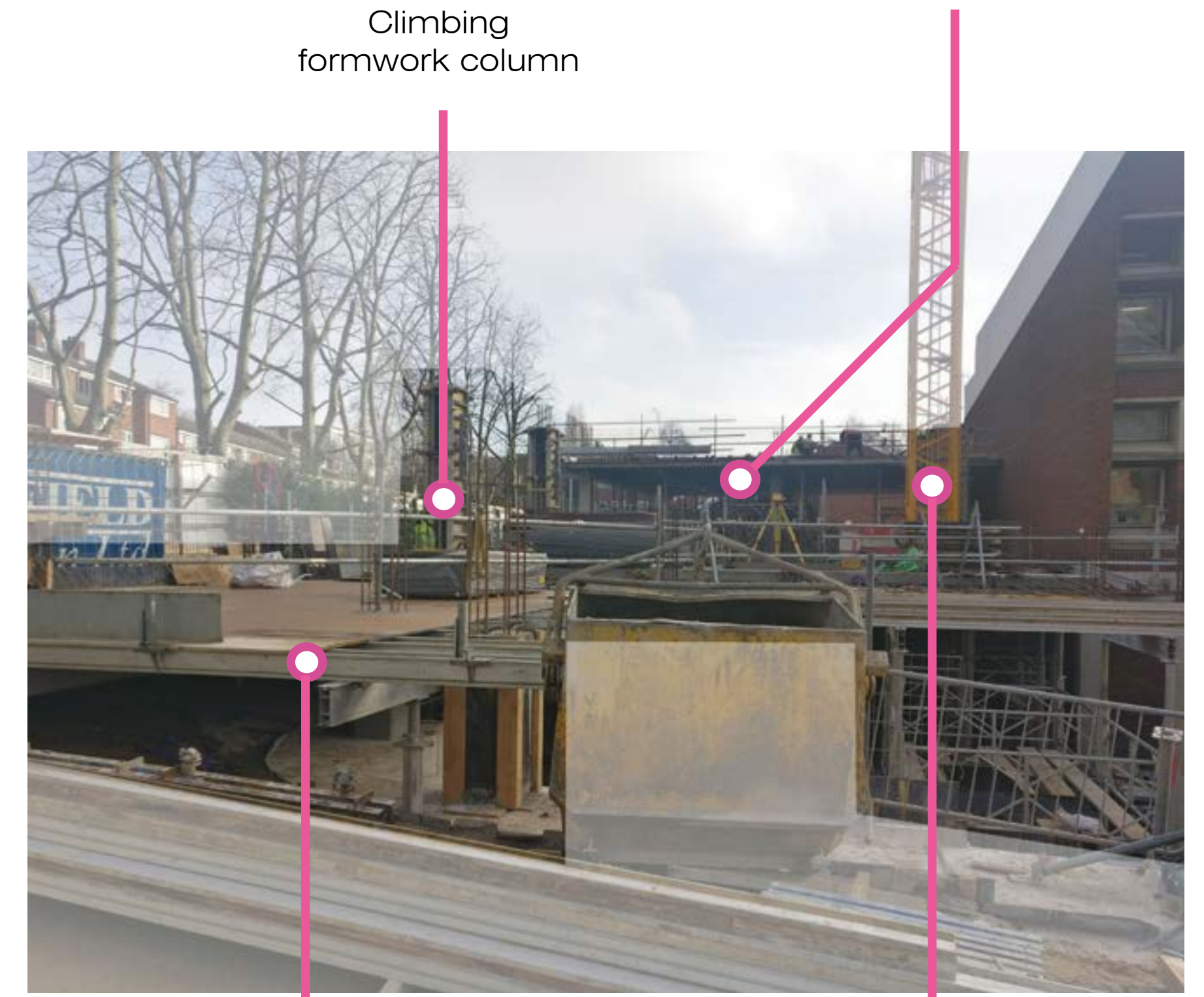
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There are a few variants of climbing formwork within this build that are especially prominent on this visit. The first being the square and circular columns that retain their position through all floors of the building. The process of removal or shuttering and the raising of it to the next level with the crane, to then remould the next part of the column is different to the example below used on free-standing structures, and is much easier.



In the leftmost climbing formwork diagram, upon filling a formwork docker with concrete and allowing it to set with reinforcement rebar encased within, the docker is pulled off of the column, and the structure is rolled up the anchors as one is applied atop the highest set element.

Second floor roofing elements in progress. The aim being to begin roof and external cladding after the ground floor interior is almost completed, the structure being totally finished within the next ten weeks.



The unfinished first floor at the front of the site, houses wooden boards to use as planks for traversal at this level, this may also be incorporated into the scheme as a basis for the soffit and ceiling below.

Not necessarily an example of formwork, but the crane is erected in pieces that top each-other, loaded by another crane, unsuitable for fitting within the site due to it's size in relation to the site.

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Section 3: Specialist Subject Pages

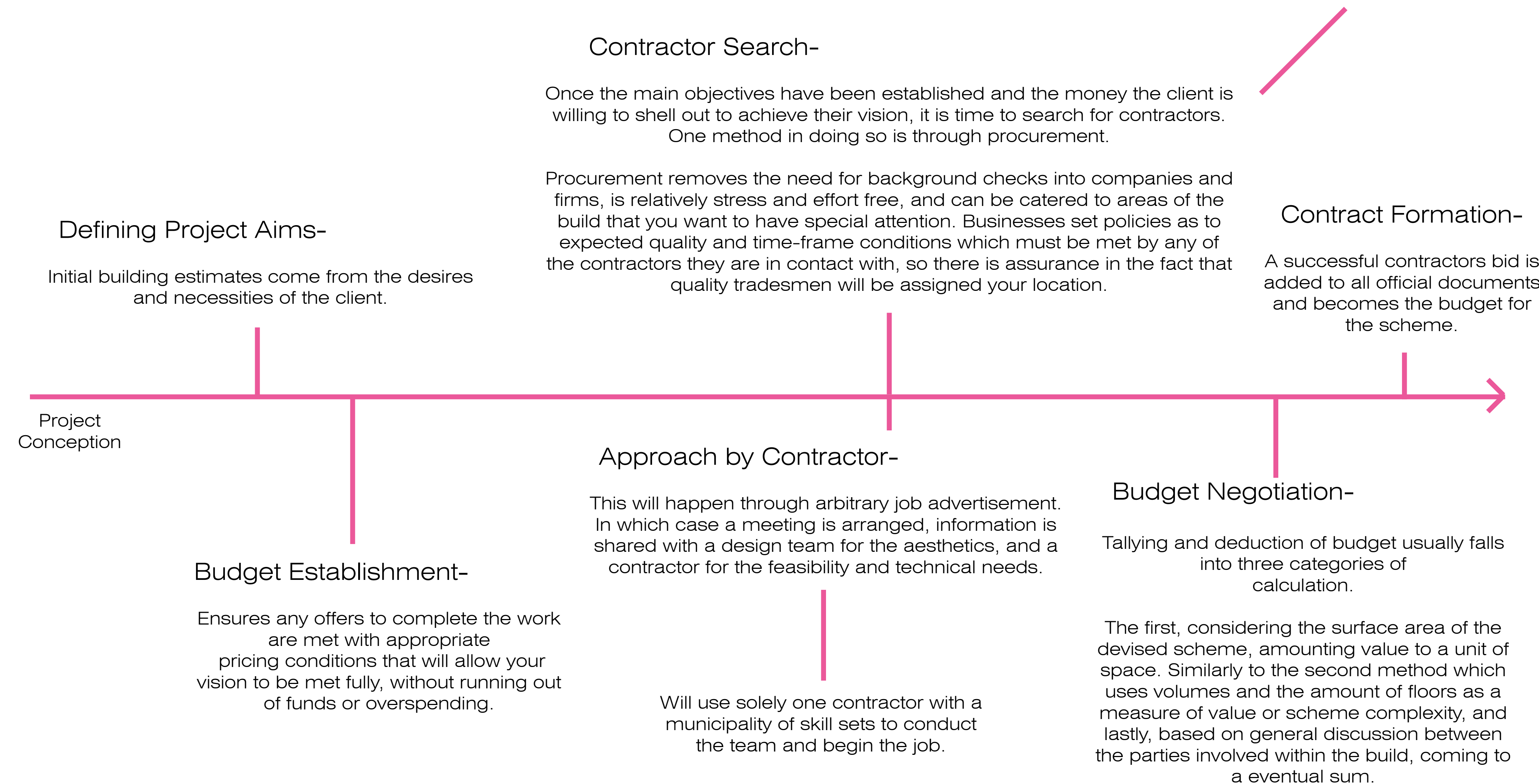
Contracts

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Price Forecasting and Contract Selection- Project Negotiation Timeline

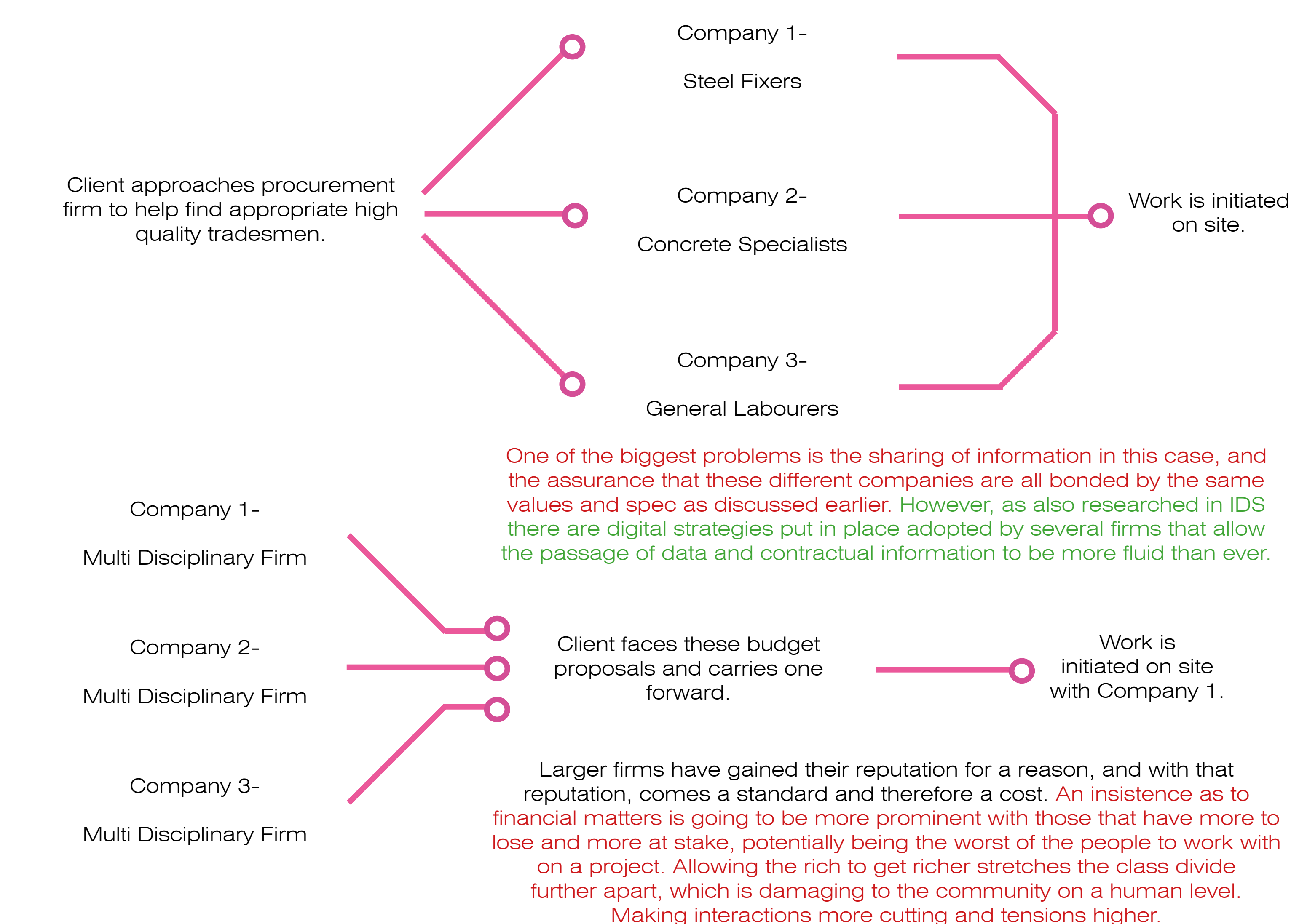


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Procurement Pros and Cons-



This process allows for a variety of companies to benefit which will boost the local economy.

There is however a large range of options and professional advice, some of it being subject to bias with companies that coalesce and are in partnership or co-ownership. With varying customer reviews for a natural waveform of job satisfaction, nothing is guaranteed. Some of these reviews and expert opinions will naturally clash due to difference in practise, method, specification usage etc:

Failure may span from the individual worker/s and how they represent and tarnish the company name, not the procurement process.

Larger firms require larger sites, which could mean that their headquarters are based more rurally for the purposes of material storage in a wide variety. This would mean the embodied energy of the material transportation could be greater than that of a variety of smaller central based firms working on the job.

Workers in this field that oppose procurement would argue that establishing the design and detailing in one place, with the same set of united co-workers, will mean there is less margin for error during the building process. Conflict is also less likely to spark if several companies don't invade their working space.

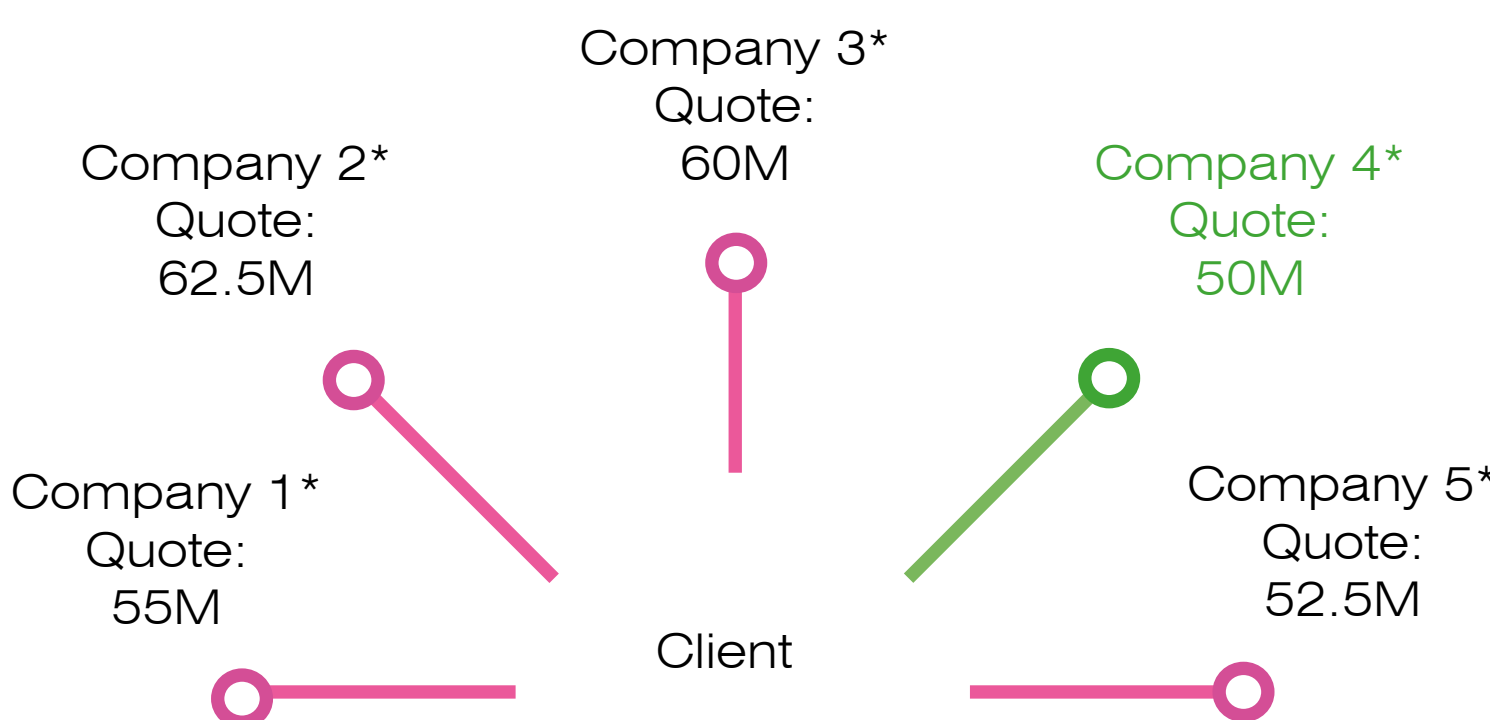
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Contracts and Competition Pros and Cons-

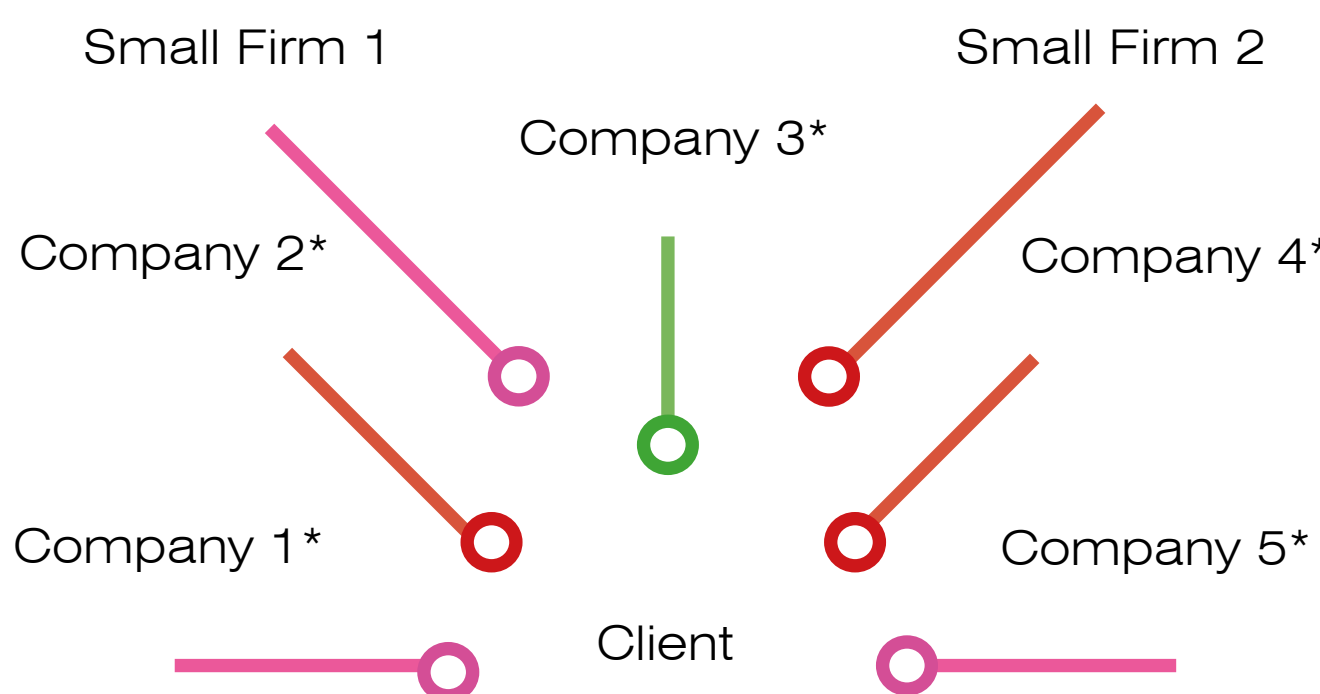
Selective Competition-



Selective competitions to obtain contracts are put towards the companies by the client, often selecting the cheapest option.

With auction based deals like this, there is always the reluctance to reduce the bid, due to the difficult circumstances and domino effect this may have on the service that a company can provide, the workers they can send and the time-frame in which they have to work. This single-sided take on deciding may not guarantee the best workmanship or service, with no analysis into specialist capabilities unless done so before the sending of the documents to each firm.

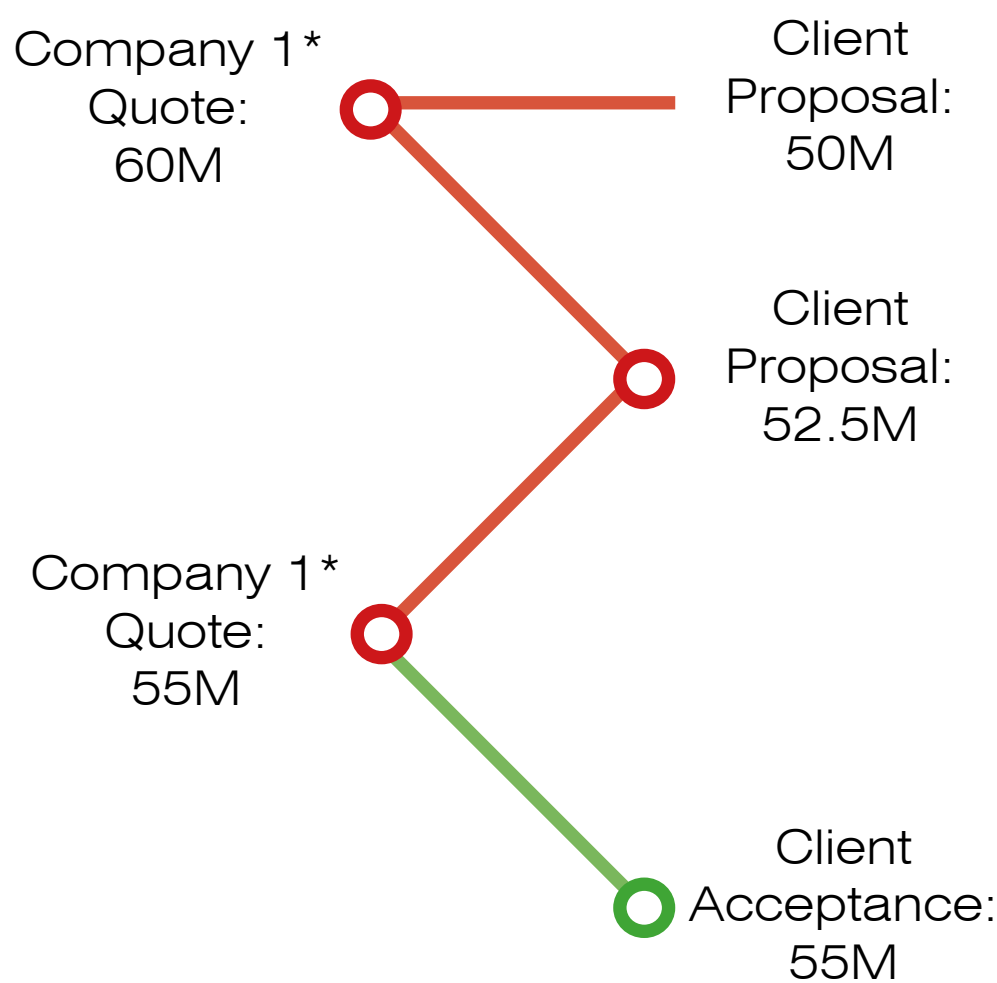
Open Competition-



In open competition, any firms no matter big or small who may not necessarily meet the criteria needed to fulfil the brief, worker requirements, professional standards or experience, have their chance to apply. The client however discounts unsuitable firms by not sending them the relevant building information for them to then make a quote on the work.

By casting the net wider to include up and coming small firms with a reputation to not withhold but build from nothing, they are more likely to receive smaller bids on the job price. The ball is then in the client's court to sift through appropriate candidates and base their decision on ability or the lowest sum of the remaining offers.

Negotiated Contract-



If no competition presents itself in the open competition stage except one firm, negotiations happen until a price is agreed.

In this case the firm has the power in leading negotiations with the knowledge they are guaranteed the investment, less the client be without a contractor at all. This leads to higher costs than planned, although with everything so black and white, pricing errors may be less frequent in the future. Discussions can start easily, as can site work, despite there being uncertainties as to quality and work ethic.

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Investigative Site Diary Summary-

Summary of the Site Visits-

I think what has impressed me the most or surprised me about the construction field from the visits is the ability of everyone on site to down tools if something cannot be done, and immediately move onto something else, not to lose time. Several instances on site regarding errors or inefficiencies in the plans that couldn't realistically be constructed under spatial constraints lead to reconsidered planning, and during the periods in which new plans were drafted, any unaffected building elements were continued, everyone on site aware of the time pressure they were under and the fact they were behind schedule for the majority of the build so far. I have confidence they will finish on time knowing despite some elements being weeks behind, other elements of the site such as the ground floor interior will be finished a month ahead of time. It's logical to assume this, as the programme was initially made to house every job before the December 2020 completion date, and so on paper, it is feasible to get everything done. Otherwise work wouldn't have commenced, or the finishing date would have been extended. This means so long as work is continuous and the estimated duration in which individual jobs were supposed to take; for example the ground floor slab, remains the same, when it is done doesn't actual matter, so long as this doesn't then restrict the time in which to do follow on jobs. Speaking of the slab, its pouring was over 4 weeks late, but its drying time of two weeks at this scale is a constant, so the team did other jobs to counter this loss. In other words, programme pitfalls caused building tasks to be completed later than anticipated, but didn't reduce the time they had to do them in. At this early stage being behind isn't worrying, especially since they briefly recovered so miraculously in week 4, as in every construction project, mistakes will be made. We're only human, and despite the growing popularity of BIM in the construction filed in this day and age, humans and therefore human error can never be fully eradicated. The hope is that the programme also caters to this understanding that things will go wrong and there are some forces and delays simply out of any reasonable control. There has been evidence of continual good conduct on site, with the appropriate measures taken to remove the asbestos with great regard to health and safety in this case and as the basement level was excavated guarding the drop with barriers on all sides. Capping to the large amount of metal rebars was also smart as the site began to intensify in week 3.

What have I learnt and how can I apply it?

Clarity on my part as to the structural connections will no doubt benefit my construction task work in this topic also. Using my understanding of at least floor slabs and/or their under-layers to convey the structure of an office building I have been developing in Revit. My understanding of details and their components and drawings conventions that portray different materials has increased as I have delved deep into the documents of the site. The sections focused on will have been different, but the technique and background info is applicable to any detail section. For example, when creating my office roof in Revit, I can't consider many if any details examined for the current progress on site as it happened, because the roof hadn't been constructed, so I had no reason to study it. I can now go back confident I can deduce its structure. What I think I've learnt more than anything from this experience in terms of the production of my work is how to decipher detail diagrams and read specifications. I was overwhelmed at first by the masses of diagrammatical and written information on the ground floor and foundation sheets, as well as the column section and floor section sheets, but as with everything simply taking the time to compare them and connect them side by side in a quiet room alone suddenly made me understand the links between the sheets and I began to understand what I was seeing. It is also shocking to me to see the sheer amount of sheets produced and that are needed to convey the building fabric, structure and materiality to the tradesmen, and I probably haven't even seen half of them. There will also be focused fire escape route sheets with fire blanket, extinguisher and alarm systems labelled, sheets for the electrical outlets and internal wall cabling etc: all of which need to be utterly specific and crystal clear in their presentation and information, which these sheets and specs must be, due to the lack of error on site throughout the first 27 construction weeks. It was also really rewarding to consider deeper the contractual obligations of everyone on site, just how much is on the line as to reputation and future business with this build and any build, as to time, quality, site conduct, communication between your peers and improvisation and ability to think for the future, but also fix immediate problems as they arise on command. I've definitely developed a new found respect and appreciation for those in the construction industry, and its projects and experiences like this, that open your eyes and that will potentially rekindle the relationship between architect and engineer in an age where demands of all kinds are increasing, there is simply no time to not get along.

Section 4 : Referencing and Bibliography

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