London Underground Ltd

York Road Station Re-opening

Volume 1

Technical Pre-Feasibility Report

March 2005

Halcrow Group Limited

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Figures

1 Executive Summary

1.1.1 London Underground Ltd commissioned Halcrow Group Ltd to determine the technical feasibility and quantified business case for an additional Piccadilly Line station, on or near the site of the former York Road Underground Station, which closed in 1932. The commission has two discrete outputs. The first, which relates to the technical aspects of the station re-opening proposition, is this technical pre-feasibility report. The scope of the technical aspects of the study was to identify infrastructure upgrade options for a re-opened York Road Station, to undertake sufficient engineering analysis to prove feasibility of construction of the proposed works, and to determine costs of design, construction and commissioning.

1.1.2 A series of archived drawings were made available by London Underground Ltd. These included sections and plans of some of the original construction drawings. The options developed by the team for the station were reviewed by LUL on various occasions, including a technical workshop. Site visits were made by members of the team in conjunction with LUL.

1.1.3 The general design principles adopted were:

- Step free access to platform level from concourse level
- Enlarged concourse with ticket purchasing facilities, based on anticipated throughput from the business study
- Reinstated platforms and upgrade of subterranean areas
- Station staff and commercial accommodation
- Secondary means of escape from platform
- Ventilation of tunnels and station
- Station compliant to current standards

1.1.4 The "do-minimum" solution developed uses the three existing shafts to provide from platform level a single lift shaft with twin lifts and an emergency staircase exit compliant with Standards, contained within a fire-hardened platform environment; and a ventilation shaft. The capital cost of the works necessary to reinstate the station on the do-minimum basis is £16.2M on the assumption that it could be carried out simultaneously with the Piccadilly Line Upgrade project.

1.1.5 That option provides a level of passenger capacity of 4200 pax/hr, limited by lift capacity. A number of derogations from Standards would be required to be sought as a consequence of the geometry of the existing sub-surface areas. To accommodate a greater throughput of passengers, additional lift capacity could be provided, but extensive reconfiguration of sub-surface areas would be required in addition, with substantial new tunnel works and track re-alignments necessary to eliminate the non-compliances with Standards. The potential disruption of such works to Piccadilly Line services would be substantial.

1.1.6 Considerable uncertainties exist in the forecasts of future patronage from the re-developed catchments area, and the extent of additional surface public transport links that would be provided to serve the 'Kings Cross Lands' development. If it became evident as the design of the development proceeded that a higher level of passenger throughput would be required over that accommodated by the "do-minimum" option, a completely rebuilt station would have to be contemplated.

1.2 Business Case Analysis

1.2.1 An outline business case analysis has been conducted on the scheme and is presented in volume 2 of the report. The appraisal has been carried out in line with the TfL Business Case Development Manual (BCDM) and engenders clear definitions of the scheme objectives and the measures of performance against which the benefits of the scheme are assessed.

1.2.2 The central case passenger demand forecasts indicate that around 9,200 passengers would use York Road Station during the morning peak. The Pedroute analysis of pedestrian movements through the station indicates that proposed design layout would operate within acceptable tolerances.

1.2.3 An assessment of the impact of re-opening York Road Station on the level of crowding at King's Cross St Pancras indicates it will provide little in the way of congestion relief. Furthermore, the addition of a further stop on the Piccadilly Line provides considerable journey time disbenefits to all existing users.

1.2.4

1.2.5 Overall, the scheme performs poorly in economic terms with a negative net present value to society of -£34.1 million and a benefit to cost ratio of merely 0.03 : 1.

2 Introduction

2.1 Purpose of study

2.1.1 London Underground Ltd commissioned Halcrow Group Ltd to determine the technical feasibility and quantified business case for an additional Piccadilly Line station, on or near the site of the former York Road Underground Station.

2.1.2 The commission has two discrete outputs. The first, which relates to the technical aspects of the station re-opening proposition, is this technical pre-feasibility report. The second, which relates to the business case aspects, is a Business Case prepared in accordance with Transport for London guidance and methodology.

2.1.3 The scope of the technical aspects of the study is as follows:

(i) Identify infrastructure upgrade options for a re-opened York Road Station, to be compliant with London Underground Ltd space planning standards, and incorporating step-free access. Existing (disused) station infrastructure is to be considered for re-use wherever practicable, to minimise the cost of the required works.

(ii) Undertake sufficient engineering analysis to prove feasibility of construction of the proposed works, and to determine costs of design, construction (including all necessary fitting-out) and commissioning to a stated accuracy tolerance not worse than 50%. Demand assumptions for station sizing assessment are to follow the guidance in London Underground Ltd Station Demand Modelling guidance.

(iii) Assess and cost modifications to tunnels, track, signalling, and other line-side systems necessitated by construction and operation of the new station. It is to be assumed that these would be integrated with the future Piccadilly Line Upgrade works

2.2 York Road Station

2.2.1 York Road Underground Station, approximately 1km north of Kings Cross station is positioned between Kings Cross St Pancras and Caledonian Road stations on the Piccadilly Line (fig 1). It was opened in 1906 but was closed in 1932 due to lack of demand from the sparsely populated, primarily industrial area that surrounded the station.

Fig 1. Location of station on Piccadilly Line (extract from Stingemore map supplied by LUL)

The surface building, situated on the corner of Bingfield Street and York Way (originally York Road), survived the war and its distinctive maroon façade, typical of the Leslie Green designed stations, remains substantially intact today with the original lettering still visible. Internally the station was similar in design to Caledonian Road Underground Station and in its original form had a small at-surface ticket hall with lifts leading to an island platform. The platforms could also be accessed by a set of stairs. (refer to Fig 2)

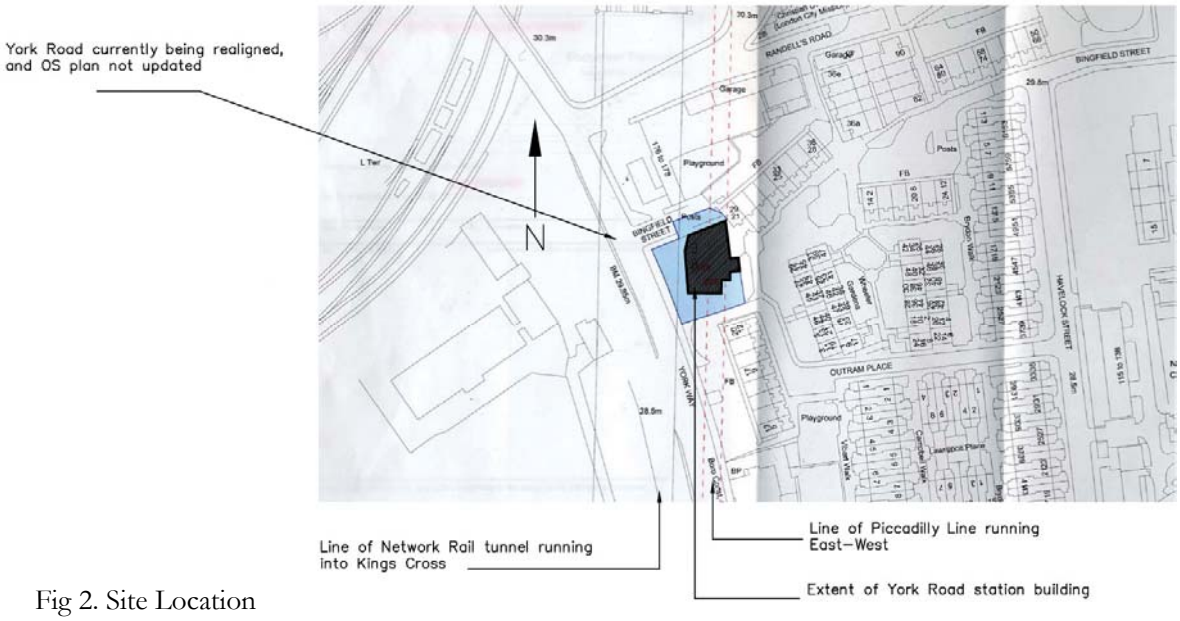


Fig 2. Site Location

2.2.2 The interior of the surface building has now been extensively modified for use as offices and workshops and is presently occupied on lease by TubeLines Ltd and Siemens Technology Systems, a supply chain partner of TubeLines Ltd.

2.3 Study Team

The following staff have been involved in the study:

- David Simmons – Project Manager
- Nick Haseltine – Architect
- Steve Beaumont – Mechanical and Electrical Engineer
- Alastair Smith – Ventilation and Tunnels Engineer
- Robin Walker – Railway Interface Engineer
- Upendra Dave - Signals Engineer
- Andrew Lee – Pedestrian Modelling
- Terry Davies (Cyril Sweett) – Quantity Surveyor

3 Methodology of Study

3.1 *Existing information*

A series of archived drawings were made available by London Underground Ltd. These included sections and plans of some of the original construction drawings, although not all the information was clearly identifiable due to their age and condition. They however gave an overview of the existing station infrastructure which will need to be clarified in more accuracy by a full measured and structural survey if the project proceeds further. The main drawings are included in Appendix B.

Additional information was made available which include the new road alignment to York Way outside of the station.

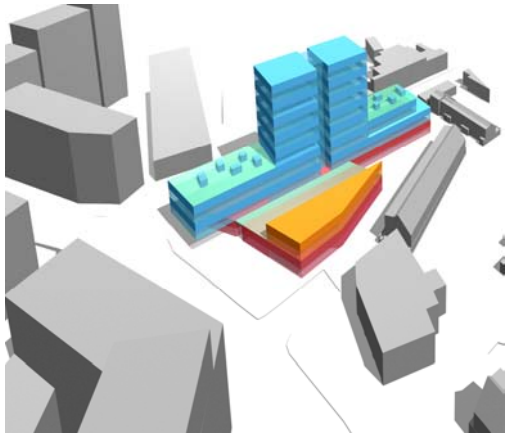
3.2 *Consultation and reporting*

The options developed by the team for the station were reviewed by LUL on various occasions, including a technical workshop held on 28th January 2005. Copies of meetings and workshop notes are included in Appendix H.

Consultations were held with:

Buschow Henley – Architects for developers of adjoining garage site on York Way. The proposals here are for an 18 storey residential development with commercial on the ground floor. Additional developments taking place within the immediate vicinity also include for a 240 unit residential development and a supermarket. (ref fig 3)

Fig 3. Concept proposal for development of adjoining site – York Rd station to lower right hand side. (owned and supplied by Buschow Henley Architects)



Additional consultations were held as part of the Business Case study, and these are included in that report.

3.3 Site visits

Site visits were made by members of the team in conjunction with LUL.

The first on 7th January 2005, consisted of a visit to the ground and first floors of the existing station building (now converted to office accommodation) and to the rear of the building leading down to the basement and top of the spiral stairs to platform levels. This constitutes the current emergency access and egress.

A second visit was made in engineering hours on 11th February to the sub surface areas; the base of the remaining shafts, cross passages and area of removed platforms.

Surveys and visual inspections made on these visits assisted in the design process and analysis for this report, and additional information are included in the section on the existing building.

3.4 Pedestrian Route Study

A pedestrian modelling study has been carried out, following inputs from the business case, and working in conjunction with the scenarios mentioned in this report. A copy of the pedestrian modelling technical notes is included in the business case report .

Fig 4. Existing overall
frontage of station building

4 Station Building

4.1 *Original building configuration*

The above ground building dates from 1906 and is very typical of the Leslie Green style of Piccadilly Line station, consisting of a maroon tiled external finish, 6 large full height arches facing onto York Way/Bingfield Street. The design is compact on the site, with an area to the south, which was never developed and sits atop the current spiral staircase shaft. (Figures 5 and 6 below and figure 7)

Fig 5. Front elevation facing York Way

Fig 6. Rear elevation

Internally, the original layout consisted of an entrance off the corner of York Way/Bingfield Street, gaining access to a ticket office and central lobby, between the two lift shafts. As the lifts were a through configuration and each shaft contained two lift cars, exiting out of the lifts at street level meant that there were exits from the station through the right hand arch to York Road and the central arch to Bingfield Street. To the rear of the ground floor, toilets were positioned and an access staircase went down to basement level directly below the building and thence via a spiral staircase, within the 3rd shaft, to platform level. This basement level also contained the original ventilation fans (venting up the centre of the spiral staircase shaft). (figure 7)

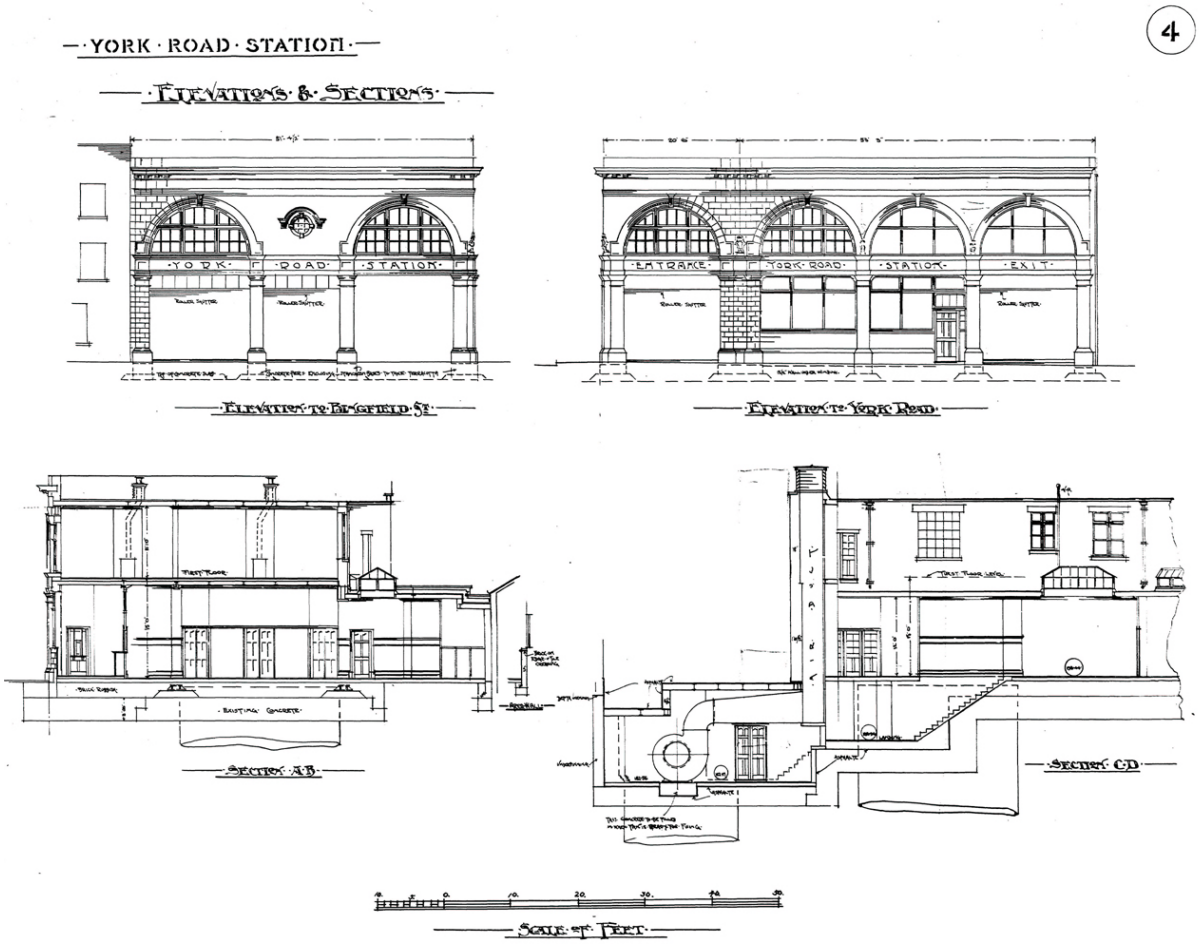


Fig 7. Original elevations and sections

The first floor, which was accessed via a staircase behind the central arch to the York Way elevation, contained additional accommodation and the lift motor rooms.

The height between concourse and platform levels is noted as 89' 6" (27.15m). The diameter of each original lift shaft is noted as 23'0" (6.96m) and the staircase shaft is noted as 16'0" (4.8m).

At platform level, the 2 larger lift shafts (for clarity shafts 1 and 2) and the smaller staircase shaft (shaft 3) were positioned between the two platforms. Central between the two lift shafts the lift access lobby was created which allowed for passengers to enter the lift cars at platform level, and then exit out the other sides at concourse level, and visa versa. The staircase within the 3rd shaft was approximately 2.2m in width, with a central ventilation core.

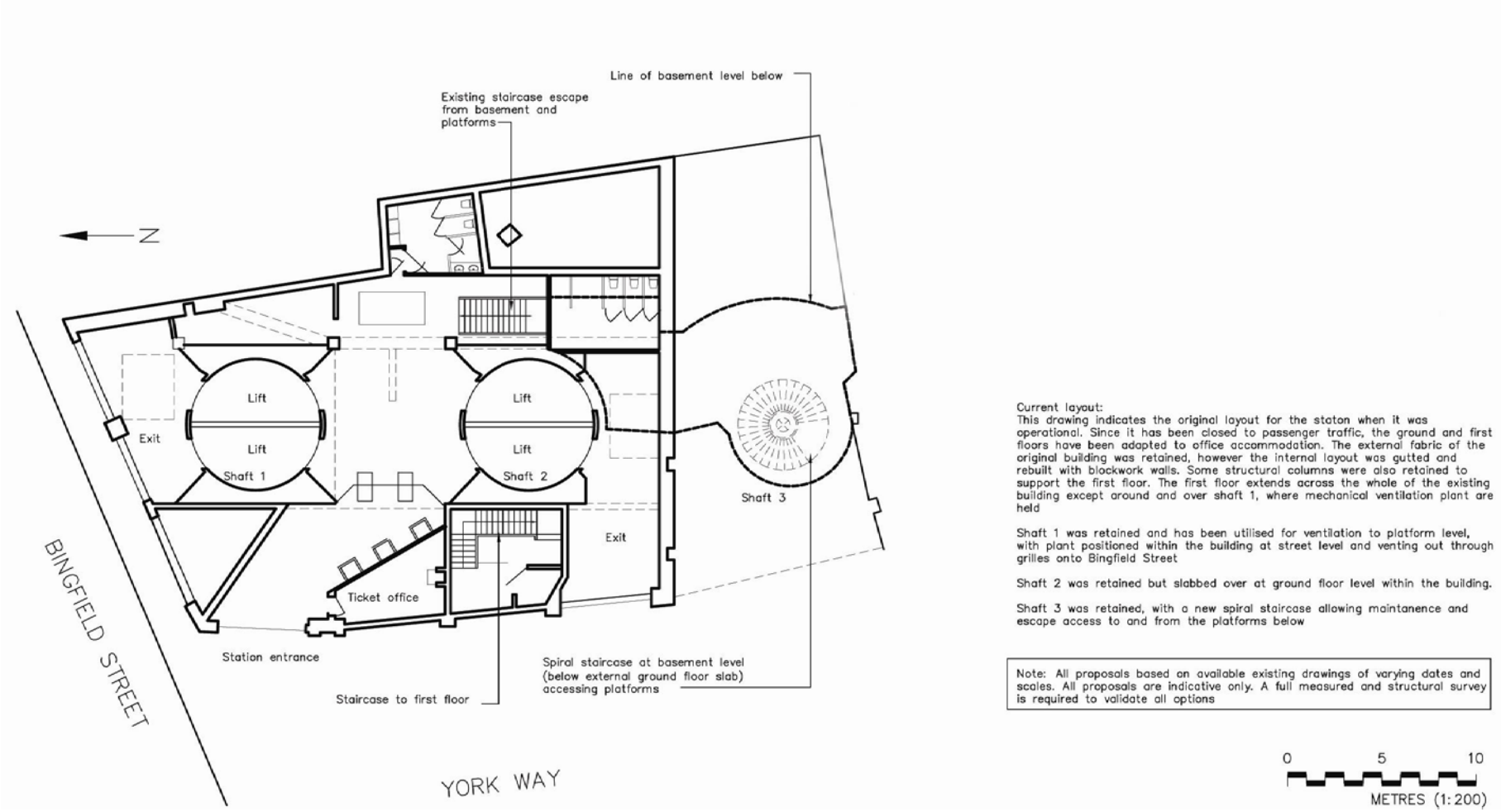


Fig 8. Original concourse layout of station prior to closure

Each original platform was approximately 350ft (106m) long and at a height of 0.5m above rail level. The tunnel accommodating the platforms is noted at a diameter of 21.0ft (6.36m). It can be assumed that the width of the surface of platform level was approximately 2.9m from edge of coping to back edge, although it also needs to be stated that because of the curvature of the tunnel coming in at this back edge, the full headroom could not be achievable over this entire width. (figure 9)

In addition to the 3no. central cross passages accessing the stairs and lifts, an additional 2no. cross passages were also provided, set back approx. 15m from the end of the platforms. The cross passages are approximately 10'0" (3.0m) in diameter with a 1.85m opening onto the platform.

Immediately off the end of the eastbound platform (going towards Caledonian Road), a facing crossover was provided.

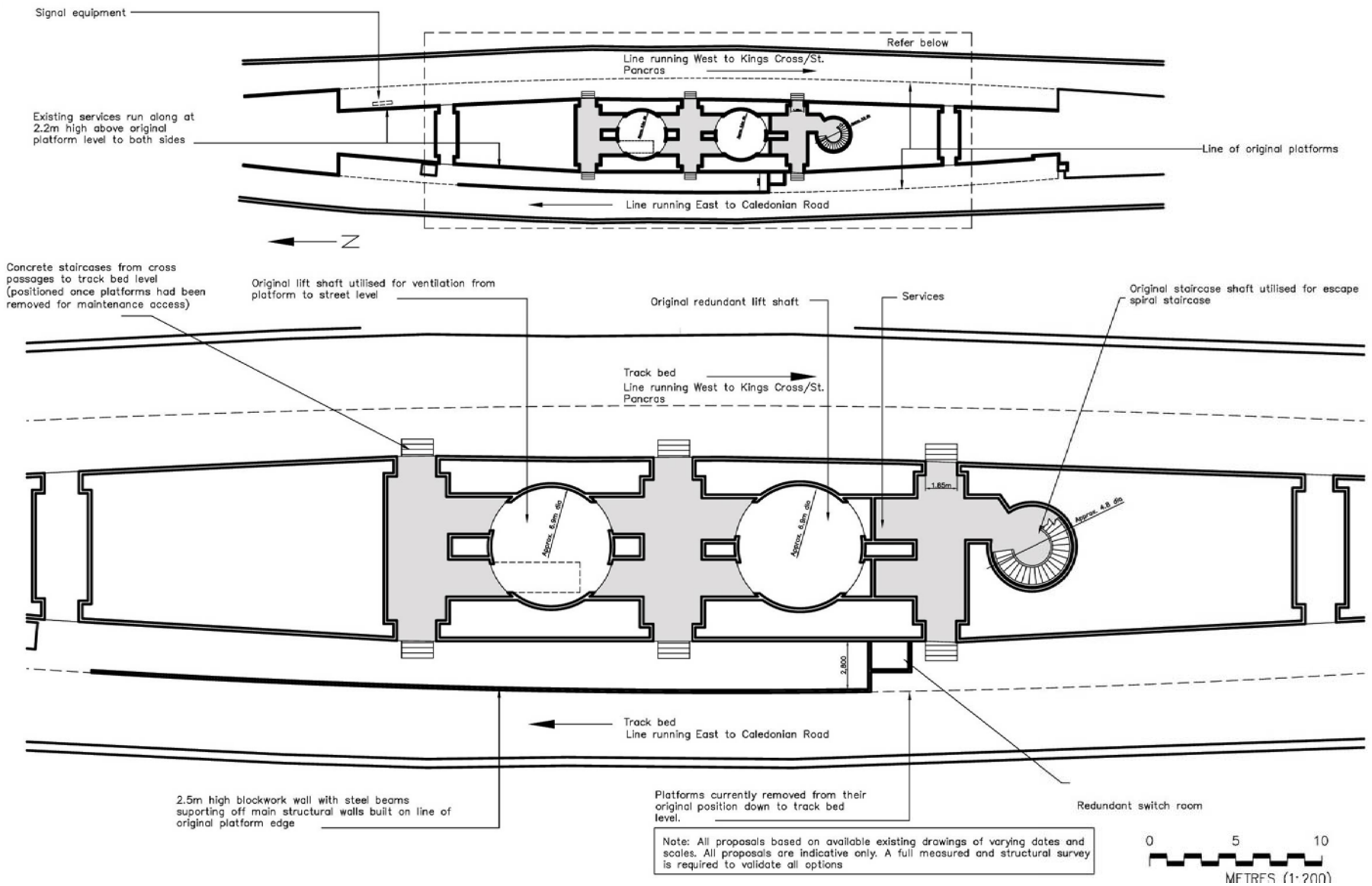


Fig 9. Platform layout as per site visit 11th February 2005

4.2 Existing condition

4.2.1 Station building

The building appears to be, visually, reasonably structurally sound (full structural survey not carried out as part of this study). The original lettering was we believe raised lettering around the first floor level but this was removed on closure of the station and subsequently painted on within the past 20 years. The remaining arches at ground floor level have been bricked up, with some high level windows repositioned. There are 2no. doors to the York Way elevation allowing access into the ground and first floor office accommodation. To the Bingfield Road elevation, there are 2no. alarmed doors for escape and emergency access and ventilation grilles. To the rear an external escape staircase is provided from the current first floor.

The first floor parts of the arches are glazed to all but the left hand arch to Bingfield elevation, which is infilled with grilles to facilitate the tunnel ventilation within the building.

The ground and first floor internal areas have been converted to separate office accommodation, with the staircase retained to the front central arch. To the rear of the ground floor, the existing staircase from the basement has been retained as an intervention point to track level, with an entrance from Bingfield Street.

It appears that the original steel framework has been retained as part of the reworked layout, although the shaft structures above ground level have been removed.

In general the areas of the original station at ground floor are very dirty in appearance, and there is water ingress to some areas, notably the basement and over the spiral staircase (this area being in effect outside of the original building envelope above)

4.2.2 Shafts

All the shafts remain intact, although only below ground level. At ground floor level, shaft 2 has been slabbed over to allow for office accommodation above. There is also (accessed from platform level), a maintenance ladder constructed up the shaft to the underside of the slab. (figure 10)

Shaft 1 remains open at ground floor level with a grille over the opening and ventilation plant positioned above to vent the platforms and tunnels below, extracting to the northern elevation of the station building.

Fig 10. Existing condition of shaft 2 looking from platform level

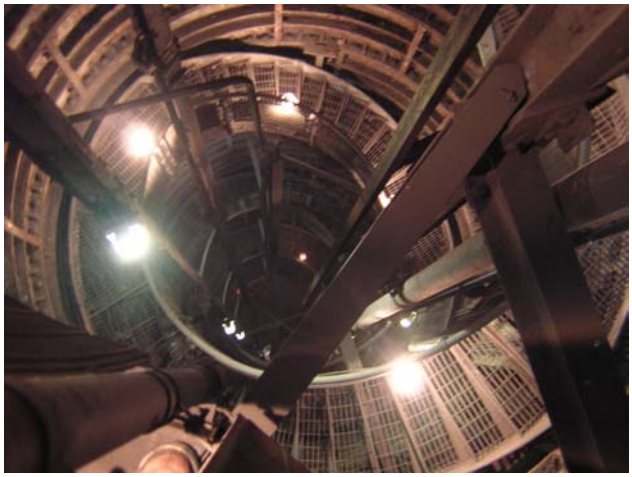


Fig 11. Existing condition of shaft 3 looking from platform level

Shaft 3 is also retained for its original purpose, although the original staircase has been removed and a new spiral access staircase with a smaller tread width has been installed. (refer to figure 11)

In general, shafts 1 and 2 appear in reasonable condition, whereas shaft 3 has water ingress problems. These are dealt with in more detail in section 6.

4.2.3 Subterranean structure

The cross passages and lobbies exist at platform level in reasonable structural condition. Some of the original access doors into the two lift shafts have been blocked up, although each shaft is still accessible at this level. Additional plant equipment have also been installed in certain areas of the cross passages. (Refer to figures 12 & 13)

Both platforms have been removed down to the track bed level, with access from each cross passage via steps. To the Eastbound platform, a wall has been built 2.8m out from the cross passages openings, with a height of approx. 2.5m. This

wall is supported off the tunnel sides by beams at high level, and there is no apparent reason for the existence of this wall (although it could have been used as an air raid shelter in WWII, shielding the occupants from passing trains). At the southern end of the wall, there is a redundant switch room, and at approx. 2.2m above the original platform level, extensive cabling has been installed the full length of the tunnel.

Fig 12. Existing cross passage between shafts 1 and 2

Fig 13. Existing detail of cross passage between shafts 1 and 2

To the Westbound side, the original platform area has been left vacant except for storage. There are similar service runs as noted on the previous platform, and in addition a drainage sump is also evident.

The trackwork for the facing cross over has been removed but its tunnel is still in position.

5 Appraisal of Options

5.1 *Outline of strategy*

The general design remit is to allow for:

- Step free access to platform level from concourse level
- Enlarged concourse with ticket purchasing facilities, based on anticipated throughput from the business study
- Reinstated platforms and upgrade of subterranean areas
- Station staff and commercial accommodation
- Secondary means of escape from platform
- Ventilation of tunnels and station
- Station compliant to current standards

Other factors also tie into these areas, notably alterations to signalling, mechanical and electrical etc, and these are noted later in this report.

5.2 *Design concept*

The main direction of concept design taken with the proposals is one of 'do minimum', which evaluates the utilisation of just the 3 existing shafts (referred to as Scenario 1); and a more extensive option which reviews an additional shaft (Scenario 2). Both options are dealt with in more detail in the shaft section under section 5.4. However, the concept for the concourse level is similar for both.

Scenario 1 – Refer to figs. 13, 14, 15, 16

Scenario 2 - Refer to Appendix C

5.3 Concourse level

The existing building is in reasonable structural condition, and has been modified within the past 20 years.

Although the building is currently not Listed or under a protection order, if works are proposed to open the station again, it could be anticipated that more interest in the building resurfaces from conservation bodies and lobby groups, making its complete demolition more difficult. It has also been expressed that this is the preference of London Borough of Islington. However, the building is a fine example of the Leslie Green stations, as it stands in reasonable isolation, and for that reason, there should be no reason why the building should not be retained from the outset of the concept design.

The proposal is that only the façade should be retained, as the internal spaces are reasonably hemmed in by the proximity and location of the existing shafts. This would allow for the original concept of Leslie Green's design to be incorporated into a contemporary proposal taking on board current standards.

To create the desired concourse area (both paid and unpaid sides) together with compliance with current standards, it is proposed that the current line of the station building is extended towards York Way. This could be achieved by creating a full height curved glazed façade, which would allow for the automatic gates to be positioned within the existing arches and allow sufficient run offs between the main entrance and the gates, and between the gates and the lift entrances. (refer to fig 14). The remaining area of the concourse would also be double height, with the existing arches opened up full height to create an open modern interior.

To either side of the concourse, there is sufficient area for commercial use fronting the street, and for the station control room suite. The issue of ticket purchasing was discussed during the study consultation. Although current standards denote that a staffed ticket office is required with an adjoining POM enclosure, it was directed by LUL that we should only show a POM enclosure adjoining the station control room. However, there is sufficient area which could accommodate a staffed ticket office if this was deemed necessary.

The space allows for up to 7no. automatic gates plus a manual gate to be positioned with the required run offs. We have indicated 4no. automatic gates, with an additional manual gate positioned next to and released from the station control room. (refer to figure 15)

Some of the existing first floor would be used up by the double height concourse. The remaining areas would be utilised for the lift motor room and commercial/ storage/staff accommodation. Access to and a fire escape staircase down from the first floor will be provided behind the rear protected escape route, together with a lifting well to the lift motor room.

Fig 14. Proposed concept perspective of station extension

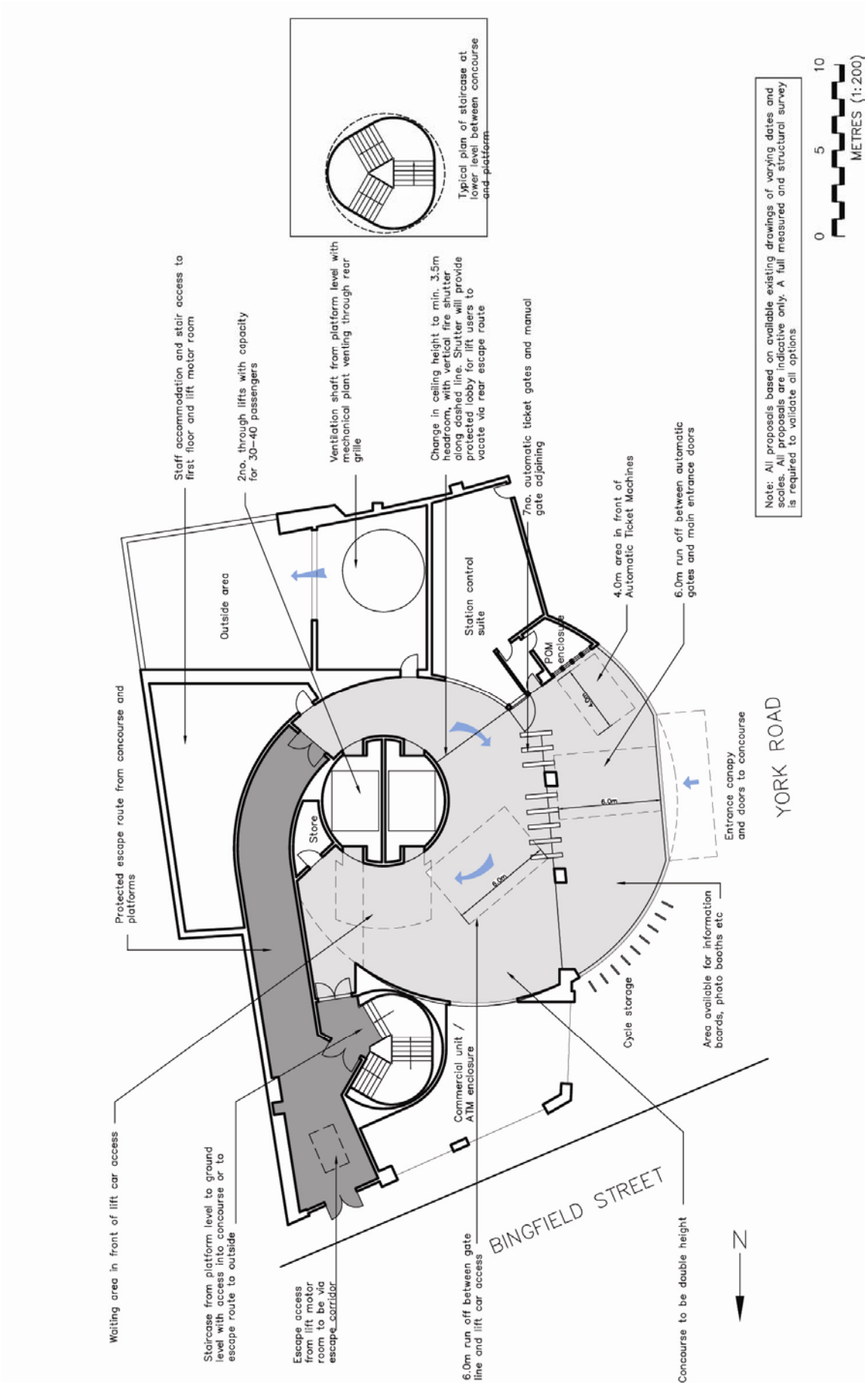


Fig 15. Concept proposal for concourse level of scenario 1

5.4 Shafts

Vertical access down to platform level from the concourse could be attained via lifts, staircases or escalators.

Escalators at this location would require a considerable amount of extra tunnelling down to platform level to achieve the required length. However, this would be in excess of the current confines of the existing building envelope, and would require additional land take including the truncated area of Bingfield Street. At platform level, the area between the platforms is confined in width, coupled with the close proximity of the Piccadilly Line tunnels and the Network Rail tunnel into Kings Cross, the installation of a new escalator shaft would prove costly and problematic.

In this instance, therefore, considering the anticipated passenger flows, the reintroduction of lifts appeared the most feasible and economical option for this station.

It is the current standards that all underground station should have an alternative means of escape from platform level. Therefore to achieve the standards, we would need in theory to provide 2no. compliant staircases, 2no. 50 person lift cars together with a ventilation shaft. At this station with only 3 existing shafts, there were 2 clear options (for ease of location, shaft 1 and 2 are the original lift shafts, and shaft 3 being the existing spiral staircase).

Scenario 1 – Refer to figs. 14, 15, 16, 17, 18

- Shaft 1 utilised for compliant staircase:
- Shaft 2 utilised for 2no. lift cars including fire hardening of structure to allow for escape use;
- Shaft 3 utilised for ventilation.
- This is considered the 'do-minimum' option

Scenario 2 - Refer to Appendix C

- Shafts 1 and 2 utilised for 4no. lift cars including fire hardening of structure to allow for escape use;
- Shaft 3 utilised for ventilation;

- New shaft sunk to accommodate the compliant staircase (shaft 4, say 7.0m dia).
- This is the most costly option

With Scenario 2, the new shaft could be constructed below the existing Bingfield Street. This would need to connect back into the existing station building either at basement level, or by extending the building over the road. The alternative on this option would be to construct the ventilation shaft below the road, and enlarge the existing shaft 3 for the compliant staircase.

The additional cost of the new shafts would need to be set against the anticipated use of the station.

With scenarios 1 and 2, the issue of the alternative means of escape is accommodated by utilising the lift shaft within a fire hardened shell. Therefore no additional shaft is required, although this option would require derogation against standards. If there is a requirement under scenario 1 for a secondary escape staircase, then this would make the scheme the same as scenario 2, except that one lift shaft becomes the second staircase.

With both scenarios, it is also paramount to provide a compliant staircase design to current standards. Spiral staircases are no longer compliant.

The existing shaft is 6.9m internal diameter. Calculating for 800 people being on the platform and requiring escaping (based on a practical crushed loading of 4 persons per m^2 on a train and the remainder on the platform), the clear dimension between handrails is 2.3m, which allows for those 800 persons to escape in 6 minutes.

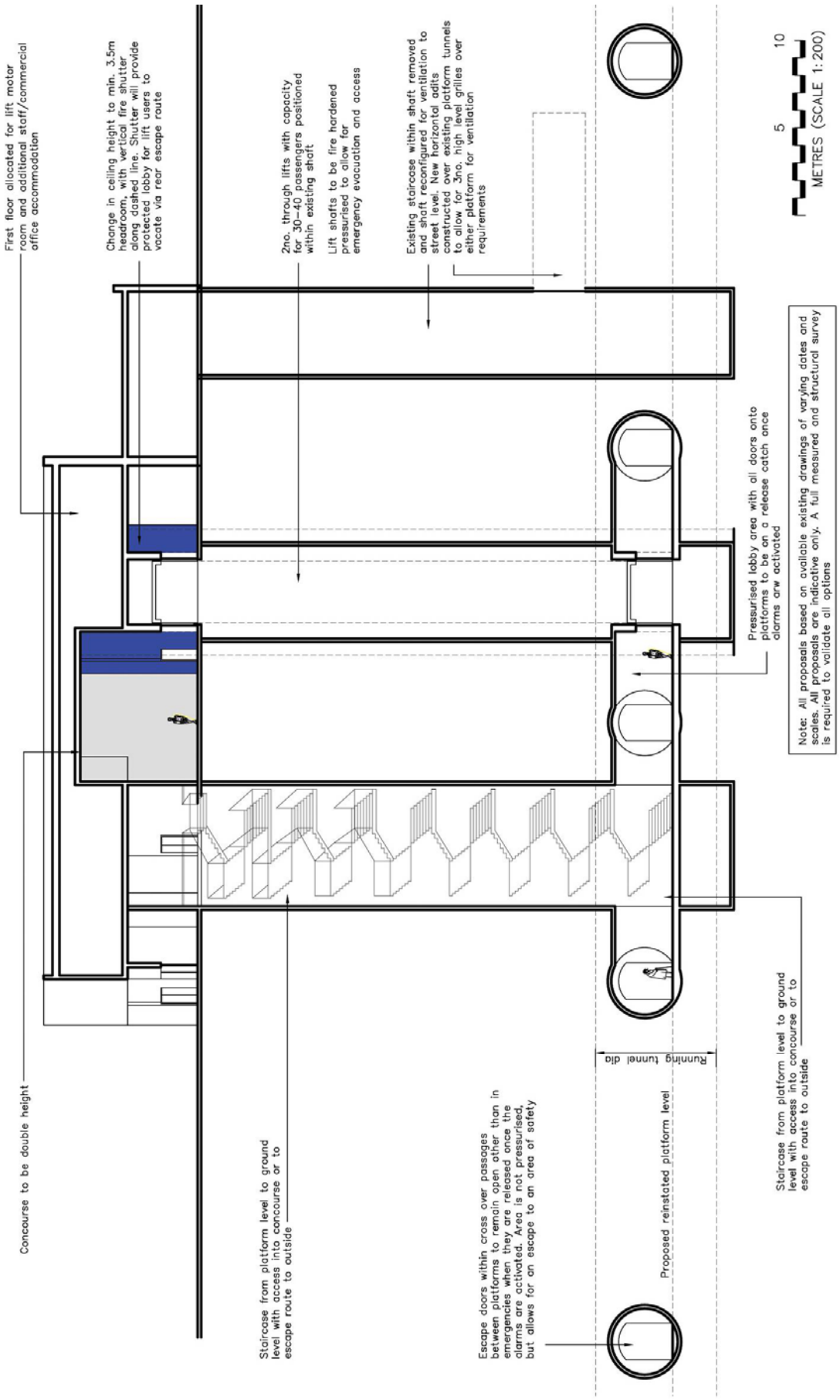


Fig 16. Concept proposal for longitudinal section through scenario 1

5.5 Platform level

The existing lobby and cross passages at platform level are in reasonable condition and would need upgrading to modern day finishes, lighting, customer information etc.

To achieve the required escape criteria of all passengers at platform level to reach a protected place of safety within 6 minutes of the activation of the alarm, it is proposed that the existing cross passageways are adapted to form fire protected lobbies. Hence the central area between the three shafts would have the 6 openings onto the platforms controlled by double fire doors, which would remain open during normal working hours, but would close to following the activation of the fire alarm. This would therefore create a large central protected lobby (approximately 95m^2) allowing access to the shafts 1 and 2 (and if necessary, shaft 4), for fire escape.

Additional to this configuration, the 2no. cross passageways at either end of the platforms would also have fire doors positioned, to enable passengers to cross to the opposite platform in the event of a fire, and to remain protected once the doors close.

The platforms would need to be reconstructed at the same floor level as the existing cross passageways. Due to the curvature of the station tunnels, although the width of the platform would be approximately 2.9m at platform level, the width of the platform having full 2.5m headroom is only 2.5m, compared to 3.0m in the standards. Therefore concessions would be required.

The radius of the reinstated platforms (approx. 600m) would also be sub standard compared to the current day minimum requirements of 1000m.

The ventilation requirements for the running tunnels utilising the existing shaft 3 would also require additional adits to facilitate in providing the required air intact and extract at the this level. It would be more desirable to have the vent grilles directly over the platform, rather than at the back of the platform, which would have a more detrimental effect on passengers waiting for trains.

Under standards, a suicide pit is required along the full length of both platforms, beneath the tracks.

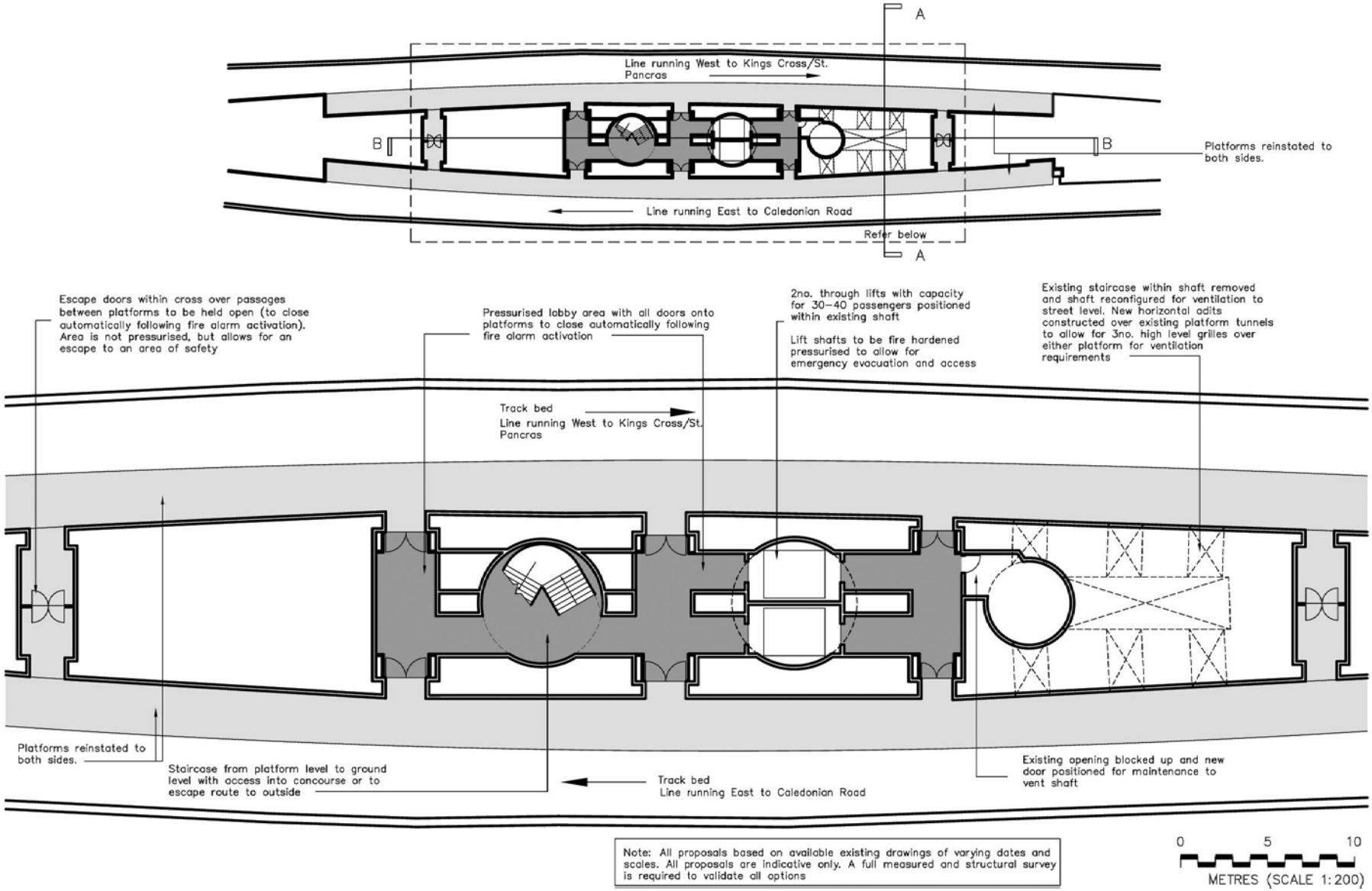


Fig 17. Concept proposal for platform level of Scenario 1

5.6 Preferred scheme

At an early stage of the study, it was advised that the preferred option was a scheme which did not allow for extensive large scale excavation of new shafts. This is a costly element of works, and would have major impacts on existing infrastructure.

The preferred scheme for the station under this report is Scenario 1, as the layout relates to the existing subterranean structures at the station and the capacities they can accommodate without major civil engineering works (it is anticipated that the 2no. lifts could accommodate 4200 people per hour). Scenario 2 would require considerable extra works on top of the additional shaft. The knock on effect of the extra lifts would increase the throughput at the station, especially passengers accessing the platforms, which is already below standards. Therefore, under this option, consideration would need to be given as to whether to completely rebuild the station and upgrade the subterranean lobbies and platforms to standards, which could have a major impact on the Piccadilly Line upgrade works and probably involve temporary closure of the line.

5.7 Non compliances inherent in preferred scheme

5.7.1 Following guidance from the Client, the preferred scheme has been developed without recourse to constructing any significant new tunnels or shafts, and to avoid closure of the Piccadilly Line. Re-using the existing infrastructure as a result, the following are the main non-compliances against HMRI Railway Safety Principles and Guidance (RSPG) Part 2 section B - Guidance on Stations and/or LUL Standard E1024 A2 - Station Planning;-

- **No Ticket Office Suite**
  This was instructed by the Client, but is at variance with LUL Standard.
- **(Former) platform minimum width less than 3.0 metres - see below for dimension**
  This is at variance with RSPG Clause 74(b) and E1024

- **(Former) platform minimum headroom less than 3.0 metres to tunnel arch - 2.5 metres minimum headroom over a platform width of 2.5 metres.**
  This is at variance with RSPG Clause 74(c) and E1024
- **(Former) radius of platform less than 1000 metres - 600 metres**
  This is at variance with RSPG Clause 74 (h) and E1024
- **Widths of (former) platform entrances/exits less than 2.0 metres -1.85 metres**
  This is at variance with E1024
- **No alternative escape route to the street in fire in station scenario- only one protected staircase route from platform level provided.**
  This is at variance with E1024. However this was discussed with representatives of the Client and the Chief Engineering Department, and it was concluded that that the critical scenario would only be if there was a fire on the escape route from the platforms (not one in the Ticket Hall). In such a scenario the protected lifts could be used for those customers, who required immediate evacuation, before the remainder were evacuated by train.

5.7.2 Since several of the Stations on the Piccadilly Line (such as Caledonian Road) are similarly non-compliant, HMRI might countenance granting derogations for the re-opening of York Road, if a Quantified Risk Assessment (QRA) showed that risk to the passengers using it was As Low As Is Reasonably Practical (ALARP). It is therefore recommend that before carrying out any feasibility design, a QRA is carried out and discussions are held with HMRI.

6 Services, Signals and Tunnel works

6.1 *Mechanical and Electrical services*

With the complete reopening of the station, it allows for all the Mechanical and Electrical works to be new and to current standards. As part of this study, the general allowance is made for control room installation; power; telecoms; Heating &Ventilation; Lifts; Customer Information System; Fire alarms; Public Announcements and all necessary associated building works etc.

Tunnel ventilation fans will also be replaced to the new layout, and positioned over the existing 16' shaft and venting to the rear within a new structure.

All Mechanical and Electrical works to be reviewed and designed in more detail within the next stage following this report. This will also allow for any proposed changes in the intervening period. Additional existing information is available in Appendix E.

6.2 *Signal works*

Both east and west bound platforms will require detailed surveys carried out to confirm the current signalling installations (existing information as part of this report obtained from project briefing and Piccadilly Line track plan P7). However, the proposed new east and west bound platforms may require minimum signalling alterations based on current available information.

Since the proposed changes to the signalling as part of the upgrade works have not yet been determined, this is only an indication as part of this study.

Further details and the proposals can be found within F

6.3 Tunnel works

6.3.1 It is the intention to retain the 2no. 23' shafts for staircase and lifts and the 16' shaft for ventilation.

Both 23' shafts are in reasonably structural condition, and could be utilised for 2no. new lifts and a metal escape staircase. The lift shaft would be subdivided to form a full height fire protected shaft from platform to concourse level.

6.3.2 The 16' shaft utilised for the ventilation would need additional tunnelling at platform level to achieve the required ventilation requirements. Some remedial works would be required to reline the existing shaft.

The existing cross sectional area for ventilation in the shaft is approx. 16m². Therefore, to achieve the required ventilation at platform level, it is proposed to create 2no. new adits from the shaft direct to the platform tunnels at a level starting above the platform tunnels. This would allow for 11m² of ventilation. Additional tunnels would be driven parallel to the platform tunnels away from the cross passage and at the same level as the other shaft openings. This would provide the additional 5m² required of ventilation.

Further details and analysis of the existing shafts and the proposals can be found within Appendix G

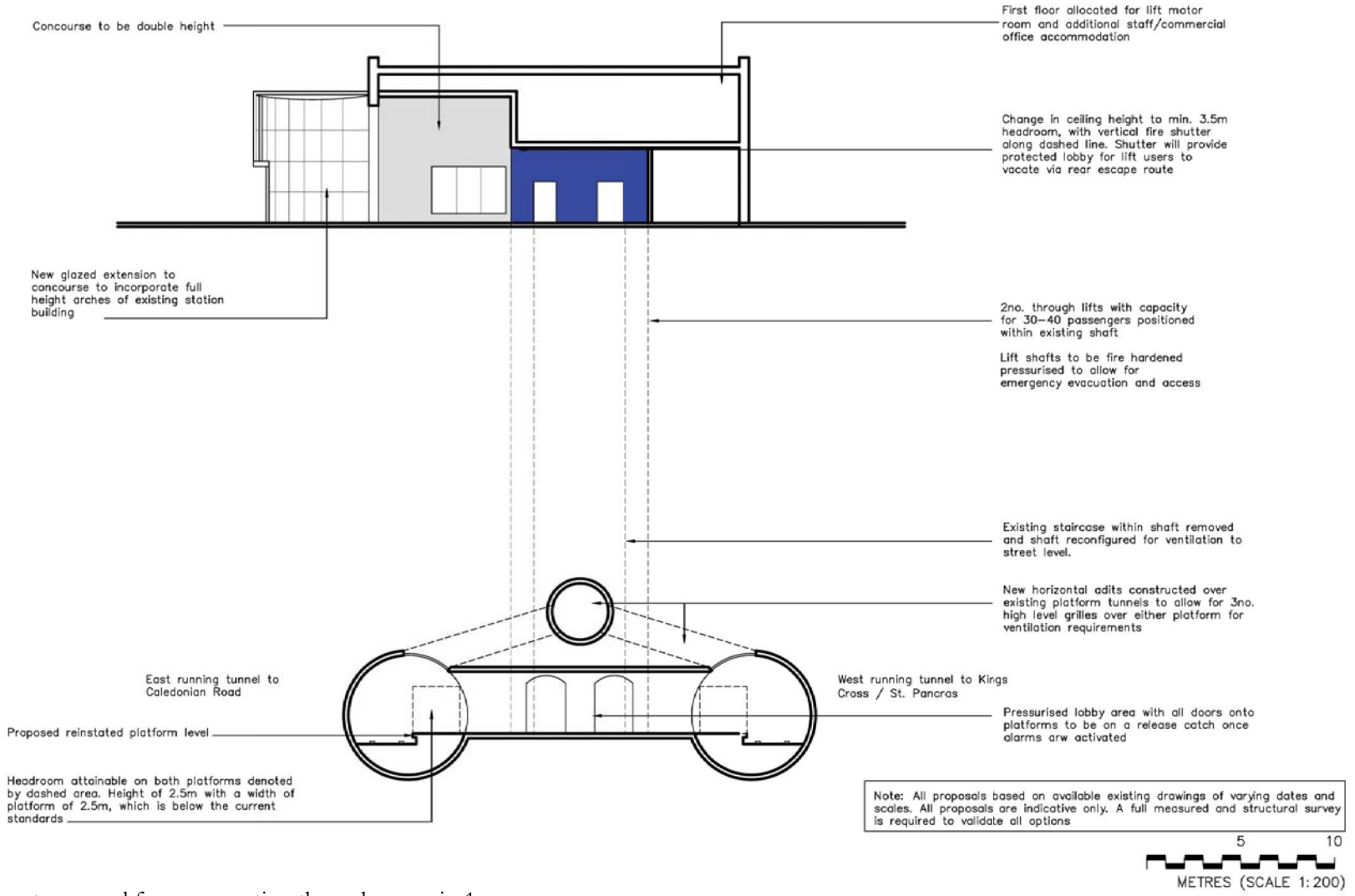


Fig 18. Concept proposal for cross section through scenario 1

7 Implementation – Operational Issues and Construction Risks

7.1 Operational implications of station reopening

7.1.1 The proposed reopening of the station could have implications on the existing and proposed railway operations as follows:

- Following minimum works being carried out to reopening the station, temporary closures could be required due to greater passenger usage than forecast

7.2 Construction risks

7.2.1 The proposed reopening of the station could have implications on the construction as follows:

- During the TubeLines upgrade of the Piccadilly Line, there may be extensive use of the existing station access and buildings as part of their works, and therefore simultaneous works to reopen the station could extend the upgrade works.
- The construction of the suicide pit could require the closure of the Piccadilly Line for a limited period of time
- The Piccadilly Line could require closure for a period of time if all station areas need reconstruction, to meet current day standards
- The intervention point currently at York Rd may need to be temporarily closed during construction.
- Additional works may be required to maintain existing façade.

7.2.2 There is a large range quoted for the number of passengers using the re-opened Station in the separate demand forecasting report, and therefore the QRA would need to cover more that one scenario. It is likely the case for requesting derogations could only be made for passenger flows at the low end of the range,

and for larger flows a major compliant replacement Station would be required, which would then entail closure(s) of the Piccadilly Line.

7.2.3 We would therefore recommend that for the QRA further work is carried out to refine the demand figures (including discussions with London Buses and London Trams on their future proposals for new transport services in this area).

8 Costings

8.1.1 The costing exercise are based on the Capital Costs associated with the preferred option (Scenario 1) with the retention of the existing 3 shafts and existing above ground structure (with relevant remedial works) and the extension of the concourse.

Budget costings for works to retain existing station building		
Enabling works and sequencing operations to shafts	£	3,160,000.00
reconstruction of concourse building	£	2,585,000.00
platform works and finishes	£	2,700,000.00
Mechanical and Electrical installation	£	4,875,000.00
Signalling alterations	£	300,000.00
Total	£	13,620,000.00
Contractor Prelims and Management costs	£	2,724,000.00
Provisional sums	£	5,196,400.00
Overall Total	£	21,540,400.00

8.1.2 Additional costing has also been carried out assuming that the existing building is demolished and a new station building constructed over, possibly as part of a future much larger commercial development, to a similar configuration as to the preferred scheme. The overall total of this work would amount to approximately £21,000,000.

The installation of the suicide pit is problematic in an existing station with the tunnels used on a daily basis. It is anticipated therefore that the suicide pit and other associated works track works are carried out as part of the upgrade works, when longer periods of workings could be accommodated. Therefore this has been excluded from the above costs, and this is noted, with other exclusions, and a more detailed breakdown of costs, in Appendix D.

9 Conclusion

9.1.1 The proposal is an outline technical solution for bringing York Road station back into use on the basis of a "do-minimum" works option. That option provides a level of passenger capacity of 4200 pax/hr, limited by lift capacity. A number of derogations from Standards would be required to be sought as a consequence of existing sub-surface platform widths and their situation due to track curvature.

9.1.2 To accommodate a greater throughput of passengers, additional lift capacity could be provided, but extensive reconfiguration of sub-surface areas would probably be required in addition, with substantial new tunnel works and track re-alignments necessary to eliminate the non-compliances with Standards. The potential disruption of such works to Piccadilly Line services would be substantial.

9.1.3 Considerable uncertainties exist in the forecasts of future patronage from the re-developed catchments area, and the extent of additional surface public transport links that would be provided to serve the development. If it became evident as the development proceeded that a higher level of passenger throughput would be required over that accommodated by the "do-minimum" option, a completely rebuilt station would have to be contemplated.

Appendix A – Project Brief

Appendix B – Existing drawings

Appendix C – Design analysis

Appendix D – Cost report

Appendix E – Mechanical and Electrical report

Appendix F – Signal report

Appendix G – Tunnel works

Appendix H – Consultation notes