

South London Stations Report (Camberwell Stations)

Final v1-0

Transport for London

18 July 2014

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View over old station location, Walworth



Bridge over Knatchbull Road, Camberwell

Introduction and Scope

- **Introduction**

Steer Davies Gleave was commissioned by Transport of London in June 2014 to undertake a feasibility study to consider the possibility of providing two additional stations on the line where trains run non-stop between Loughborough Junction / Denmark Hill and Elephant & Castle. The aim of the study is to assess and review the technical feasibility of building new stations at Walworth and Camberwell to replace the original stations closed in 1916.

We have been asked to consider a solution to accommodate 8 and 12 car trains at both Camberwell and Walworth stations.

The report comprises 5 major analysis sections as follows:

- Project requirements and design standards

Clear visibility, easy access, platform curvature & length have been assumed as the main project requirements

The proposed options have been developed based on the Railway Group Standard GI/RT7016.

- Condition of stations and platforms

A site visit has been carried out from publically-accessible areas to understand the feasibility of re-opening both stations within a modern railway context.

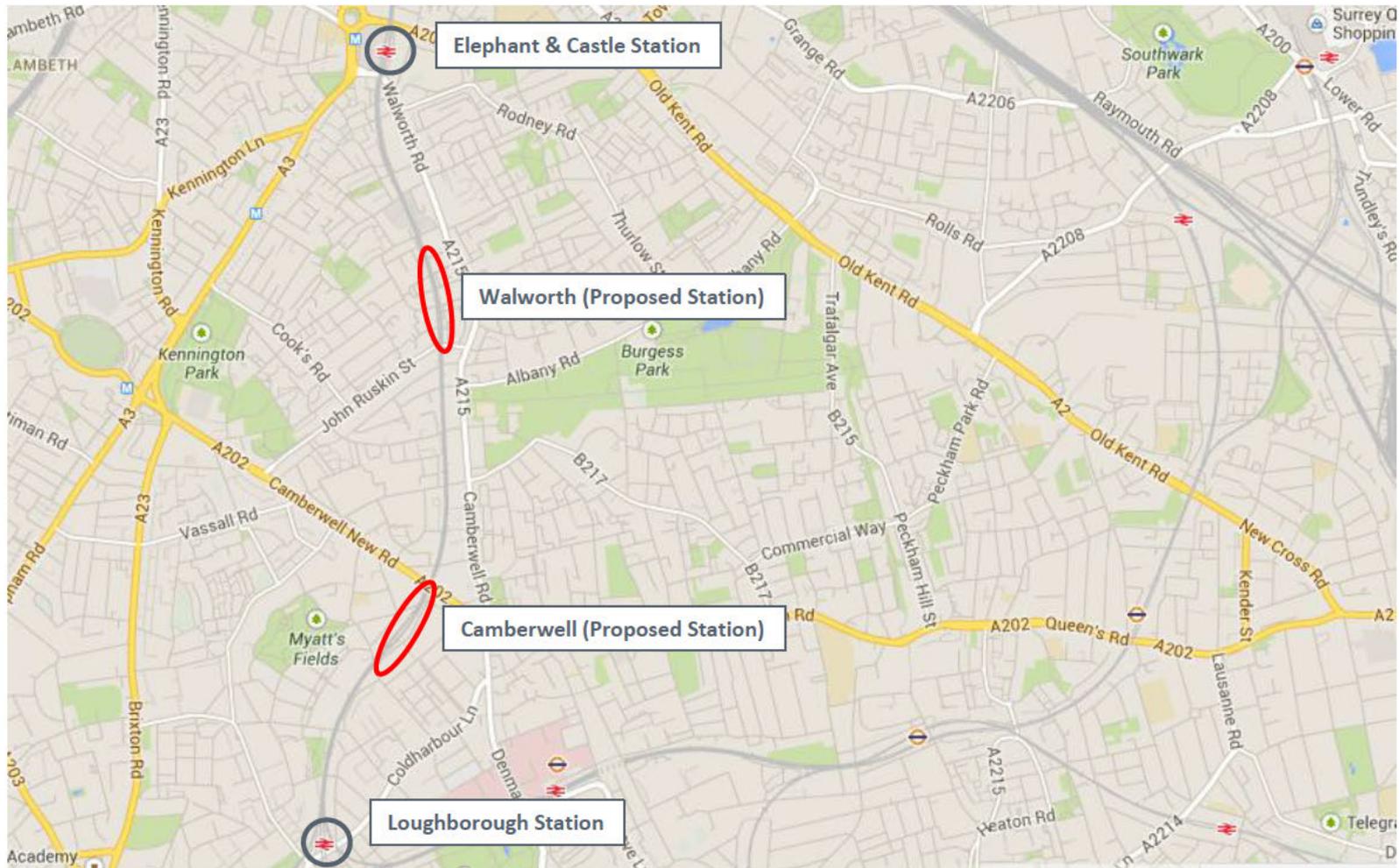
- Proposed options

A constraints map has been developed at both stations to propose solutions with minimum property impact

- Estimated costs

At this early development stage, cost estimates are based on a large estimating range (typically +/- 40%).

Location overview



Walworth and Camberwell locations. (Source: <https://maps.google.co.uk/>)

Study scope

The outputs of this study include:

- Identify issues that need to be addressed at the old station locations, such as easy access, clear visibility, potential station location and platform length to accommodate 8 and 12 car trains .
- Identify the possibility of reinstatement the old platforms, station building, and other existing facilities based on the current railway standards.
- Set out the project requirements to identify the best approach to the options developed.
- Identify if alterations to the running tracks may make the provision of new station more viable.
- Develop a constraints map at the preferred locations in order to minimize the property impact at both stations.
- Set out the layout options based on the constrains map.
- Understand the impacts of the options on the existing retail business.
- Identify potential business opportunities based on other emerging development schemes adjacent to the stations
- Identify potential locations for station location/pick-up and drop-off areas.
- Provide indicative cost estimates based on recent station costs that SDG has carried out for other clients

Current Railway Standards (GI/RT 7016)

- **Interface between station platforms, track and trains**

This study is based on the Railway Group Standard GI/RT7016 which defines the requirements for the design and maintenance of the station platforms for their safe interface with track and trains, with dimensional criteria as follows:

- Horizontal track alignment through station platforms: $R \geq 1000$ m.
- Minimum usable width of platforms: 2.5m for a single platform and 4.0 for a double face platforms (some reduction available if needed at the ends of the platforms)
- Platform height: $h = 915$ mm (this requirement has low influence on the proposed options)
- Gradient: currently the platforms are approximately level

Project requirements

A high level project requirements technical note has been produced to support this report. This process is essential to identify from the beginning what are the top level requirements. The following table captures the main requirements from the perspective of different stakeholders based on three criteria:

- (Mandatory (“Must”)) = The project cannot continue in its current form without this requirement being achieved.
- Targeted (“Should”) = Requirements that should be achieved unless at disproportionate cost.
- Desirable (“Could”) = Desirable features if available at low impact

Stakeholder	Mandatory (“Must”)	Targeted (“Should”)	Desirable (“Could”)
Client	<ul style="list-style-type: none"> • 8 car trains length platform • Level access 	<ul style="list-style-type: none"> • 12 car trains length platform • Proposed stations at the same location as the old stations 	<ul style="list-style-type: none"> • Provide retail opportunities • Provide space for cycle parking
Customers	<ul style="list-style-type: none"> • [Not consulted] 	<ul style="list-style-type: none"> • [Clear visibility of station from road] • [Level access] • [Bus stop integration] 	<ul style="list-style-type: none"> • [Retail offer] • [Pick-up and drop-off areas] • [Road access for emergency services]
Emergency Services	<ul style="list-style-type: none"> • [Not consulted] 	<ul style="list-style-type: none"> • [Not consulted] 	<ul style="list-style-type: none"> • [Not consulted]
Environmental Authorities	<ul style="list-style-type: none"> • [Not consulted] 	<ul style="list-style-type: none"> • [Not consulted] 	<ul style="list-style-type: none"> • [Not consulted]
Project Neighbours	<ul style="list-style-type: none"> • [Not consulted] 	<ul style="list-style-type: none"> • [Minimum property impact] • [Maintain access to the existing businesses during construction] 	<ul style="list-style-type: none"> • [Improve business opportunities] • [Provide new business opportunities]

Square brackets indicate assumed requirements, for confirmation through consultation

Preliminary stakeholder mapping

The stakeholder influence is also a key point for project success. This will be important in determining the action to take when there are conflicting stakeholder requirements. The stakeholders priority will be based in their degree of interest, support and influence, as shown in the table below:

Stakeholder	Responsibilities	Interest	Support	Influence
Client	[Minimum property impact]	[Very High]	[Very Positive]	[Very High]
Customers	[Clear visibility entrance] [Level access]	[Very High]	[None]	[Low]
Emergency Services	[Not Consulted]	[Not Consulted]	[Not Consulted]	[Not Consulted]
Environmental Services	[Not Consulted]	[Not Consulted]	[Not Consulted]	[Not Consulted]
Project Neighbours	[Property impact]	[Very High]	[None]	[Medium]

Square brackets indicate assumed entries, for confirmation through consultation

Walworth Station

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Historical background

- Walworth railway station was open in 1863. The station was originally named Camberwell Gate before it was renamed Walworth Road in January 1865. The entrance was located on the north side of John Ruskin Street. The station was closed in 1916 due to restraints of WWI but was never reopened and was eventually demolished afterwards.
- After its closure there was still a tram route via Walworth road (see Walworth Road OS plan 1893-6) to meet the demand along the route. However, in 1952 the tram route was discontinued.
- There have been previous studies, as the proposed routes for the southern extension of the Bakerloo line, which have reviewed the case for a new station at Walworth. However, these have not been available to us.



Walworth Road station seen from a passing train in May 1968. (Source: http://www.disused-stations.org.uk/w/walworth_road/)



North side of John Ruskin Street. South facing (Source: google maps)

Walworth station layout before its closure in 1916

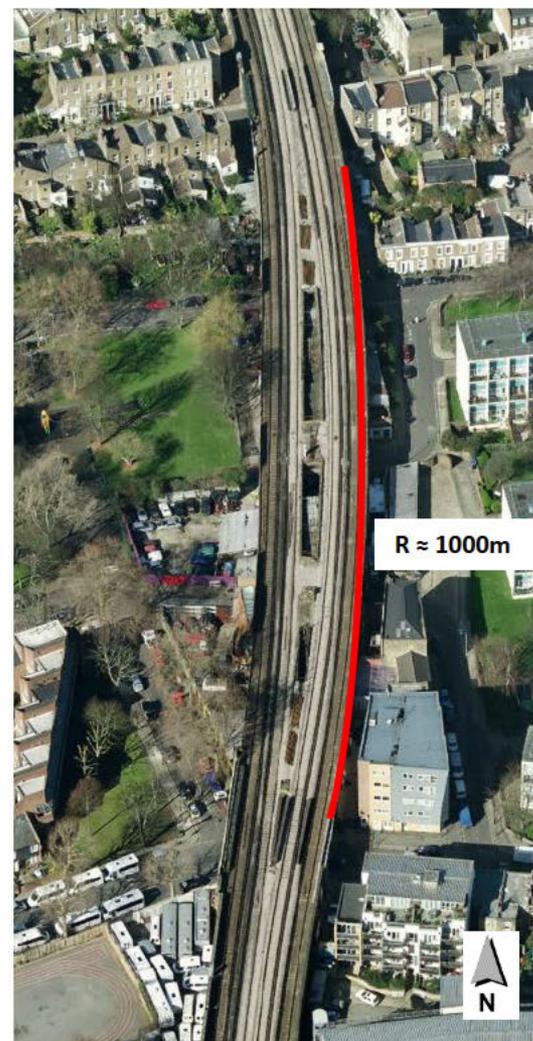
Walworth Road, 1893-6



Walworth Road OS Town Plan 1893-6. (Source: <http://maps.google.com/gallery/>)

Condition of station and platforms

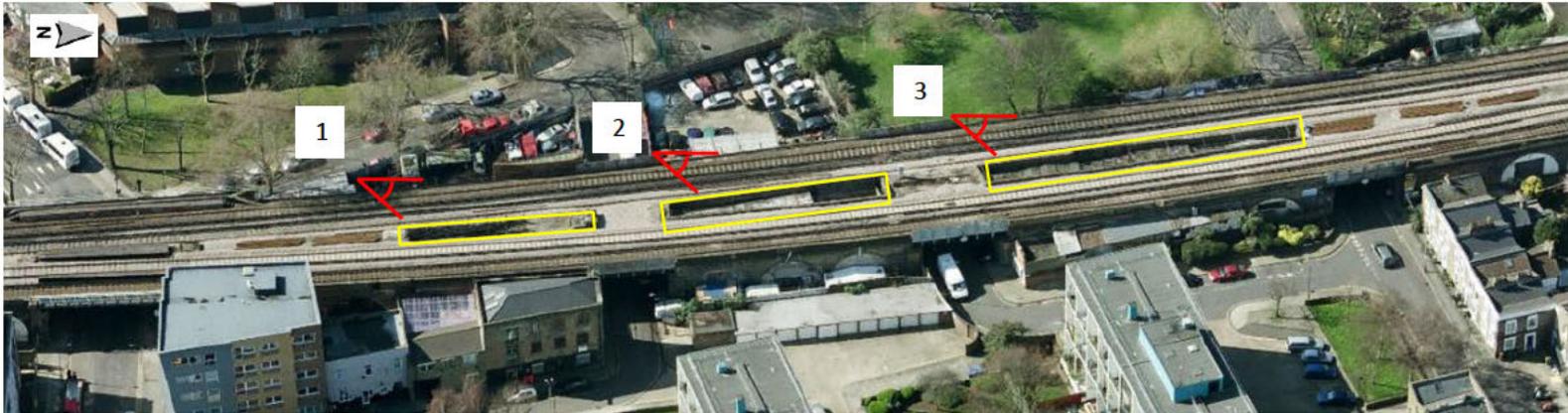
- After Walworth closure the platforms have been demolished. Just a few infrastructures remained such as stair access and handrails.
- The current space between the tracks is not enough for a central platform to comply with current railway standards.
- There is no evidence of side platforms. This implies widening the existing track platform to fit at least 2.5m side platforms on both sides.
- The alteration of the running tracks may take the new station more viable in order to be located at the same location as the old station.
- There is no evidence of the original station building.
- The old station was located on a large curve, approximately 1,000 m, which complies with the current railway standards.



Walworth station: North facing (Source: Bing Maps)

Condition of station and platforms

- Existing platforms infrastructures at Walworth Station (in yellow).



Walworth Road station. West facing (Source: Bing maps 2014)



Proposed options

Whilst developing the proposed layout at Walworth, there were 3 criteria with the greatest practical influence on the final solution:

- The proposed station should be at the same location as the old station.
- 8 car trains length platform as mandatory requirement and 12 car as target requirement.
- Minimum property impact.

Our proposed solution for this location is illustrated in the following drawings, provided separately:

- **22718101-SK01 – 01:** Proposed Layout
- **22718101-SK01 – 02:** Local Property Constraints
- **22718101-SK01 – 03:** Geolocation Photo Map

Proposed options - layout



Source: Drawing No. 22718101-SK01 (Sheet 01 of 06)

Key:

- | | | | | | |
|---|---|---|---|---|------------------------------|
|  | OS Mapping |  | Proposed 12 car train platform extension (12 x 20m) |  | Proposed Lift (2x2m) |
|  | Proposed tracks |  | Area of modified infrastructure |  | Proposed Staircase (2m wide) |
|  | Proposed modified bridges |  | Potential station location for buildings and access | | |
|  | Proposed 8 car train platform (8 x 20m) |  | Proposed Kerb | | |

Proposed option property constraints and impacts



Source: Drawing No. 22718101-SK01 (Sheet 02 of 06)

Key:

	OS Mapping		Proposed 12 car train platform extension (12 x 20m)		Proposed Lift (2x2m)	Land use map: (Hatched areas indicate land identified as likely to be affected by permanent works)			
	Proposed tracks		Area of modified infrastructure		Proposed Staircase (2m wide)		Residential property		Commercial/Industrial property
	Proposed modified bridges		Potential station location for buildings and access				Access Road		Community property
	Proposed 8 car train platform (8 x 20m)		Proposed Kerb				Public Open Space (e.g. parks, play areas, open gardens)		Substation

Proposed option – Local geolocation photo map (1)



Source: Drawing No. 22718101-SK01 (Sheet 03 of 06)



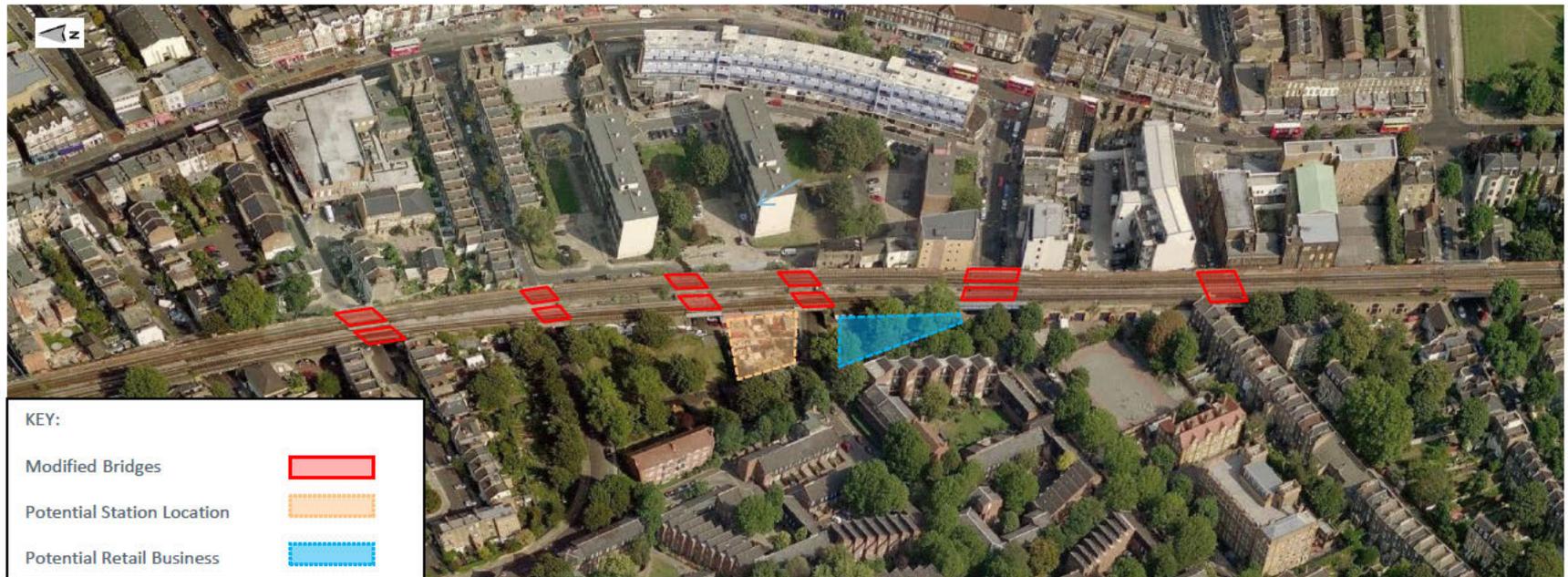
Proposed option – Local geolocation photo map (2)



Source: Drawing No. 22718101-SK01 (Sheet 03 of 06)



Proposed option – Key features

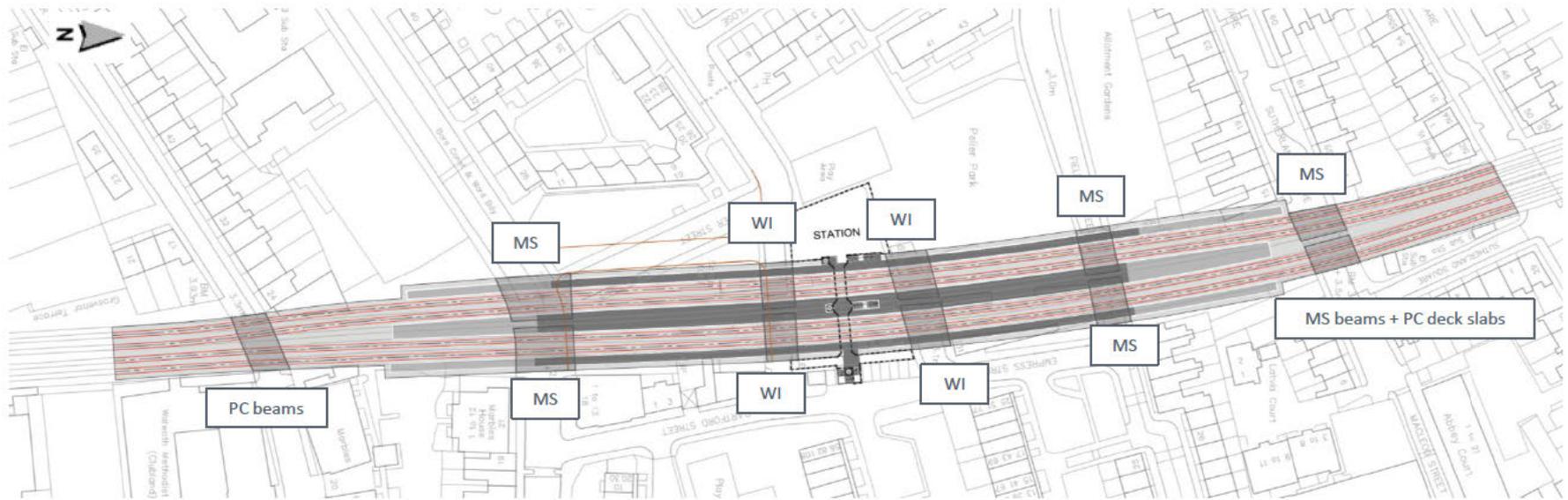


Walworth Station. East facing (Source: Bing maps 2014)

- One bridge to be reconstructed; one bridge to be modified; 9 bridges to be relocated.
- Potential station location integrates with Pelier Park.
- Opportunity to upgrade the local commercial offer.
- Clear visibility and level access to the platforms/station.

Proposed option – Key features (cont.)

- Type of existing bridges to be modified:



KEY:

- MS – Mild Steel (modern construction)
- WI – Wrought Iron/Early Steel (up to early 1900s)
- PC – Pre-cast Concrete (modern construction)

Source: Drawing No. 22718101-SK01 (Sheet 01 of 06)

Camberwell Station

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Historical background

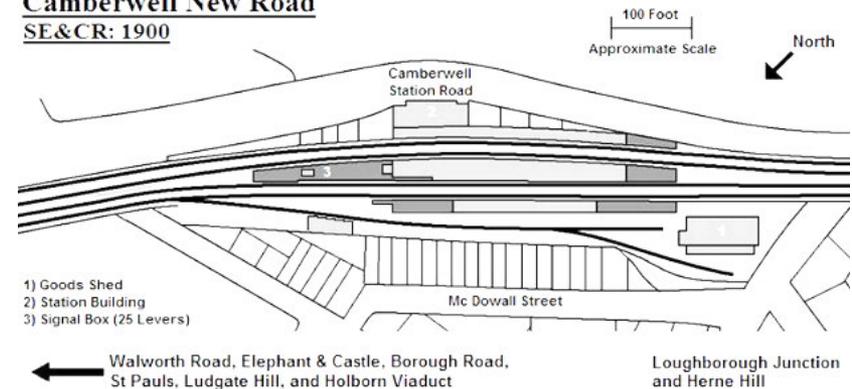
- Camberwell station was opened in 1862 and was renamed Camberwell New Road in 1863 but reverted to Camberwell in 1908. Camberwell station was also closed in 1916 due to restraints of WWI. The station continued to carry goods until 1964 but it was never reopened to passenger traffic. Despite its closure, the station building remained.
- Since 1916, there have been various studies to propose a station at Camberwell, although they have not been available to us. In 2000, the Council's Rail Passenger Partnership presented a Pre-Qualification Bid for a station building based in Medlar Street. However, in 2002, a study undertaken by a rail expert, Nick Alexander, concluded that a "*station located at the old Camberwell station site should be considered if the option were to be considered in future*".



Looking north towards Camberwell Station in May 1968.

(Source: http://www.disused-stations.org.uk/c/camberwell_new_road/index.shtml)

Camberwell New Road SE&CR: 1900



Indicative layout at Camberwell Station in 1900

(source: http://www.kentrail.org.uk/camberwell_new_road.htm)

Camberwell station layout before its closure in 1916

Camberwell Station, 1893-6



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Camberwell OS Town Plan 1893-6. (Source: <http://maps.google.com/gallery/>)

Condition of station and platforms

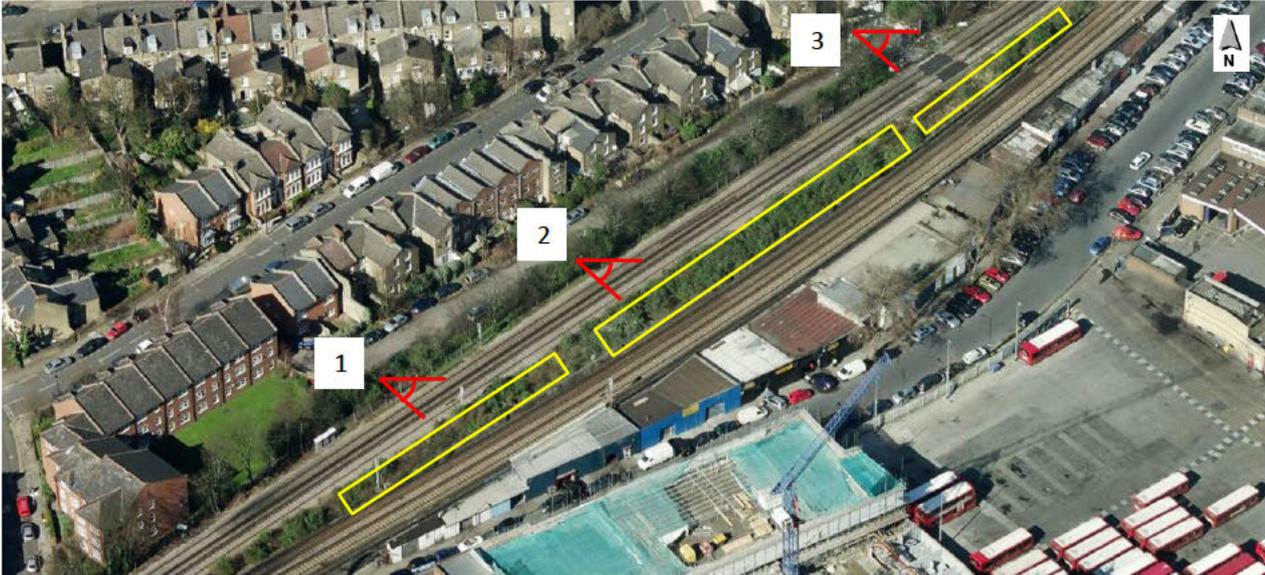
- The current space between the tracks is not enough for a central platform with 8/12 car trains to comply with current railway standards.
- There is level access to the former (low) platform on the West side.
- The platform height does not comply with the current railway standards which is 915mm from the rail to platform.
- The alteration of the running tracks may take the new station more viable in order to be located at the same location as the old station.
- The old station was located between two curves, possibly on a straight line.
- Camberwell station building remains but is blocked up and of poor quality. Re-use of this location for a modern station would probably mean total reconstruction
- There are a number of small business units adjacent to the east side of the track.



Camberwell station: North facing (Source: Bing Maps)

Condition of station and platforms

- Existing platforms infrastructure at Camberwell station (in yellow).



Camberwell Road station. North facing (Source: Bing maps 2014)



Proposed options

Whilst developing the proposed layout at Camberwell, there were 3 criteria with the greatest practical influence on the final solution:

- The proposed station should be at the same location as the old station.
- 8 car trains length platform as mandatory requirement and 12 car as target requirement.
- Minimum property impact.

Our proposed solution for this location is illustrated in the following drawings, provided separately:

- **22718101-SK01 – 04:** Proposed Layout
- **22718101-SK01 – 05:** Local Property Constraints
- **22718101-SK01 – 06:** Geolocation Photo Map

Proposed options - Layout



Key:

-  OS Mapping
-  Proposed tracks
-  Proposed modified bridges
-  Proposed 8 car train platform (8 x 20m)
-  Proposed 12 car train platform extension (12 x 20m)
-  Area of modified infrastructure
-  Potential station location for buildings and access
-  Proposed Kerb
-  Proposed Lift (2x2m)
-  Proposed Staircase (2m wide)

Source: Drawing No. 22718101-SK01 (Sheet 04 of 06)

Proposed options – Local property constraints and impacts



Source: Drawing No. 22718101-SK01 (Sheet 05 of 06)

Proposed options – Local geolocation photo map (1)



Source: Drawing No. 22718101-SK01 (Sheet 06 of 06)



Proposed options – Local geolocation photo map (1)



Source: Drawing No. 22718101-SK01 (Sheet 06 of 06)



Proposed options – key features

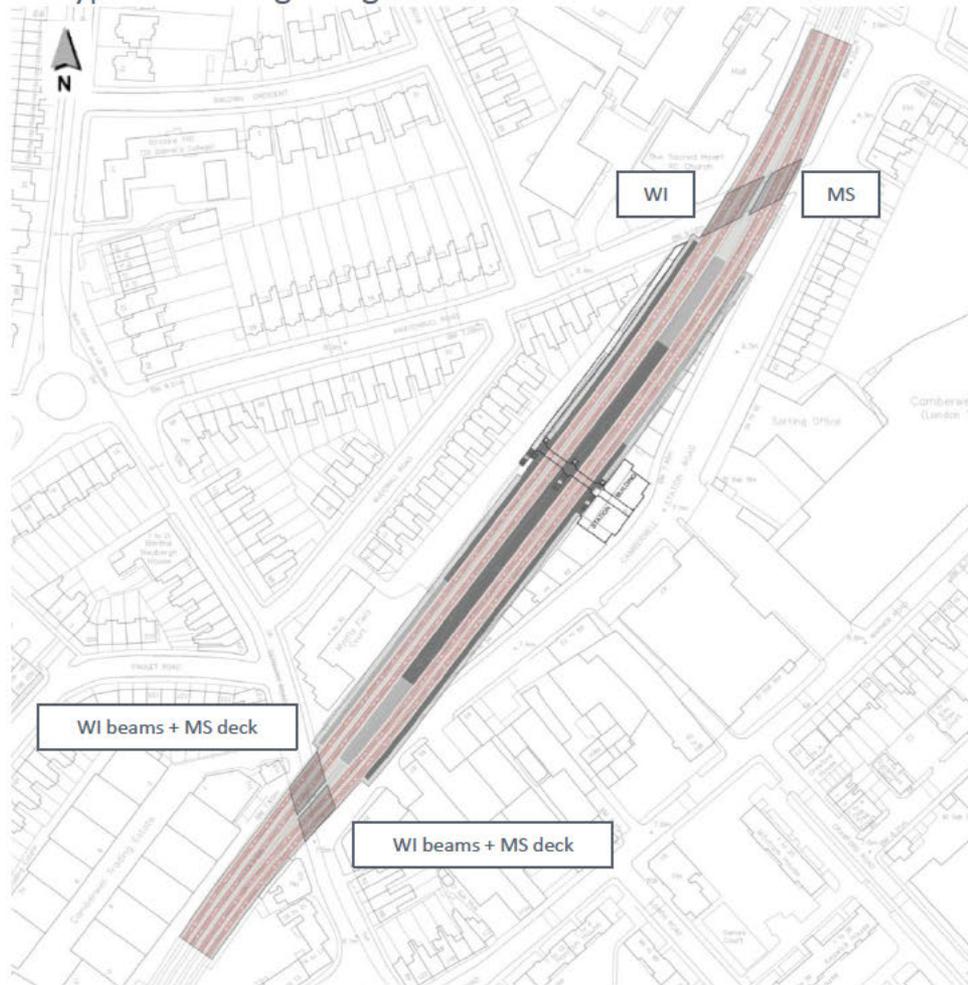


Camberwell. East facing (Source: Bing maps 2014)

- 4 bridges to be relocated / replaced
- Upgrade the local commercial offer.
- Opportunity to reinstate / replace the existing station building.
- Clear visibility and level access to the platforms/station.

Proposed option – Key features (cont.)

- Type of existing bridges to be modified:



KEY:

- MS – Mild Steel (modern construction)
- WI – Wrought Iron/Early Steel (up to early 1900s)
- PC – Pre-cast Concrete (modern construction)

Source: Drawing No. 22718101-SK01 (Sheet 01 of 06)

Cost estimates and Designer's Risk Assessment

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Cost estimate buildup information

- Measured construction costs:
 - Platforms: 8 and 12 car train platform (but assumed constructed for 12 car).
 - Track: Most areas with little alteration but some requiring additional construction adjacent to viaduct. Re-use the track infrastructure where possible.
 - Bridges: Relocation of existing bridges requires extension of foundations and abutments.
 - Station : The station building could vary significantly with extent of architectural engagement. It includes drop-off/pick-up area and pedestrian access.
 - Signalling: Movement of signals. Adjustment for difficulty of signalling modifications in London area.
 - Power: Minor adjustments to existing traction cabling system.
 - Subway: Assume some works in place already.
- Construction cost allowances (not including risk) developed as a percentage of measured construction cost:
 - Utility diversions: alterations to existing utilities.
 - Telecoms: installation of stations telecoms.
- OnCosts as percentage of all construction costs (measured and allowances):
 - Design: GRIP stage 1,2,3 and 4; GRIP stages 5 design + 6 to 8 attendance).
 - Sponsorship: NR project management & sponsor.
 - Contractor oncosts : contractor preliminaries, overheads and profit.
 - Property: compensation for temporary and permanent works.
- Risk allowance: Early stage design (44%).

Estimating tolerance and exclusions

We have developed these cost estimates based on similar project early stage estimates on other recent projects based on the findings as set out in this report. Based on the level of information and design development, we consider that these estimates are at the +/-40% estimating tolerance level.

In keeping with this very early stage feasibility study, there are some features that are unknown (or subject to change) and hence have not been directly allowed for in the cost estimates. The main exclusions are:

- Client costs including procurement costs
- Operational and maintenance costs
- TOC compensation / Possessions
- Site investigations and enabling works including demolition
- Temporary road diversions
- Signage & route map alterations
- VAT

Costs Summary (£m)

Cost item	Walworth	Camberwell	Difference	Notes
Platforms for 8-car	2.2	2.5	0.3	
Additional platforms for 12 car	0.6	0.7	0.1	Assumed constructed at same time
Track	1.4	1.1	-0.3	Small difference in amended area
Bridges	16.0	5.2	-10.8	Significant additional bridge works at Walworth
Station	1.1	1.5	0.4	Slightly larger station assumed at Camberwell making more use of existing footprint for retail
Signalling	1.2	1.2	0.0	
Power	0.1	0.1	0.0	
Subway	0.5	0.5	0.0	
Utility Diversions	0.3	0.4	0.1	Percentage allowance
Telecoms	0.3	0.4	0.1	Percentage allowance
Construction costs subtotal	23.8	13.5	-10.3	
Oncosts	9.8	5.6	-4.2	Percentage-based
Risk @ 44%	14.7	8.4	-6.3	Percentage-based
Total	48.2	27.5	-20.7	

Note: some subtotals do not quite match the sum of items above because of rounding errors

Estimating costs commentary

- When the bridge costs are removed and allowance is made for the length and number of platforms, both station costs are comparable with typical new-build station costs in other parts of the network.
- The major cause of the increase above this is the cost of bridge modifications or reconstructions, and with some 11 bridges requiring works for Walworth, this has significant cost implications amounting to 68% of the station construction costs. The equivalent is 40% for Camberwell station.
- Because the construction costs are typically doubled through the addition of oncosts and risk, all variations in construction costs are magnified for the final sum. Walworth has nearly three times the bridges costs of Camberwell and hence overall, Walworth is nearly double the cost of Camberwell.
- The addition of platform to move from 8-car to 12-car is a marginal cost of 3% for Walworth station and 5% for Camberwell station on the assumption that the other infrastructure would be modified only once and properties with potential to be impacted by the 12-car extension would be blighted anyway. The cost of doing the additional section for 12-car at a later point would be much more expensive without the economies of scale generated by the main project.

A note on bridge costs (1)

- For the most part, we have assumed that bridges will be relocated to accommodate the realigned track. This requires:
 - Extension of the existing foundations and bridge abutments (outside possession)
 - Jacking up, moving, and repositioning the bridge on new bearings on the extended abutments
- There are some important unknowns which need to be understood for each structure:
 - The condition of the bridge decks and their tolerance of being relocated. Several are of riveted wrought iron or early steel construction (up to early 1900s), and may be at or close to the end of their design life.
 - The construction of the existing abutments and foundations, and ability to 'tie into' these structures adequately.
 - The feasibility of constructing new foundations so close to the existing foundations, which will be dependent on local ground obstructions, and the size of piling apparatus
 - Number, type and location of buried utilities that may be in the way of piling works

A note on bridge costs (2)

- Given the unknowns listed previously, we have made an estimate of the cost of moving a bridge, and increased it, to make allowance for approximately one in every four bridges needing replacement rather than movement.
- One bridge at Walworth road is of precast concrete beam construction, and we have assumed that this may be extended by the use of additional beams.
- One bridge at Walworth road straddles a road junction (John Rusking Street / Pelier Street) and would need to be rebuilt. Further assessment may result in a recommendation to re-align Pelier street to allow a shorter span bridge to be constructed, saving significant costs
- Further railway alignment development in subsequent stages may allow some bridges to remain in their current location, which would have direct cost benefits, but the impacts on railway operations and other station costs should also be carefully considered.

Designer's Safety Risk Assessment

We have identified here those risks that may not be otherwise identified by a competent contractor and that we can foresee at this point in the design:

- Relocation of bridges:
 - Some of these bridges are probably about 100 years old and of wrought iron or early steel construction. Bearings may well have seized up, locking in stresses that are released, perhaps suddenly, as the bridge is lifted.
 - Similarly, redistribution of stresses throughout the structure as it is supported differently during lifting will need careful management to ensure that bridge elements weakened through corrosion are not overstressed.
 - Piling of foundations to extend abutments for the relocated bridges may require piling very close to the railway – indeed the location of piles may be defined by how close the piling equipment may safely get to the railway.
- Cantilevered platforms:
 - We have assumed that for the most part, side platforms may be cantilevered off the existing arches. We have not attempted to assess the structural condition of the arch sides for this purpose.
- Arch condition:
 - We have assumed that the existing viaduct structures are capable of supporting the track in its realigned position. A structural assessment would be required at later stages to determine if this is possible.

Summary

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Conclusions

Walworth

- 8/12 car train is technically viable.
- The number of bridges to be modified is greater at Walworth and this makes it a much more expensive solution.
- Property impact is greater at Walworth than Camberwell, especially residential and commercial/industrial.
- Potential station location integrates well with Pelier Park.
- Level access possible (via lifts)
- Poor visibility from the east
- Cost circa £48.2m +/- 40%

Camberwell

- 8/12 car train is technically viable.
- Despite low industrial/commercial impact at Camberwell, this is an opportunity to upgrade the local commercial offer.
- No residential property to be taken. Some industrial/commercial impact
- Opportunity to reinstate the existing station building at Camberwell.
- Level access possible (via lifts)
- Clear visibility of the platforms/station from the east
- Cost circa £27.5m +/- 40%

Thank you

For further information, please contact
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