Twickenham Station Redevelopment

Demolition and Construction Method Statement

1.0 Introduction

The proposed Twickenham Station scheme is a mixed-use (commercial and residential) development with rail enhancements including a new ticket office; concourse, platform stairs and platform lift access.

To facilitate the site development a 'podium' will be constructed above the operational railway forming a new public realm as well as enabling the site wide development.

The works will be built in stages:

Early Works – minor enabling works that started in Feb 2015.

Mobilisation Works – preparing for the main works to commence.

Main Works – The Podium, Blocks A & B, new station concourse & public realm starting in month 3.

Final Works – Block C month 22 till month 36

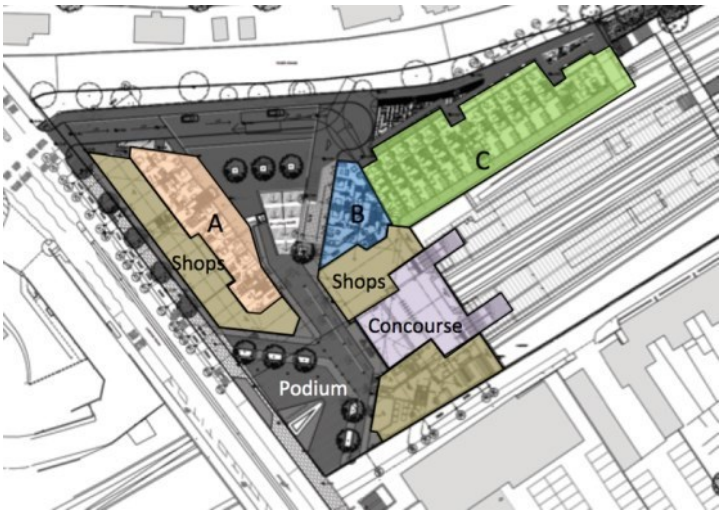


Figure 1 The Disposition of the Works.

This Demolition and Construction Method Statement sets out to provide a high level overview of the entire works programme to be carried at Twickenham Station.

2.0 Redevelopment Overview

Early Works – The initial works consisting of the start of the of removal of Japanese knotweed, archaeological investigation, initial Asbestos surveys, Intrusive Surveys of Services and the construction of the first manhole and other minor associated works which started in February 2015.

Mobilisation Works - Diversion of trackside services - the erection of temporary ticket office, the amendment of the platform canopy to enable space for the construction of the Temporary Footbridge and site set up. The widening of Mary's Terrace junction with Beauchamp Road to facilitate the piling works at the other end of Mary's Terrace, moving of the bicycle racks and canopies. The closure of the car part and the start of the erection of an acoustic hoarding surrounding the Northern and eastern construction site boundary will also be done in this period. Works adjacent and immediately over the railway will be carried out during booked T3 Possessions, Rules of the Route (ROTR) access and during normal hours. Hoardings will be erected to separate the works site from the operational railway and the station facilities.

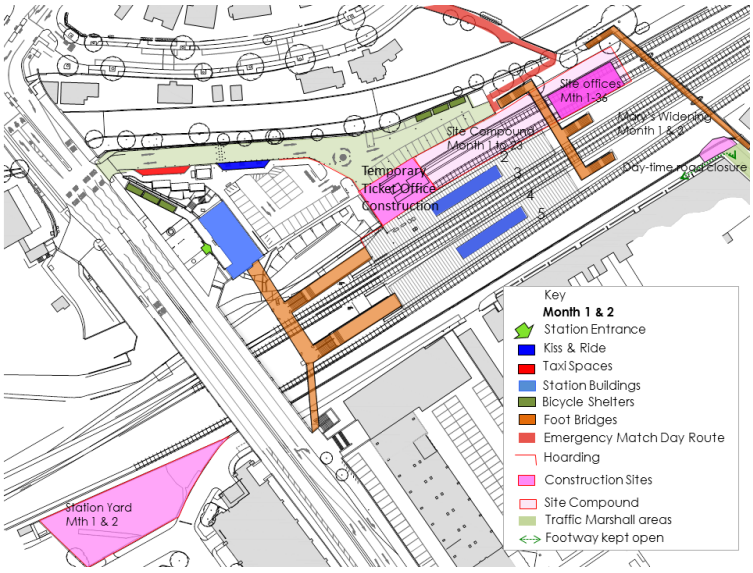


Figure 2 Mobilisation Works.

Main Works - The Main Construction works for the project commencing in month3. The Main construction work involves: Construction of the Temporary Foot bridge, demolition of the existing station, works to the bridge abutment, contiguous piled wall to London Road, the reduction in levels over the site works, piling to blocks A&B including to the areas
adjacent to the operational railway lines (This later work will require the temporary vehicular closure of a length of Mary's Terrace), relocation of existing facilities and construction of the new public realm, Blocks A & B, 39 flats and 52 flats respectively, including the construction of the new station entrance and ticket hall and 6 retail shell units.

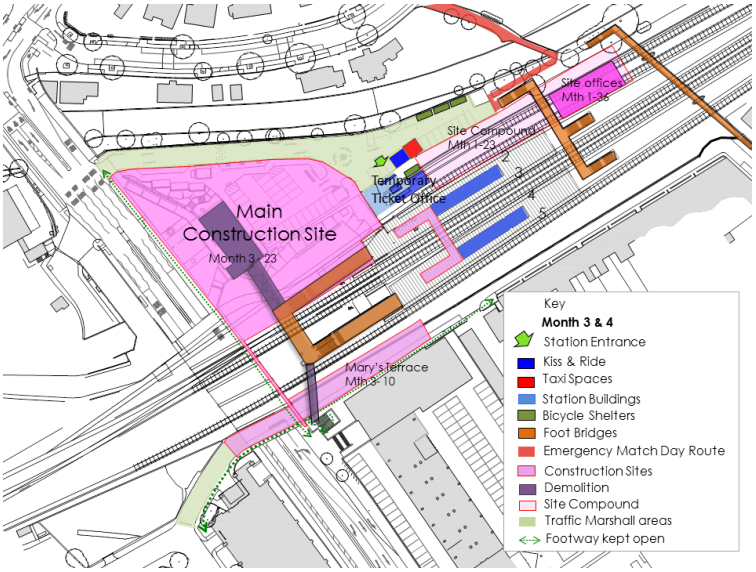


Figure 3 Main Works

Final Works - Block C, 24 flats commencing in month 22 and completed in month 36.

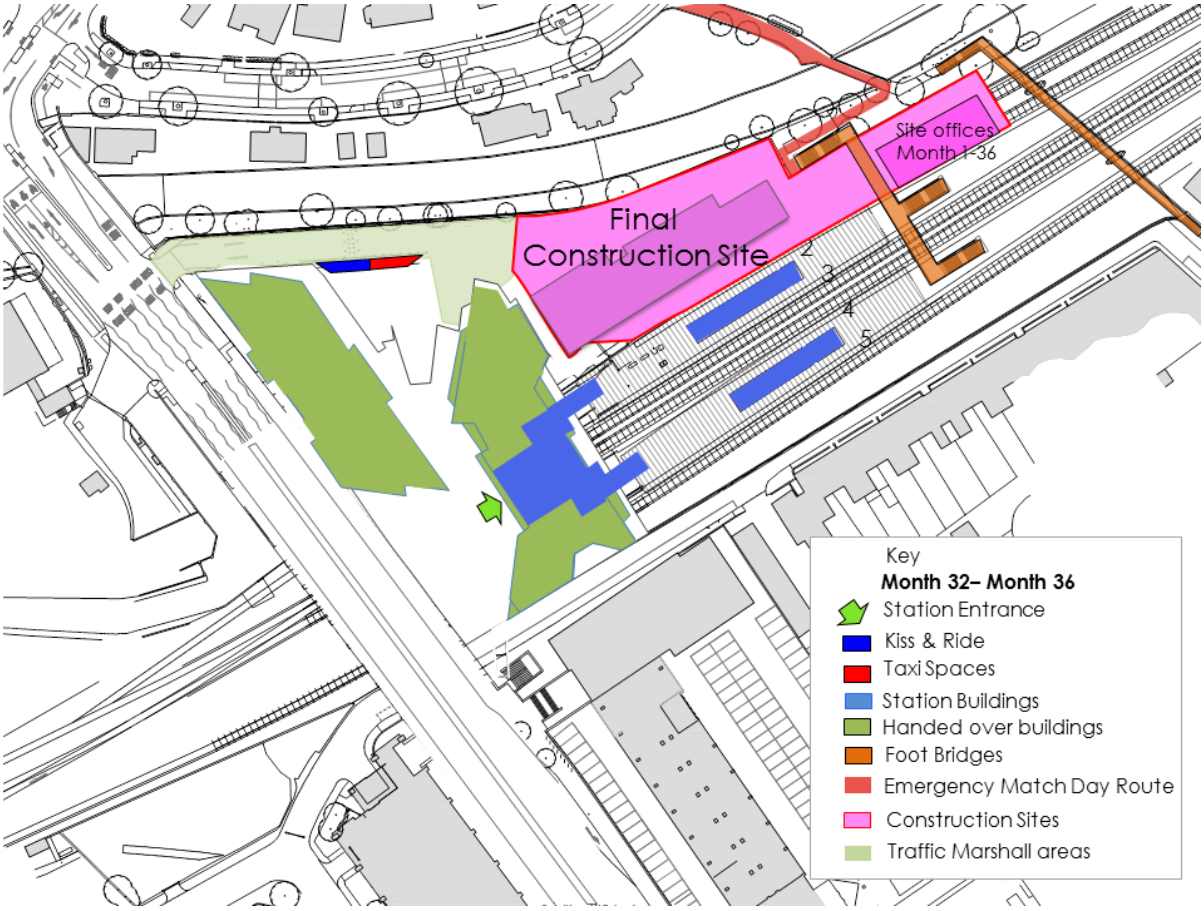


Figure 4 Final Works stage

Section 9.0 Appendix includes diagrams showing the areas of work for each phase and outlines the alternative access arrangements during construction of the three main blocks A, B and C of the development.

3.0 Overview Programme and Phasing

The works have been programmed as the attached summary programme in section 9.1 Appendix.

The works have been phased and programmed around the requirements of the station train operating company (South West Trains) and ensuring access is maintained throughout the works for station users.

No construction works will take place on Twickenham event days. As the contract programme is developed it will incorporate all known event days and through liaison with RFU will continue to incorporate future planned events as they become available.

The following represents a summary of the overview programme: -

Early Works - Started February 2015

1. Mobilise to site
2. Start initial treatment of Japanese Knotweed
3. Detailed Surveys including tag and trace
4. Archaeological excavation
5. Construct Manhole, including root barrier
6. Reinstate and leave site

Mobilisation Works starting late 2016/early 2017

1. Vacant Possession of Station Yard for commuter parking
2. Vacant possession of station ticket office, shops and cafe
3. Mobilise to site.
4. Relocation of bicycle shelters
5. Erection of Acoustic screening, Tree Protection and Site Hoardings
6. Relocation of Services
7. Closure to public use of Station car park to rear of station building
8. Relocation of power supply from District Network Operator (DNO)
9. Construction of Temporary Ticket Office (TTO)
10. Services and diversions associated with all the TTO above
11. Statutory Utility diversions and connections associated with the TTO above.
12. Relocation of Ticket Machines and gate line
13. Widening of Mary's Terrace/ Beauchamp Rd Junction
14. Diversion of Network Rail Trackside Services
15. Creation of under track crossings for drains & concrete lines
16. Diversion of Level 3 fibre optic service
17. Temporary Ticket Office goes live

Main Stage Works starting in mid 2017

1. Intrusive Asbestos surveys
2. Soft strip of existing ticket hall
3. Asbestos Removal
4. Demolition of Existing Ticket Office
5. Preparation for Contiguous Piling
6. Contiguous piling to London Road
7. Battering back & Demolition of retaining wall
8. Dismantling of Platform Canopies for Temporary Bridge Erection
9. Foundations for Temporary Bridge
10. Installation of a Track Crossing to access the island area from the Main Site
11. Erection of Temporary Footbridge and Stairs
12. Demolition and Removal of existing station footbridge and Out of Hours Gantry Making Good of London Rd wall following above
13. Installation of Trackside hoarding island site

14. Continuation of Japanese Knotweed treatment
15. Formation of Piling mat to trackside
16. Reduced Dig to Main Construction Site
17. Temporary propping to Contiguous piled walls
18. Formation of piling mat to area A&B
19. Cutting back North bridge Abutment
20. Tying in contiguous piling to Abutment
21. Pile caps and drainage works
22. Start of concrete frame up to podium slab level blocks A&B
23. In-situ concrete slab deck to Blocks A&B
24. Over pumping of station drainage
25. Piling adjacent to trackside
26. In-situ Pile caps to trackside
27. Drainage works adjacent to trackside
28. Precast Concrete Wall Panels, columns and beams for Podium
29. Station lift shafts and stair foundations
30. First storey of Lift shaft and maintenance stairs for OSD beneath raft.
31. Brickwork Wall to Mary's Terrace Boundary
32. Reinstatement of Mary's Terrace carriageway
33. Erection of First Tower crane
34. Installation Bridge Beams to over track & completion of podium slab
35. Installation of new service connections
36. Scaffold erection to allow gantry construction
37. Erection of second tower crane and hoists
38. Superstructure Construction for Blocks A & B
39. Installation of steel framing to ticket hall
40. Construction of broad walk to Riverside walk
41. Play Area to riverside walk
42. Fit out of under podium drainage
43. Main Plant room construction
44. Car-park surfacing
45. Installation of Structural Framing Light Gauge steel
46. Façade installation A & B
47. Roof installation A & B
48. Fitting out flats A & B
49. Installation of new electrical intake and telecoms rooms for station
50. Installation of new staircases and lifts for station
51. Surfacing and landscaping to the Public round areas at podium level
52. Construction of steel mezzanine for bicycle stores
53. Fit out of new railway station concourse
54. Removal of Temporary Footbridge across the railway tracks
55. Relocation of Acoustic Hoarding and Site enclosure
56. Opening of new station concourse
57. Fit out of commercial units

Final Stage works Block C Starting in month 22

1. Pad footings to block C
2. Scaffold erection block C
3. Block C superstructure
4. Façade installation
5. Roof installation
6. Fitting out flats
7. Hard and Soft Landscaping to Block C

4.1 Context & Preparation

4.2 Precondition Surveys

In advance of any works being carried out on site precondition surveys will be carried out including full inspection and photographic records of the existing site areas and tie-ins.
In the case of adjacent Highways, the LBRuT Street scene inspector will be contacted to arrange a pre-commencement photographic survey of the public highways adjacent to and within the vicinity of the site [Informative 26]

4.3 Site Establishment

The main contractor's site establishment during the development will be within the used platform 1 & 2 area. See figure 5

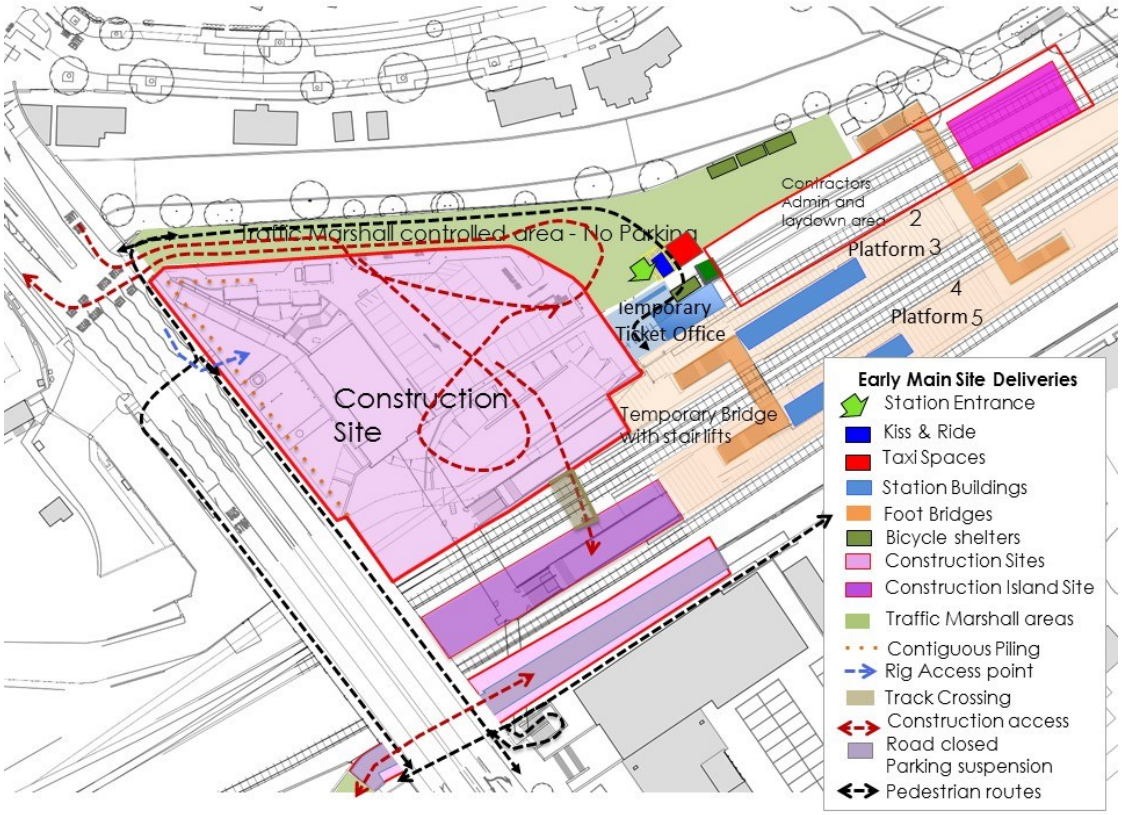
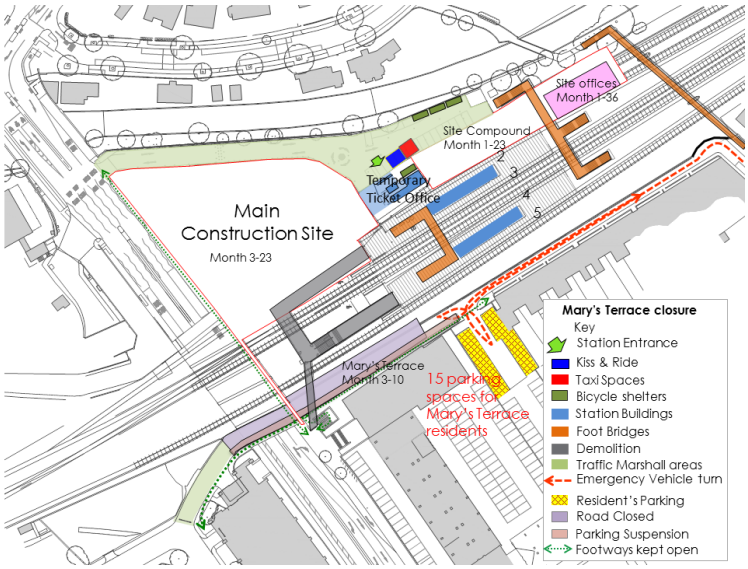


Figure 5 Site Establishment – Main Works

The site establishment will be constructed using Structural Insulated timber Panels System (SIPS) to allow easy removal at the end of the project. The site establishment include office, welfare and storage facilities for the duration of the project. It is intended to install a double, stacked two storey facility.

No provision for contractor parking will be allowed on the project. Station Yard adjacent to the bus turning area, which is currently used as a public car-park will continue as a facility for the Train Operating Company for commuter parking.



With reference to NS50 Construction Logistics Plan and the proposed project Travel Plan, Project staff will be encouraged to use public transport to come to site each day.
Figure 6 shows the proposed facility for Mary's Terrace whilst the road is closed to traffic.

Figure 6: Mary's Terrace Parking during Road Closure

At the start of the Main construction works the existing Station car park area will be cleared, connections made to the existing water supply/drainage outfalls and foundations constructed to accommodate the two storey temporary structure. The perimeter of this site establishment area will be secured with 2.4m high hoarding. A secure double gate of similar height will be installed to provide vehicular access to this compound.

It is intended to connect this office set up to a mains electrical supply. It may however be necessary in the short term to utilise a super silenced generator to provide power until the mains connection is finalised.

Pedestrian access for the workforce will be via the site offices through a safety induction entrance, they will get to the main works area using stairs over the temporary ticket office to avoid disruption to commuters using the station. The few operatives working at Mary's terrace must register at the pedestrian entrance to the works and then go via London road and the stair to Mary's Terrace. Operatives will not need to cross London Road to access the site at any time.

4.4 Access

4.4.1 Site Parking

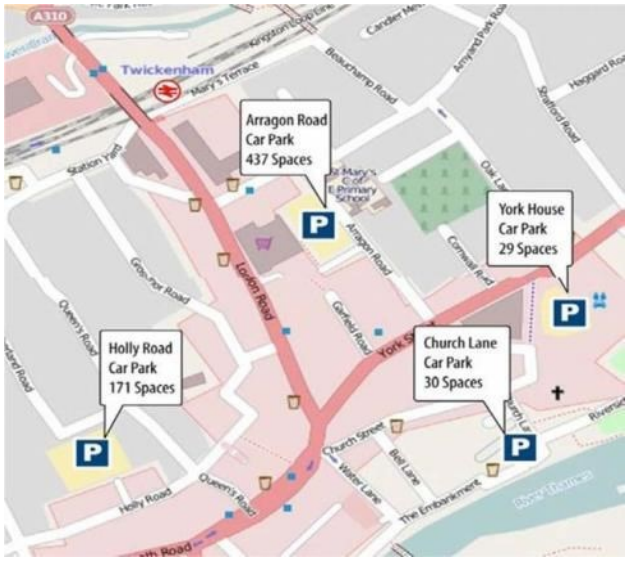
The main site area for the proposed Twickenham station redevelopment is within the existing station car park that will cease to be available for public use on commencement of the project.

4.4.2 Site Personnel & Travel

With reference to NS50 Construction Logistics Plan and the Travel Plan detailed within, management staff and operatives will be encouraged to use alternative means of transport other than cars to travel to site.

Train travel, cycling and use of alternative public transport will all be encouraged through the Travel Plan and facilities made available to incentivise the use of such alternatives. For example within the compound there will be the provision of a shower facility and cycle storage.

All operatives, subcontractors and visitors will be informed of the site restrictions before their works commence on site. The project Travel Plan will also be communicated to all members of the team.



The requirement for parking in recognised parking facilities will be included within all subcontractor negotiations and contract documents. This will be further reinforced when operatives first attend site through the induction process. Maps showing where the local car parkingis located (including the parking rates) will be provided and personnel will be instructed to use one of these. Where it is not possible to avoid the use of car, personnel who have to drive to site will need to use one of the many recognised car parks in Twickenham.

Figure 7 – Car Park Hand Out

As detailed in the Travel Plan, operatives will be encouraged to use public transport wherever possible this will make them aware of services and routes that are available.

4.4.3 Parking for Station Staff and Rail Users

As detailed in NS24 Car Park Management Plan, when the works commence the existing parking provision in the station car park for members of the public will be closed. There is no provision to replace this parking during the works due to the limited space available. Therefore, commuters will need to make alternative arrangements to park in either nearby car parks or be encouraged to use alternative stations at Richmond or Whitton. This will be communicated and promoted through

posters, leaflets and South West Trains website in advance and during the works.

There is no current parking provision for station staff and as such no loss of parking will befall these users.

4.4.4 Taxi Rank Parking

With reference to NS25 Taxi Parking Management Plan, the existing taxi parking is not managed by South West Trains but a lay-by for two to three taxis is provided within the station car park. It is proposed that the taxis are managed as detailed in NS25 during the period of the works.

4.4.5 Parking- Mary's Terrace Residents

Throughout the closure of Mary's Terrace at the station yard (west) end it will be necessary to provide alternative parking for the residents this will be provided on the garage site half way down Mary's Terrace as identified in Figure 6 above.

Pedestrian access to Mary's Terrace and to the public stairs at London Road Bridge will be maintained throughout the construction period, with segregation from the construction works utilising suitable fencing and hoardings.

4.4 Material Management and Deliveries

The detailed arrangements for material management and deliveries to site for the Twickenham Redevelopment scheme are shown in NS50 Construction Logistics Plan, Section 4.0 Outline Traffic Management Plan.

In respect to delivery and removal of materials NS50 Construction Logistics Plan details:

- Strategic Routes
- Access to Main construction Site
- Island Access Area
- Use of Mary's Terrace

A traffic Marshall will control access to the main site and the area outside the construction site up to London Road. Only vehicles booked with the Vehicle Movement Booking System organised by the logistics management company will be able to gain entry to the vehicle site gate in accordance with the Construction Logistics Plan.

The road down to the temporary ticket office and the car park area up to the event day bridge will have a traffic marshal whilst the construction site is in operation. On event days this area can be amended to provide an extended pedestrian management and queuing area footprint for match days.

Segregation of vehicle and pedestrian routes will be planned in the traffic-marshalled areas to maintain the safety of the public.

4.4.1 Main Site Compound

The majority of construction materials will be delivered directly to the construction site however some materials that require to be bulk procured and delivered in a single lorry load will be delivered to the site compound. Deliveries to the compound will be relatively infrequent, once or twice a week. See Figure 5 above.

The following main materials have been identified for delivery to the Main Compound: -

- Hoarding and Fencing materials
- Acoustic screening materials
- Drainage materials
- Temporary support work
- Cabling and ducting materials
- Bricks
- Temporary Bridge and stairs components
- Mechanical and electrical equipment (lights, cables, panels etc.)
- Temporary Lifts and decking
- Temporary Ticket Office fittings

Due to the constrained nature of the site, it will not be possible to have large stockpiles of materials as these will hamper site activities. Therefore materials will only be brought to site as and when they are needed in accordance with the Vehicle Movement Booking System (VMBS) detailed in NS50 Construction Logistics Plan. Materials will be unloaded using the mechanical equipment on site and self-unloading vehicles. Materials will ideally be delivered directly to locations adjacent to where they will be used by the tower crane to avoid multiple handling of materials.

Materials that need to be delivered to the site compound will subsequently be re-distributed using a telescopic handler to the work face or via the tower cranes, once erected, directly onto loading gantries around the development. The tower cranes will be used for materials unloading and distribution wherever their working limits allow under Network Rail standards for their operation adjacent to an operational railway, in accordance with a lifting plan which will be prepared and approved by Network Rail. Materials delivery, compound layout and storage required for the Final Stage works (block C) will be detailed in an updated revision of this method statement six months prior to the start of Block C.

4.4.2 Mary's Terrace Hoarded Area

As this area is isolated from the main site, it is planned to deliver and store materials within the fenced off zone (see figure 5) off the closed road. Deliveries and spoil removal will only occur during the day-time.

The following materials have been identified as required for delivery via Station Yard: –

- King posts
- Hoardings and Fencing

- Piling mat and fill materials
- Piling reinforcement
- Fill materials
- Shuttering materials
- Reinforcement and accessories
- Surfacing materials
- Scaffolding
- Bricks
- Fuel for plant to a double bunded location

Materials will only be brought to site as and when they are required to reduce the amount of space required for their storage. Materials will be unloaded using the mechanical equipment on site and self-unloading delivery vehicles and secured.

4.5 Plant & Equipment

The following plant will typically be used to undertake the Main construction works:

- 2 number WK 3220 BF/355B 45m luffing jib tower cranes
- 360 Degree Tracked excavators (7.5 ton – 25 ton) with attachments
- Road & Site materials transportation plant
- Klemm KR 709 reduced height Piling Rigs adjacent to the track
- Hydraulic Rotary Rig SR80 or SR65 piling rigs for contiguous and other piles
- Machine mounted hydraulic breakers and compactor plates
- Cutting equipment to saw the Concrete Abutment
- Hydraulic crunching equipment for demolition
- Proof Rollers for piling mat
- Road / Rail mounted elevated working platforms
- Scaffolding
- Ground Water Pumps
- Other Mobile cranes and hiabs
- Lighting towers
- Compressors and Small tools
- Concrete pump
- Concrete Mixers
- Telescopic Handler
- Hoists
- Road Surfacing Plant
- Generators

It should be noted that not all of these items of plant will be on site at the same time. Due to the constrained nature of the site, once the substructure works are completed, the amount of plant that can be accommodated and will be required on site will be reduced. All of these items of plant will be secured on the site at all times when not in use, as there is no provision for storage elsewhere.

In accordance with Planning Condition NS36, no construction equipment (including cranes and hoists), construction cabins or materials will be stored within 4m of the southern bank of the River Crane.

4.6 Working times

The majority of the construction work will be carried out between 8:00am and 6:00pm on Mondays to Fridays. Some Saturday work between 8:00am and 1pm may be carried out except on days where there are Twickenham Events.

Deliveries to the main construction site will generally be restricted to off-peak hours - in the mornings after 9.15am and prior to 5pm in the evenings. See Fig 8a & 8b

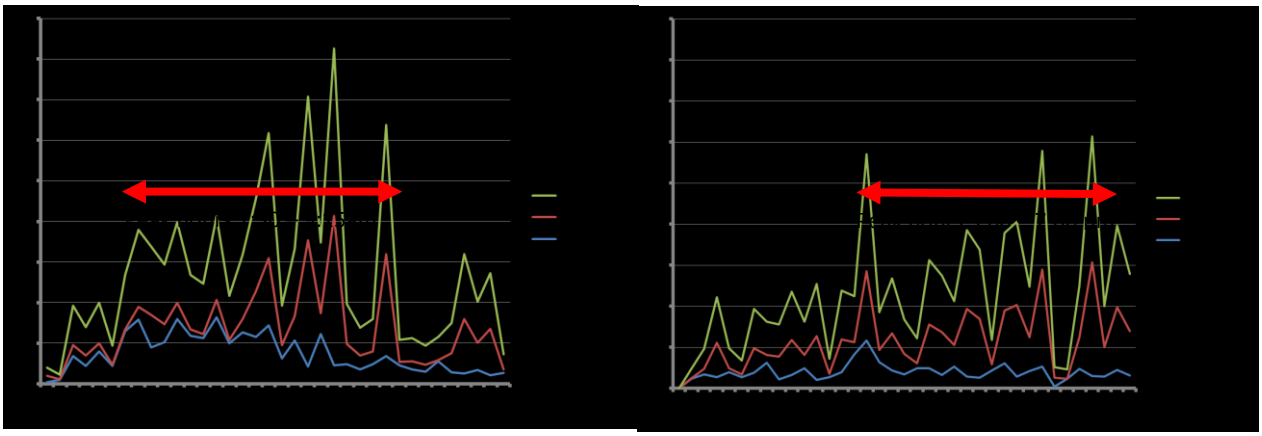


Figure 8a & 8b Daily Peak Commuter Movements

For safety reasons some work associated with the railway can only be carried out during times that the railway is not operating and the constructor has possession of the track. Effectively there are two types of possession T3 Possessions and 'Rules Of The Route'.

4.6.1 T3 Possessions

The duration of these possessions on this project are 28 hours, 52 hours or 76 hours long. The 28-hour possessions start at 1:00am on Sunday mornings and end at 5:00am on Monday morning. The 52-hour possessions start at 1:00am on Saturday morning and end at 5:00am on Monday morning. The 76hr possession runs from 1am Friday till 5:00am Monday.

T3 possessions available for works at Twickenham Station are as described in the below Table.

#	date	length	Proposed main work
1	5,6 Nov 2016	52 hr	Trackside Cable Diversions
2	27 Nov 2016	28 hr	Trackside Cable Diversions
3	14, 15 Jan 2017	52 hr	Mary's Terrace Widening & Trackside Protection / Hoarding
4	9 Apr 2017	52 hr	Remove Platform Canopies
5	14-16 Apr 2017	76 hr	Install Temporary Footbridge
6	10, 11 Jun 2017	52 hr	Dismantle Footbridge - Cladding and Walkway
7	24, 25 Jun 2017	52 hr	Under Track Crossing, Complete Footbridge Removal - Main Spans
8	10 Sep 2017	28 hr	Install Tower Crane 1
9	17 Sep 2017	28 hr	Install Tower Crane 2, Tower Crane 1 backup

#	date	length	Proposed main work
10	28, 29 Oct 2017	52 hr	Install Tower Crane 2 backup
11	25, 26 Dec 2017	52 hr	Podium Deck installation
12	13, 14 Jan 2018	52 hr	Podium Deck installation
13	28, 29 Apr 2018	52 hr	Podium Deck installation
14	5, 6 Jan 2019	52 hr	Remove Temporary Footbridge, Remove Tower Crane 2
15	12, 13 Jan 2019	52 hr	Reinstate Platform Canopies
16	23, 24 Mar 2019	52 hr	Remove Tower Crane 1

Work has been programmed during these possessions that can't occur at any other time, due to the complexity and length of time required to carry out specific works. Out of preference during these possessions work will be carried out in daylight hours, however as it is an absolute requirement to hand the railway back in fully tested, working order before the Monday morning, therefore work on some of the possession days will need to be carried out throughout the duration of the period.

4.6.2 Rules of the Route

The other kind of possession is a night time possession - Referred to as Rules of the Route (ROTR), it is a period from 1:00am to 5:00am Mon to Friday and 1:00am to 6:00pm on Sunday. The kind of work which is done during these possessions is work which for safety's sake can't be carried out whilst the trains are running.

The work that we would use ROTR methodology is normally for work of a shorter duration, compared to a T3 possession.

Work that will be done during ROTR possessions includes: -

- Amendments to the station canopy in the location of the Temporary, footbridge over the tracks between the temporary ticket office and platform 4/5
- Removal of the spoil arisings from the piling work in the island area.
- The slewing of some cables and work to some of the signalling equipment cabinets and LOC boxes.
- Moving materials and equipment to the island site between rail lines 4 & 5 from the main construction site, which must be carried out when the trains are not running.
- The routing of cables and trunking for the temporary ticket office that is between the platforms.
- Erection of hoarding adjacent to the tracks
- The erection kingpost retaining walls adjacent to the tracks to Mary's terrace. The steel posts that form the structure will need to be driven in to the ground.

Once these protective hoarding lines are erected during night-time possessions other work can then be safely carried out within these hoarded area during the day.

All other work besides the T3 possessions and the ROTR possessions has been programmed to be carried out during normal construction hours during day time.

4.6.3 Twickenham Events

The programme of works takes account of the confirmed Twickenham Events Programme through to December 2016.

No construction work will take place during match days. The area outside of the construction hoardings will be kept clear and free of obstructions within the control of Osborne and their subcontractors. Kiss and Ride and taxi bays outside the temporary ticket office will be suspended.

Twickenham Stadium Events to 2018				
#	day	date	time	Event
1	Sat	3/09/2016	14:00	Aviva Premiership London Double Header
2	Sat	8/10/2016	19:30	Rugby Championship - Argentina v Australia
3	Sat	12/11/2016	14:30	Old Mutual Wealth Series - England v South Africa
4	Sat	19/11/2016	14:30	Old Mutual Wealth Series - England v South Africa
5	Sat	26/11/2016	14:30 17:05	Old Mutual Wealth Series – England v Argentina (men) England v Canada (women)
6	Sat	3/12/2016	14:30	Old Mutual Wealth Series – England v Australia
7	Thu	8/12/2016	11:30 14:30	Varsity Match (women) Varsity Match (men)
8	Tue	27/12/2016	TBC	Aviva Premiership Big Game 9 Harlequins v Gloucester
9	Sat	4/02/2017	16:50	RBS Six Nations - England v France
10	Sat	26/02/2017	15:00	RBS Six Nations - England v Italy
11	Sat	11/03/2017	TBC	RBS Six Nations - England v Scotland
12	Wed	29/03/2017	11:00	Nat West Schools Cup
13	Sat	8/04/2017	TBC	Aviva Premiership Bath v Leicester
14	Sat	29/04/2017	12:00	Army v Navy Babcock Trophy
15	Sat	6/05/2017	11:00	RFU Cup Finals & National U20's Final
16	Sat	20/05/2017	TBC	HSBC London Sevens
17	Sun	21/05/2017	TBC	HSBC London Sevens
18	Sat	27/05/2017	TBC	Aviva Premiership Final
19	Sun	28/05/2017	TBC	Old Mutual Wealth Cup
20	Sat	03/06/2017	TBC	Twickenham Events
21	Sat	17/06/2017	TBC	Twickenham Events
22	Sat	02/09/2017	TBC	Aviva Premiership London Double Header
23	Sun	01/10/2017	TBC	Twickenham Events (Possible NFL)
24	Sat	07/10/2017	TBC	Twickenham Events (Possible NFL)
25	Sun	08/10/2017	TBC	Twickenham Events (Possible NFL)
26	Sat	14/10/2017	TBC	Twickenham Events (Possible NFL)
27	Sun	15/10/2017	TBC	Twickenham Events (Possible NFL)
28	Sat	21/10/2017	TBC	Twickenham Events (Possible NFL)
29	Sun	22/10/2017	TBC	Twickenham Events (Possible NFL)
30	Sat	28/10/2017	TBC	Twickenham Events (Possible NFL)
31	Sun	29/10/2017	TBC	Twickenham Events (Possible NFL)
32	Sat	11/11/2017	TBC	Old Mutual Wealth Series
33	Sat	18/11/2017	TBC	Old Mutual Wealth Series

Twickenham Stadium Events to 2018 (cont)				
#	day	date	time	Event
34	Sat	25/11/2017	TBC	Old Mutual Wealth Series
35	Sat	02/12/2017	TBC	Old Mutual Wealth Series
36	Thu	07/12/2017	TBC	Old Mutual Wealth Series
37	Wed	27/12/2017	TBC	Aviva Premiership Big Game 10 Harlequins v TBA
38	Sat	03/02/2018	TBC	Twickenham Events (Possible 6 Nations)
39	Sun	04/02/2018	TBC	Twickenham Events (Possible 6 Nations)
40	Sat	10/02/2018	TBC	Twickenham Events (Possible 6 Nations)
41	Sun	11/02/2018	TBC	Twickenham Events (Possible 6 Nations)
42	Sat	17/02/2018	TBC	Twickenham Events (Possible 6 Nations)
43	Sun	18/02/2018	TBC	Twickenham Events (Possible 6 Nations)
44	Sat	24/02/2018	TBC	Twickenham Events (Possible 6 Nations)
45	Sun	25/02/2018	TBC	Twickenham Events (Possible 6 Nations)
46	Sat	03/03/2018	TBC	Twickenham Events (Possible 6 Nations)
47	Sun	04/03/2018	TBC	Twickenham Events (Possible 6 Nations)
48	Sat	10/03/2018	TBC	Twickenham Events (Possible 6 Nations)
49	Sun	11/03/2018	TBC	Twickenham Events (Possible 6 Nations)
50	Sat	17/03/2018	TBC	Twickenham Events (Possible 6 Nations)
50	Sun	18/03/2018	TBC	Twickenham Events (Possible 6 Nations)
51	Sat	24/03/2018	TBC	Twickenham Events (Possible 6 Nations)
52	Sun	25/03/2018	TBC	Twickenham Events (Possible 6 Nations)
53	Sat	25/04/2018	TBC	Twickenham Events (possible)
54	Sat	05/05/2018	TBC	Twickenham Events
55	Sun	06/05/2018	TBC	Twickenham Events
56	Sat	19/05/2018	TBC	Twickenham Events
57	Sun	20/05/2018	TBC	Twickenham Events
58	Sat	26/05/2018	TBC	Twickenham Events
59	Sun	27/05/2018	TBC	Twickenham Events
60	Sat	02/06/2018	TBC	Twickenham Events
61	Sat	01/09/2018	TBC	Aviva Premiership London Double Header
62	Sat	07/10/2018	TBC	Twickenham Events (Possible NFL)
63	Sat	06/10/2018	TBC	Twickenham Events (Possible NFL)
64	Sat	14/10/2018	TBC	Twickenham Events (Possible NFL)
65	Sat	13/10/2018	TBC	Twickenham Events (Possible NFL)
66	Sat	20/10/2018	TBC	Twickenham Events (Possible NFL)
67	Sat	21/10/2018	TBC	Twickenham Events (Possible NFL)
68	Sat	27/10/2018	TBC	Twickenham Events (Possible NFL)
69	Sat	28/10/2018	TBC	Twickenham Events (Possible NFL)
70	Sat	03/11/2018	TBC	Old Mutual Wealth Series
71	Sat	10/11/2018	TBC	Old Mutual Wealth Series
72	Sat	17/11/2018	TBC	Old Mutual Wealth Series
73	Sat	24/11/2018	TBC	Old Mutual Wealth Series
74	Sat	06/12/2018	TBC	Old Mutual Wealth Series
75	Sat	27/12/2018	TBC	Aviva Premiership Big Game 11 Harlequins v TBA

5.1 The Construction Works

5.2 Time Scales

Section 9 refers to other relevant documents including the Overview Osborne Programme rev K
The overview timescales for works are as follows: -

Procurement of contractor - main and final works	Jan 2015 –	May 2015
Design development:	Jan 2015 –	Jan 2017
Early Phase 1 Works:	Feb 2015 –	Oct 2015
Enabling works including Temporary Ticket Office	Oct 2016 –	Mar 2017
Start on Site Main Works	Apr 2017	
Podium Works	Apr 2017 –	Jan 2019
Block A	Aug 2017 –	Jan 2019
Block B	Sep 2017 –	May 2019
New Station Ticket Office	Jun 2018 -	Feb 2019
Block C	Feb 2019 -	Mar 2020

5.2 Detailed Early Works

As noted above the Early Stage works were completed prior to the Rugby World Cup, September 2015. This involved:- site clearance and construction works and was carried out between January 2015 and September 2015.
Construction works were limited to the construction of a surface water manhole located within the existing station compound area.

All activities associated with the construction of the manhole were carried out in normal daytime working hours. Following the removal of Japanese Knotweed (see NS 39 for a detailed Method Statement on JKW treatment and removal) the sequence of works was as follows:

- Setting up temporary mobile site cabins
- Erecting acoustically sheeted Heras fencing
- Mobilise plant and materials
- Identifying any services present (the manhole will be located to avoid services in the first instance)
- Levelling the ground in the construction area
- Temporary protection of services
- Archaeological Excavation trench AT1 and record (NS34 Archaeology refers)
- Excavation of manhole to a depth of 2m
- Placing of temporary shoring (hydraulic box unit)
- Installation of root barrier protection
- Construction of manhole in stages, including rocker pipes, to finished level
- Backfill around completed manhole
- Tag and Trace all cables
- Demobilise plant and equipment

The above works were generally carried out between the hours 08:00 to 18:00, Monday to Friday except where work was required to be done adjacent to the railway.

5.3 Detailed Mobilization Stage

A major communications programme will be implemented to explain the main stage of the works prior to commencement this will be done in the mobilization stage and just before.

Prior to being able to construct the podium over the operational railway a defined schedule of activities are required to enable the works. Initially site cabins including site welfare facilities and hoardings will be erected to allow the use of the existing car park area as described previously.

Figure 9 Site Establishment with new Temporary Ticket office

The Bicycle stores will also be relocated to a position adjacent to the new Station entrance.

5.3.1 Temporary Ticket Office and Station Entrance

In order to commence the Main works it is necessary to set up a temporary Station Ticket office and Gate line for passengers to access the station and enable the existing building to be demolished. It has been agreed with South West Trains to replicate where possible the existing ticket office facilities adjacent to the current match day access on platform 2, by using a Temporary Ticket Office. The structure will be assembled from off-site fabricated elements. The temporary structure will be fitted out with 2 ticket windows, a small mess area, toilet facilities for the staff, a store, office and power supply room from the District Network Operator (DNO). Six ticket vending machines will also be relocated from the original ticket office location.

Prior to the ticket office becoming operational cable and service routes will need to be relocated to allow a seamless switch over from the existing facility to the new one. Some of these trunking and service routes that will go from the existing platform buildings will need to be routed during Rules Of The Route, at night where works are in close proximity to the train lines.

Where feasible all customer information and CCTV services will be relocated to serve

this area prior to staff being moved from the existing ticket office. The fit out of the temporary office is planned to take place between May and June 2016.

A new gate line will be established within the temporary ticket office roofed area.

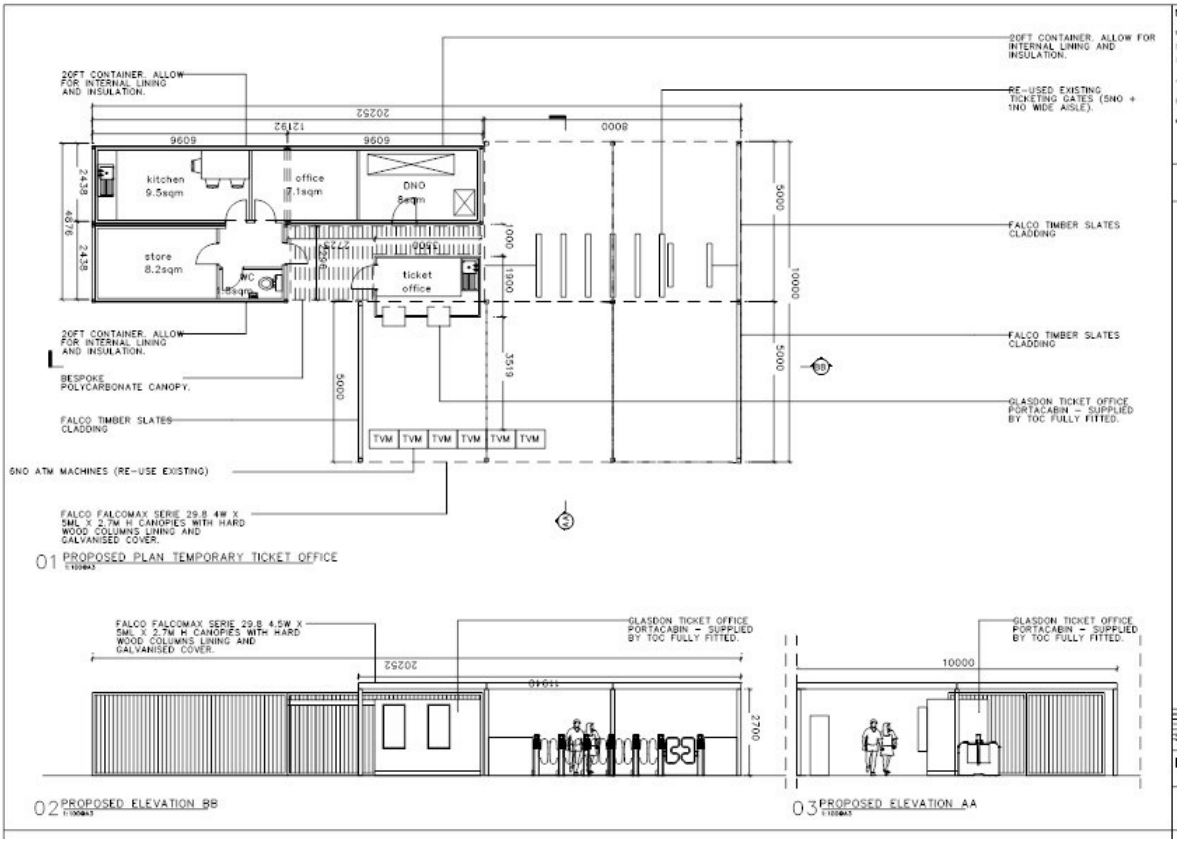


Figure10 the Temporary Ticket Office

Public access to the temporary station will be by means of a temporary segregated access route down from London Rd via the car park adjacent to the River Crane. The route will be subject to agreement from South West Trains and will be subject to changes as the works progress.

For the match day arrangements see the NS50 response for the diagrams that illustrate how the pre and post match day arrangements will be made.

The temporary ticket office will be operational until the new facility ticket concourse is available in February 2018.

Once the new station facilities are complete and in use, these temporary arrangements will be removed to allow the construction of the Final Stage of the works in Block C.

5.3.2 Acoustic Hoarding

Acoustic screening 3.8m high will be erected along access road from London Road down to the temporary ticket office. This hoarding will be between the construction work-faces and the River Crane in accordance with the NS 36 River Crane Protection document. As the fence is closer to potential noise sources and the angle between the source and the top of the acoustic fence will be higher it will marginally increase the acoustic mitigation to neighbouring properties in comparison with a fence on the riverside of the access road. The fence in this location will also not cause damage to the line of trees along the boundary.

This acoustic screening has been the subject of a detailed design, to comply with a noise assessment to mitigate impact to properties along the River Crane and wildlife. The design has been carried out by Anderson Acoustics, specialist noise consultants; they have also produced the Noise and Vibration Management Plan. They will also produce Section 61 Applications on behalf of the applicant at six monthly intervals throughout the development works.

5.3.3 Road Widening to Mary's Terrace

Road widening to Mary's terrace at the junction with Beauchamp Road is being done to allow emergency vehicles to access Mary's Terrace from the east.

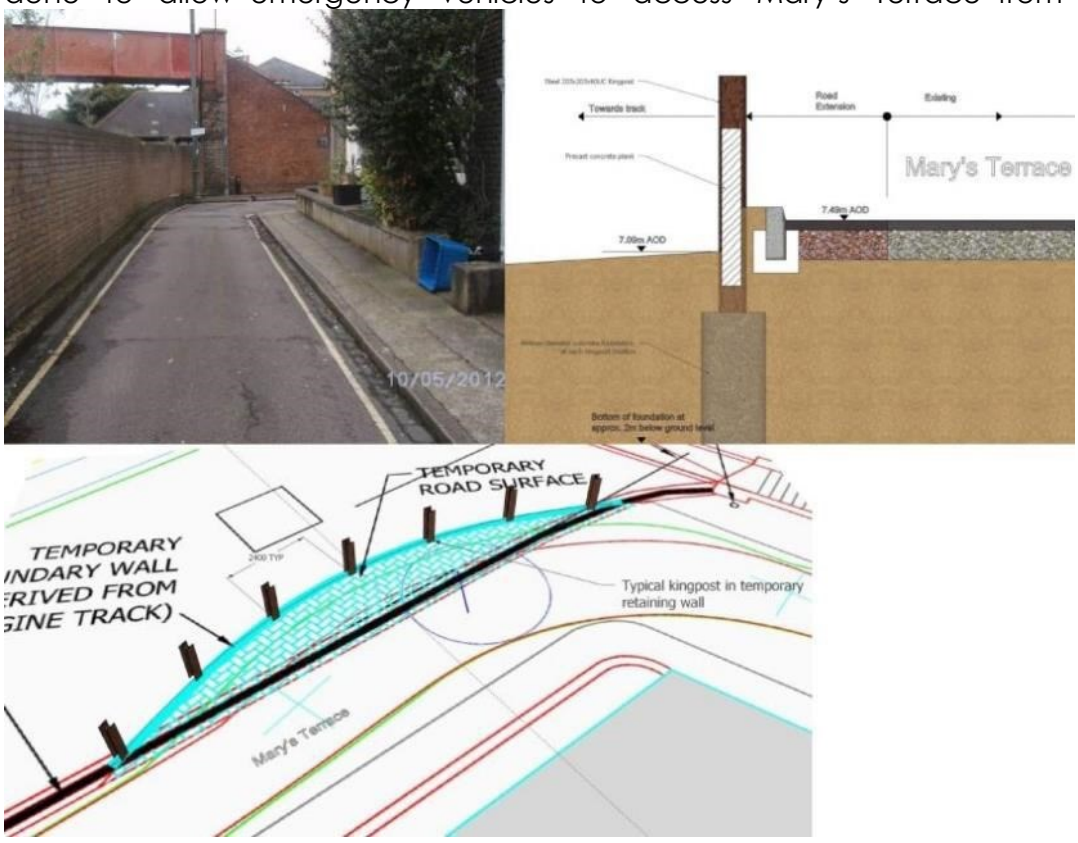


Figure 11 Road widening at the junction with Beauchamp Road to allow fire engine access to Mary's Terrace

Mary's Terrace has been closed to through traffic for a number of years and all vehicles except fire engines must enter the road from Beauchamp Road. The temporary road widening of Mary's Terrace at Beauchamp Road will allow emergency vehicles to access Mary's Terrace from the west.

A suspension of parking and the closure of Mary's Terrace, for emergency vehicular traffic from the east will be needed, adjacent to the new podium position near London Road Bridge. This will enable piling to take place on the site boundary to Mary's

Terrace opposite the hotel, as well as the construction of a pile caps retaining element, columns to take the load of the edge of the new station concourse and the re-construction of the wall on the boundary.

The road widening to the Mary's Terrace and Beauchamp Road junction will be carried out late April 2016 using daytime hours as much as possible but also utilising night-time Network Rail Maintenance track Rules of the Route possessions. This will require short-term closure of the road at the junction whilst the work is carried out, adjacent to the public footbridge, the footpath will remain open. Vehicular access for residents and construction vehicles during this operation will be via the barrier at the London Road end of Mary's Terrace. Details of access will be agreed with the local highways authority.

Segregation for pedestrians using the footpath and residents vehicles will be by use of Heras style temporary fencing for this particular short-term activity.

These works, which have been Approval in Principle by the Highways Authority, will include localised removal of the Network Rail boundary wall, installation of a temporary retaining element to the extended carriageway and resurfacing of the road to the new alignment (see Figure 11). A new fence line will be erected to prevent access to the network rail land and a kerb will be provided to protect network rail LOC boxes. Notification of these works will be made in accordance with planning condition DV42 'not less than 21 days prior to a material start on the development'

A full detailed design will be prepared by the specialist contractor and submitted to Network Rail, LBRuT and Highways and prior to commencement. A photographic condition survey of the carriageway, footpath and existing boundary wall will be undertaken and recorded with the Traffic Department as Planning Informative 26. All these works will be undertaken in accordance with an approved Network Rail Works Package Plan (WPP) and Safe System of Work (SSOW).

Once work is completed and the junction reopened to enable emergency vehicles to enter Mary's Terrace from the east, Mary's Terrace will be closed to vehicles at the Western end of Mary's Terrace so that work can commence adjacent to London Road Bridge.

All works will be in accordance with planning condition NS 55 and the approved plan

SRG Twickenham Tracks1 Rev A.

5.3.4 Slewing cables and diversions

A number of Network Rail cable routes and equipment have to be relocated trackside of the existing boundary wall opposite the Travelodge Hotel and these will be carried out in night time and weekend possessions in May 2016, to utilise the possessions available. These works are all rail side and involve alterations to rail infrastructure only.

5.3.5 Platform Canopy Amendment

The platform canopy in the location where the temporary footbridge needs to go (see figure 12 below) will be carefully removed to allow the construction of the temporary footbridge. Preparation for the footbridge footings will also be undertaken, within a fenced area that maintains 2m clear platform each side. The extent of these works will be kept to a minimum through the use of counterweight supports to the bridge which will be the subject of a fully designed and checked temporary works design, but will include removal of platform surfacing and shallow concrete pad foundations between the new stairs and platform buildings. All these works will be undertaken in accordance with an approved Network Rail WPP and SSOW. Works within 2m of the platform edge will be carried out at night, during Rules of the Route.

5.3.6 Temporary Footbridge

The new temporary footbridge will be completed during night-time works and will be fitted with a new stair lift and a relocated one from the exiting footbridge. In the weeks before the stair lift is relocated, communications will be made with users of the stair lift as well as other commuters to advertise that the stair lift will be unavailable for a short period whilst the existing one is relocated. Alternative arrangements for the period of changeover will be communicated to users commuters and travellers who use the line to make use of alternative stations.

, ***Figure 12 Mary's Terrace Enabling – Footbridge***

The temporary footbridge will be constructed from scaffold. This will allow the bridge to be erected during "Rules of the Route" at night. Once this is erected

as described in the response to NS 47 Temporary Footbridge in section 9.0 of this document. The scaffold structure will replace the existing bridge that will be demolished to allow the new podium to be constructed. The temporary footbridge will be installed and fit for use prior to the demolition of the existing structure; the latter will remain fully operational whilst this takes place. The parts of the bridge that are below the hoarding surrounding the bridge towers can be worked on during the day time. Works above the hoarded area that could potentially fall near the track will need to be constructed in night-time railway possessions during June 2016.

Tower and bridge scaffold elements will be delivered during normal hours into the car park ready for assembly in night works. As much of the bridge as possible will be assembled into manageable sections within the station car park compound during the day. This will be lifted, erected and secured in position during the night possessions.

Decking and cladding will then be incorporated into the bridge design. The flanking balustrade to the south side of the bridge will have solid sides up to a height of 1.8m above the nosing to the stairs to prevent possibilities of overlook. Cabling, lighting and CCTV will be installed within the bridge, and completed once the bridge has been constructed and handed over by the bridge erector. The bridge will include coated handrails. Lighting, way-finding signage and customer information boards will be installed in accordance with Network Rail standards. The walkway flooring will be a low maintenance anti slip finish with minimal joints to Network Rail standards. In accordance with Network Rail standards the handrails and stair nosings will be of contrasting colours, details to be agreed with SWT/Network Rail.

The bridge will be designed, approved, located and constructed in accordance with all Network Rail standards. Its capacity and accessibility has been checked using computerised specialist pedestrian modelling software demonstrating that sufficient capacity is provided to access the central platforms. The bridge will remain in use during the main construction period up until the time the new station entrance from London Road is ready to open.

5.3.7 Other Mobilisation Works

During the possession in May and before work is carried out adjacent to the London Road bridge, a structural condition survey of the London Road Bridge will also be carried out using mobile access equipment by a Network Rail qualified Structural Inspector or Engineer. All these works will be undertaken in accordance with an approved Network Rail WPP and SSOW.

As previously noted, Mary's Terrace road between the garages and London Road Bridge will be closed to the residents and the general public, from May 2016 till January 2017 in agreement with the Highways authority. Alternative parking for residents will be provided in Station Yard. Hoardings against the footpath and across the carriage way and any acoustic screening identified from the Section 61 assessments will be erected in daytime hours to

segregate the work site from the public. Pedestrian access along the footpath and to the London Road stairs will be maintained, whilst residences and the garages will be accessible from Mary's Terrace via Beauchamp Place whilst this closure is in place.

5.4 Detailed Main Construction Works

The Main works consist of the construction of the construction of Blocks A&B, the over rail podium, the new station concourse and the creation of six retail units.

5.4.1 Demolition of existing ticket hall

Figure 13 Demolition of the old ticket hall

Once the Temporary Ticket Office is operational and pedestrians are now diverted to exit the Station via the Temporary Ticket Office, the footbridge can be blocked off where it goes down to platform 2/3. The invasive asbestos surveys can commence to the ticket hall and the soft strip out of the existing ticket hall can commence. Ticket Machines will have been relocated to their new position. Demolition will occur during daytime Monday to Friday. Demolition materials will be segregated with inert hazardous and hazardous materials being separately disposed of to appropriate registered disposal sites.

5.4.2 Contiguous Piling

Once the existing ticket hall has been demolished using hydraulic demolition equipment during daytime, contiguous piling will start to the junction with London Road. A Continuous Flight Auger (CFA) rig will be used. A piling mat will be created adjacent to the slope to the north of the old ticket hall to allow the piling rig to work on a level surface adjacent to the slope. There is a possibility that the pile arisings adjacent to the slope where the bicycle racks currently are, will need to be removed from the site as contaminated waste as they may contain roots of Japanese Knotweed. Each pile will produce about 7m3 of material that will bulk up to about 10m3. A 360degree excavator will load the arisings into bulk containers for removal from site.

Figure 14 Contiguous Piling And Mary's Terrace Road Closure

A contiguous pile retaining wall will be constructed using 750mm diameter piles along London Road. This wall will be linked to the existing bridge abutment. This work needs to be carried out prior to the area reduced dig, so that the highway support can be maintained. The reduced dig will commence once the existing ticket hall has been demolished, in accordance with an Approval in Principal from the Highways Authority, which will be progressed prior to the Main works starting. Raking temporary support members will be installed in trenches perpendicular to the contiguous piled wall to support the top of the ground beam to the top of the wall.

5.4.3 Reduced Dig and Demolition of retaining walls

All construction access to the construction site on Mary's Terrace will be via Station Yard entrance under the control of a trained Traffic Marshal, but provision will be made for a gated access to allow turning of vehicles within the garage area when necessary. Slew restrictors will be fitted to the excavator to prevent over-sailing of the Network Rail boundary or the pedestrian areas open to the public unless under the control of the Traffic Marshall, who will also be a trained banks man.

The current plan is to reduce the level of Marys Terrace to enable piling to occur at the level of the track. Once hoardings are in place trackside and roadside the existing road level will be reduced with a ramped access underneath the bridge. The boundary wall will be removed to the required level for piling and construction of the main development. These works will be undertaken in normal working hours using excavators fitted with breaker and munch attachments and diamond bladed saws.

To reduce the quantity of work in this area and the level of disruption we are investigating the possibility of piling from the road level of Mary's Terrace. This will be dependant upon the condition of, and potential to move fibre optic cables currently about 3m from the track along the length of Mary's Terrace.

Figure 15: Reduced Dig and Demolition of retaining walls

At the same time the original station forecourt will start to be reduced in level. Temporary props will be required to support the top of the contiguous wall. Hydraulic crushers and diamond saws will be used to demolish the 4.8m high concrete retaining structures. This will be some of the noisiest work on site but will be carried out during daytime. Until tests have been carried out on the concrete of the wall, it can't be precisely determined how many days it will take to remove all of the original retaining elements supporting the station concourse. Methodologies that keep vibration to a minimum will be used, to minimise damage to the existing bridge abutment and reduce noise and vibration impact to local residents.

5.4.4 Piling works

Continuous Flight Auger (CFA) piling will occur in the area of block A once the pile mat is in place. The pile mat will need to be rolled which does create low frequency vibration whilst it is being compacted. For the main construction stage conventional continuous flight auger (CFA) piles 600mm diameter of about 25m length will be installed using standard piling rigs and techniques, as these are located outside of the Network Rail zone. Additional piles will be installed in the area between block A&B to support the future tower crane to be used during the main works.

Figure 16 Works to Block A piling and Mary's terrace

The Piles to Mary's Terrace will be constructed using a special reduced height piling rig, which can not topple over on to the railway. Piling will occur during daytime. Pile arisings will also be removed using a 360 excavator the material being directly deposited into a lorry.

5.4.5 Footbridge removal

With the temporary footbridge being operational the old footbridge can be prepared for removal. The bridge will be fully scaffolded to surround the bridge this will allow the bridge to be safely demolished without any possibility of debris falling on to the track. The existing station footbridge and out of hours gantry adjacent to London Road is to be dismantled and removed from site during ROTR possessions of the railway lines between May- November 2016. This will only be dismantled once the temporary footbridge is completed and fit to be used by passengers.

The bridge roofing and some cladding panels are known to be asbestos containing materials and prior to any demolition, a detailed intrusive survey will be carried out by an independent competent consultant, to confirm the extent and grade of the asbestos.

Should further asbestos be identified, this will be advised to the Demolition Contractor and, if identified as notifiable, to the HSE in accordance with the Control of Asbestos Regulations 2012.

The appointed demolition contractor will be a member of the National Federation of Demolition Contractors fully licensed and insured for asbestos removal and demolition. A detailed method statement for controlled removal of the asbestos and the bridge will be prepared by the specialist and approved by Network Rail, prior to commencement. A copy will be made available to the Local Authority on request.

In preparation for the removal of the bridge it will be necessary to soft strip the interior including any non- essential services, and the advertising boards, this will be carried out during station closure hours.

Once the bridge is closed to passengers, the appointed Mechanical & Electrical contractor will disconnect all power and communications links to the bridge, stairs and canopies, ready for demolition.

The main spans of the existing bridge are made up of four separate deck structures bolted together, plus the fifth span for the out of hours gantry, and the bridge will be disassembled and lifted off site in these 5 spans. The concrete steps to the platform stairs will be removed sufficiently to allow disconnection form the bridge spans by cutting. The railway track and services beneath the footbridge will be protected from debris using polythene and sleepers, which will also provide access for the mobile access equipment and plant.

The roofing, cladding and windows will first be removed in sufficient quantities to gain access to the bolted connections and reduce the weight of the bridge for lifting; this will be carried out using scaffold access from track level. The sheeting and any

effected insulation will be double bagged and secured on the floor of each deck for subsequent removal. The bridge deck itself is formed of surfaced precast planks. Surfacing will be cut and the planks will be removed using lifters working from one end to a lifting position, to reduce the weight of the bridge spans to be lifted from the car park.

The out of hours gantry will be stripped of planks manually and temporary scaffold trestle supports erected beneath it. It will be broken into 3 or 4 sections and lifted off using the tower crane. Mary's Terrace will already be closed to vehicles, but it will also be necessary to close the public footpath and staircase to London Road for the period whilst this gantry is removed. The entrance to the staircase and gantry will be fenced off and a working area created at London Road to prevent public access whilst the demolition progresses.

All the remaining asbestos sheeting will be double bagged and removed by the licenced contractor to a waste disposal centre licensed to take this hazardous material. Details of this will be included in the Site Waste management Plan for the project, see NS28 Site Waste Management Plan.

The piers supporting the main spans and staircases will then be removed using a long reach 360 degree excavator with a hydraulic, munching attachment. The material will be loaded directly into wagons where reach allows or by dumper to a stockpile area.

Finally the redundant foundation pads and platform walkways will be removed using the excavator and muncher. These works will be carried out behind the track hoardings and in normal hours wherever practicable, with waste removal across the tracks 3 and 4 in night time possessions.

5.4.6 Pile Caps and columns

As piling continues in the area under block B. The areas under block A will have the piles tested for integrity. Piles will be cut down and reinforcing for pile caps and shuttering will be installed. The first Tower crane will be erected once the piled base has reached its working load. The pile cap on Mary's Terrace will be substantially out of the ground so that it can act as a retaining wall to the road. Having a raised pile cap will also enable the pile cap construction to not need steel sheet piling to stop movement of the rail tracks. Omitting this work will reduce potential noise to local residents.

Figure 17 Block A pile caps piling – Tower crane and Mary's terrace pile caps

Piling works will start to commence to the island site between track 4 and 5. This will be accessed from the main construction site. Access will occur at night for the piling rig that will operate during the day.

At night the pile arisings will need to be removed during rules of the route at night. This removal work can't occur during the day from this area because the tracks can't be crossed whilst the railway is operational. Each pile will take a day to bore and will produce about 10m3 of bulked up material as an arising. A 360degree excavator and a dumper will be needed to remove the material.

The piling adjacent to the track next to track 3 will have the both the piling and arising removal done during daytime. Removal of the pile arising will be dependant upon the quantity of water in the material it may need to be put in a bunded area to dry out using a 360degree digger. When the material is sufficiently dry it will be deposited into waste removal container for subsequent removal when full.

The elevation along Mary's terrace opposite the hotel will require a retaining wall to support the carriageway, The existing retaining wall will be removed prior to the piles being installed along the line of the retaining boundary wall. The continuous pile cap design, approved in principal by the Highways Authority, has been partially

raised out of the ground to act as the retaining wall. The large wall columns are then cast above the pile caps and are clad in brickwork. The brickwork will require a full masonry scaffold and will require the suspension of parking until this elevation is complete. Mary's Terrace will not be used for access to the island site, as this would prolong the through route closure of Mary's Terrace.

5.4.7 Trackside Pile Cap Foundations and Drainage

The raft pile caps are reinforced cast in-situ concrete elements designed to spread the loads to the piles and to resist possible impact from trains in accordance with Network Rail standards, where they are within 4.5m of the track.

The raft pile caps have been intentionally raised to limit excavation depth next to the rail tracks to minimise the risk of undermining them. The cut off level of the piles will be approximately 300mm below ground level. Outside of the Network Rail Zone of Influence the pile caps will be deeper, typically 900mm deep.

Once redundant, the pile mat will be removed using a 360 degree excavator to the required level and any redundant fill materials stockpiled locally or removed from site.

The piling mat finished level will be constructed as close as practicable to top of pile level to minimise the length of piles to be cut down for pile cap construction.

Figure 18 Block A Frame and Island Pile caps

Piles will be broken down in accordance with the Code of Practice from the Federation of Piling Specialists using a low vibration technique such as the Elliot system, which mitigates risk to operatives.

All below ground drainage and pile cap construction will take place within the hoarded site areas. The surface water drainage from the raft is to be connected into new manhole SW06 which outfalls into the River Crane. Formation will be blinded with

concrete to give a clean surface to enable the pile caps to be constructed.

Reinforcement cages will be pre-fabricated and delivered to site and timber shutters erected to approved temporary works designs, with dowel tubes and starter bars to receive the vertical walls and columns. Pile caps will be poured using ready mix concrete and mobile concrete pumps, connected to the static pumping main to serve the island areas. A crossing from the main construction site will be erected each night to span the 3rd rail, so alteration of 3rd rail will not be required.

The foundations have been designed to minimise the depth of excavation required against the operational railway lines, although some excavation will be required to prepare for the pile caps to be constructed, as well as for the bored piling, to remove obstructions, install drainage and other services. The overall duration of these activities is dictated by the restricted access and work area in the Island; the works in Mary's Terrace and the Car park will progress concurrently. By erecting the hoardings the piling, drainage and foundations can progress within normal working hours, with only deliveries and waste removal from the island, taking place at night, using the track crossing as previously described.

In accordance with Planning Condition DV 42 the following section details the intended method of constructing the foundations, including the method and equipment to be used for piling.

To ensure that the foundation construction selected, minimises nuisance to neighbours and complies with the requirements of Network Rail train impact requirements, design loading requirements and is suitable for confined working areas, an auger boring piling technique has been selected. This is in accordance with good practice that states the types of piling operations that are more suitable for sensitive development in terms of noise and vibration impact:

- Hydraulic Piling
- Auger Piling *Option selected for podium construction.
- Diaphragm Walling

The piles for the Island and Mary's terrace will be installed using low centre of gravity rigs, with reduced height masts i.e. the Klemm KR 709, which will give greater efficiency in these areas. Figure 19 adjacent shows an image of the piling rig to be used on the rail podium works.

Figure 19 Klemm KR 709 Restricted Height Type Piling Rig

These rigs and their set ups will be in full compliance with Network Rail's Code of Practice for Piling adjacent to the Running Line. The auger head on these rigs is short, mitigating the risk of retained materials dispersing as it is withdrawn from the bore.

Preparation for the piling rigs and the associated piling mat will require an excavation, filling and a compaction process to form a firm level working platform. This will involve the use of 360degree excavators fitted with slew restrictors to prevent encroachment within 3m of the nearest rail, in compliance with Network Rail standards. The piling mat will be designed, checked and approved by Network Rail prior to commencement; fill materials will then be placed in and compacted in layers in accordance with this design. Once a sufficient area of piling mat is completed the piling rigs and associated equipment will be delivered to the work sites.

The existing ground conditions of the site indicates made ground over Kempton Park Gravels and London Clay; the Kempton Park gravel is classified by the Environment Agency as a principle aquifer. These ground conditions and applied loads for railway impact lead to the selection of traditional rotary bored cast in-situ non - displacement piles of 600mm diameter into the London clay to depths of about 25m. Due to the ground conditions, temporary casings will be required through the gravels and made ground and in the zone of influence for the London Road Bridge Abutment. The pile reinforcement will be de-bonded in the cut off zone to enable passive breakdown to finished level.

Figure 20 Concrete Frame: pile caps to island

Throughout the piling operations the railway tracks will be monitored daily for movements in accordance with a plan to be agreed with Network Rail. Vibration monitoring at sensitive neighbouring receptors, including London Road Bridge, Mary's Terrace and the Travelodge will also be carried out throughout the piling as agreed in the Noise Vibration Management Plan (NVMP). As stated within the NVMP, all monitoring will be carried out in accordance with Informative NI 13, 16, 17, 18, 19, 20

and 21. The Demolition Construction Method Statement also details the projects noise and dust strategy in respect of piling and transportation of materials throughout the works.

An attendant 360degree excavator will remove spoil and lift in reinforcement cages for the piles. Ready mixed concrete will be delivered to the piling operations by road directly to the Car Park and Mary's Terrace. Concrete will be pumped to the Island site using a static concrete pump from the main construction site using a static pipe that will be installed beside the temporary footbridge in a dual walled pipe system.

Once concrete has cured to a pile, the temporary casings will be extracted using a proprietary rig attachment, unbolted and reused or removed from site.

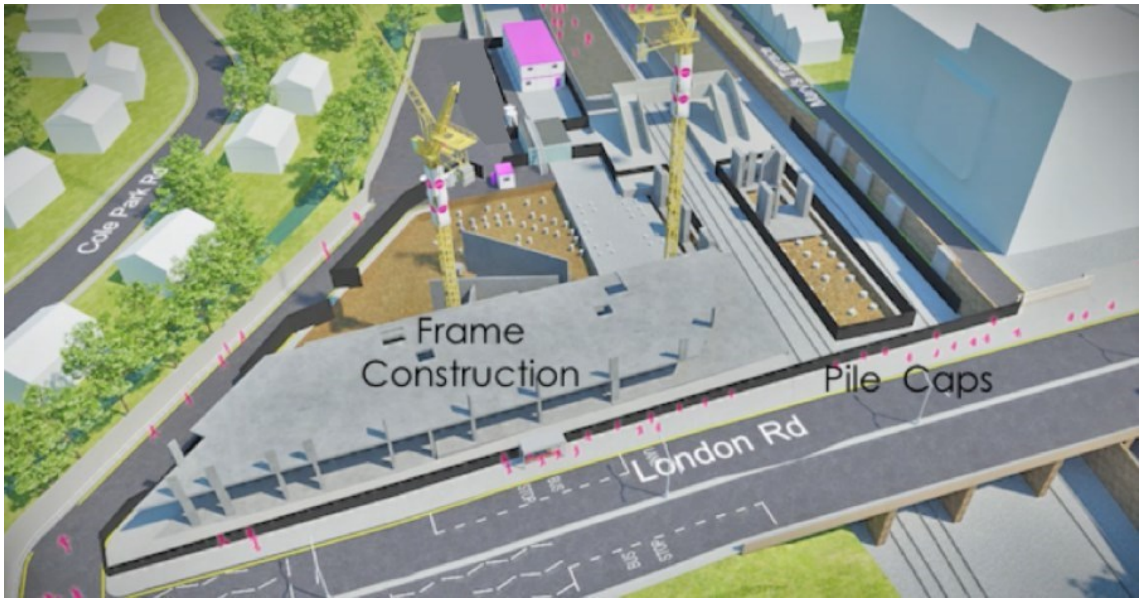


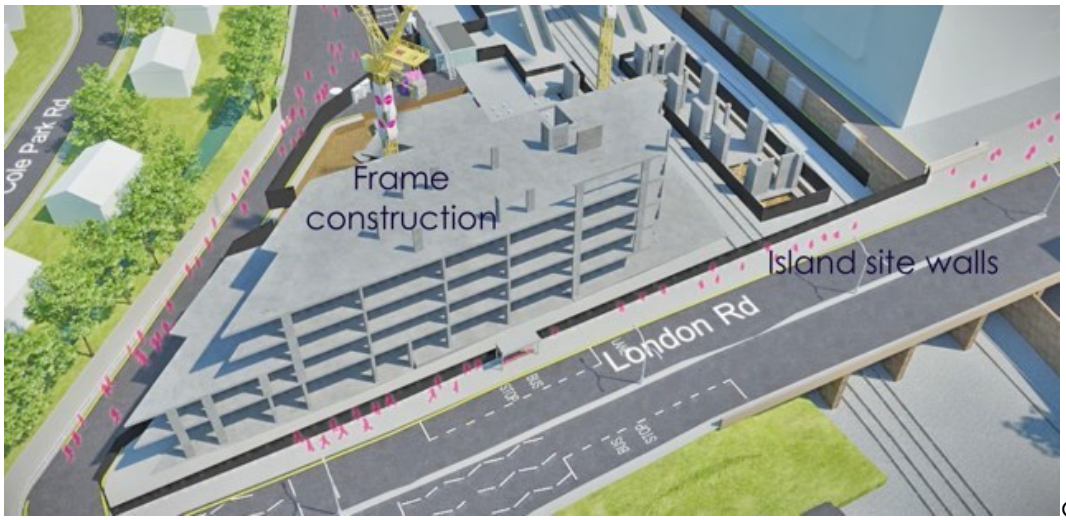
Figure 21 The First level of Post Tensioned Concrete Frame

The concrete frame in area A will be brought up to podium level enabling the temporary restraint to the contiguous piled wall to be removed. The face of the retaining wall will now be faced up to provide a waterproof structure.

5.4.8 The Columns adjacent to the tracks

The vertical elements of the podium raft will be cast in-situ wall panels and columns, connected to the pile capping beam with continuity reinforcement, which minimises the risk to the operational railway. There are 35 columns forming the vertical elements of the raft. Each column is 800mm thick by 3.2m long to withstand potential horizontal forces should there ever be a train derailment.

All column shuttering and reinforcement constituents will be lifted into position in all three areas from the tower crane in the main construction area. For this reason, and in accordance to Network Rail standards for operating cranes adjacent to the railway, all the materials will be lifted in during ROTR weeknight normal possessions, with concrete being placed by static line pump during the



day.

Figure 22 showing the completion of the columns to the Island Site

A lifting schedule will be submitted to Network Rail, detailing each individual lift for load and crane radius. Shuttering will be subject to temporary works design and Network Rail approval.

Columns to Mary's Terrace will be installed first, followed by the Island and the car park.

5.4.9 Precast Deck Beams

The deck is formed from precast beams and planks. Perimeter L shaped beams are first lifted into position between the wall columns and an in-situ concrete infill poured to join them into a frame and secure them to the top of each wall column. Firstly a movement joint is formed at the London Road Bridge parapet to separate the two structures and allow them to move independently, in accordance with a detail approved in principal by the Highways Authority. The deck is then formed from precast concrete bridge beams spanning across the tracks onto the perimeter beams, working away from the junction with the London Road Bridge and from Mary's Terrace towards the Car Park. Hollow core Precast planks are also to be installed to the open end of the raft, which will form the future maintenance platform for Block B.

All the precast beams are to be lifted into position in a similar manner using the crane sited in the station car park in pre- booked possessions of the rail in December 2016 and January 2017. As they are positioned the horizontal gaps between the bridge beams will be sealed with a GRP and mastic filler joint ready for the overlying concrete deck.

Once the podium structure has been completed a facing brickwork skin is to be constructed to the boundary from a scaffold erected in an area of closed carriageway to Mary's Terrace. The existing wall will be made good up to this new brickwork level and the carriageway reinstated to the original levels.

The pedestrian segregation hoardings will be removed to enable the carriageway to

be reopened to public vehicles. Parking will still need to be restricted adjacent to the Travelodge Hotel to enable a masonry scaffold and protective fan to be constructed whilst the brickwork is completed on this elevation.

Mary's terrace will also need to be closed for a short period of time whilst the wall at the other end of Mary's Terrace at its junction with Beauchamp Road is reinstated. A temporary fence will be erected trackside in a night time possession to enable this work to be undertaken in daytime hours.

Figure 23 Deck Slab in position

Installation of soffit lighting, cabling and other services beneath the deck, required for railway operations, will be installed behind the beam installation using mobile access platforms from track level, again in night-time and weekend possessions.

5.4.10 Concrete Deck Slab

Once all the precast concrete beams have been secured in position and the infill strips checked, the deck will be prepared for using a concrete pump situated in the Car park during normal working hours. Once the concrete deck has cured a waterproofing membrane will be applied across the surface ready for construction of Block B. Services and the external finishes will be completed whilst the station is being fitted out. See figure 23 above.

5.4.11 Post Tensioned Frames

The post tensioned concrete frame will continue to be erected for Block A & B. The large span trussed steels over the concourse will be erected as individual sticks. Scaffold will start to be erected to block A to facilitate the construction of the cladding that due to its complexity can't be erected as off site elements. Structural Steel Framing will be erected first and clad with cementitious boarding. The scaffold will be tightly protected with Marnaflex acting as a screen to prevent any materials from being blown or falling from to the works. Brickwork, render and metal cladding

will be installed under the sheeting and will not be visible until the scaffold is removed revealing the nearly completed facades. Fit out of residential units will progress on the floor levels that are weather tight. The station fit out will also commence when the station shell is completely watertight.

Figure 24 Erection of steels to new ticket concourse

5.4.12 Completion of Station works

A fixed bed lorry turning area will be created under the podium slab such that after vehicle have been unloaded, they can turn around before driving out of the site back onto London Road. Larger vehicles will be turned round using banks man support on the access road.

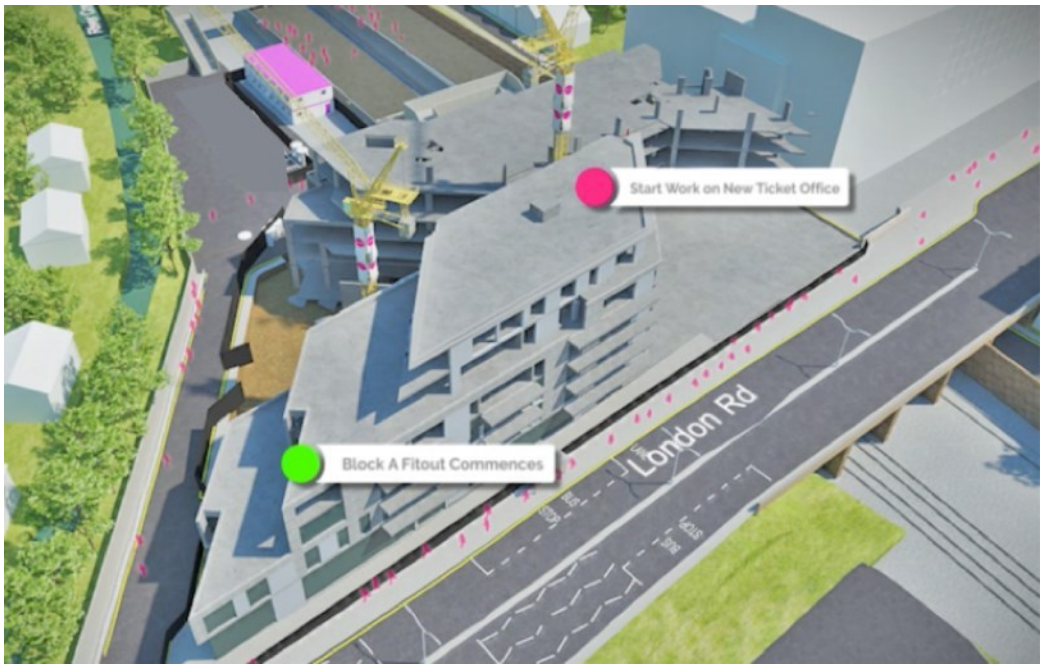


Figure 25 Start of the station fit out

Figure 26 Public Realm and Station Handover

During the construction and fit out of the new station buildings an open liaison will be maintained at all times with Train Operating Company to keep both the station staff and station users informed of the scope and progress of the works and keep them advised of any changes to the current station provision. Posters and signs will be drawn up in tandem with the train operating company to ensure that the correct level of information is portrayed to the station users throughout the project. This will be co-ordinated through the Community Liaison Officer (CLO). For all areas of interface

i.e. site entrances and the delivery area in London Road; access and egress points will be managed to ensure the minimum of disruption and safe movement of vehicles.

Materials unloaded by forklift can be transported around and, if necessary, put into storage under the podium slab.

Figure 27 completion of block A

This will include the provision of highways trained traffic marshals/gatemen to assist with vehicle movements. Clear signage will also be posted and maintained throughout the project to highlight potential conflict areas. Hoardings will be used to display further directions and diversions and to present relevant project information to allow members of the public to gain an understanding of the works that are being undertaken. Advance notices will also be displayed to ensure early notification of any planned changes to the pedestrian routes or hoarding lines and works that may affect the highway.

Following the completion of the fit out and commissioning of the new station building, the temporary footbridge will be removed and new facilities opened to the public.

5.5 Final Stage Works - Block C

The final stage work consists of:

- Relocation of the acoustic hoarding around the construction site
- Removal of temporary ticketing office facilities
- Erection of Tower crane for Block C
- Temporary works associated with above.
- Pad foundation Substructure for Block C.
- Installation of new service connections
- Superstructure Construction C, this will now be an in-situ concrete frame.
- Removal of Temporary Footbridge across the railway tracks
- Re-location of the existing bus stop
- Fit out of Block C Residential Units
- Hard and Soft Landscaping
- M & E services associated with all the above

Figure 28 below depicts the work areas noted above. There will be a slight overlap between Block B completion. Once the new permanent ticket office is operational, the demolition of the temporary facility will commence. This will effectively release the remaining footprint area for the construction of Block C. This block will have pad foundations. Method Statements and Works Package Plans will be developed for each element of the works to ensure the safety of the general public, railway passengers and staff.

Following completion of ground works and piling, in order to complete the development, it is planned to have a luffing jib tower crane for the erection of the in-situ frame. It will be utilised to lift the formwork, reinforcement and concrete in place to allow the structure to be completed and then used to assist with the cladding installation. The crane will be removed as soon as these activities are finished.

The piled base for block C tower crane will be installed at the same time as the piling for Block B. These temporary piles will be cut flush with the surface of the tarmac ready for when this area becomes a construction site. Whilst the piling is taking place for these temporary works the area will be protected with hoarding.

All cranes used on the project will be provided with a luffing jib, and will be programmed such that they cannot lift over the railway line or adjacent properties or highways. They will also be appropriately rigged such that their lifting capacities are within the requirements of Network Rail.

For the installation of the cladding, external scaffolding will be erected to give access to all facades and the cranes will be used to lift the cladding materials to each level of scaffold. Consideration will be given to have panels pre-manufactured off site and brought to site as whole units and then lifted into place as they are delivered. Haki staircases will be included within the scaffold to give external access to all levels.

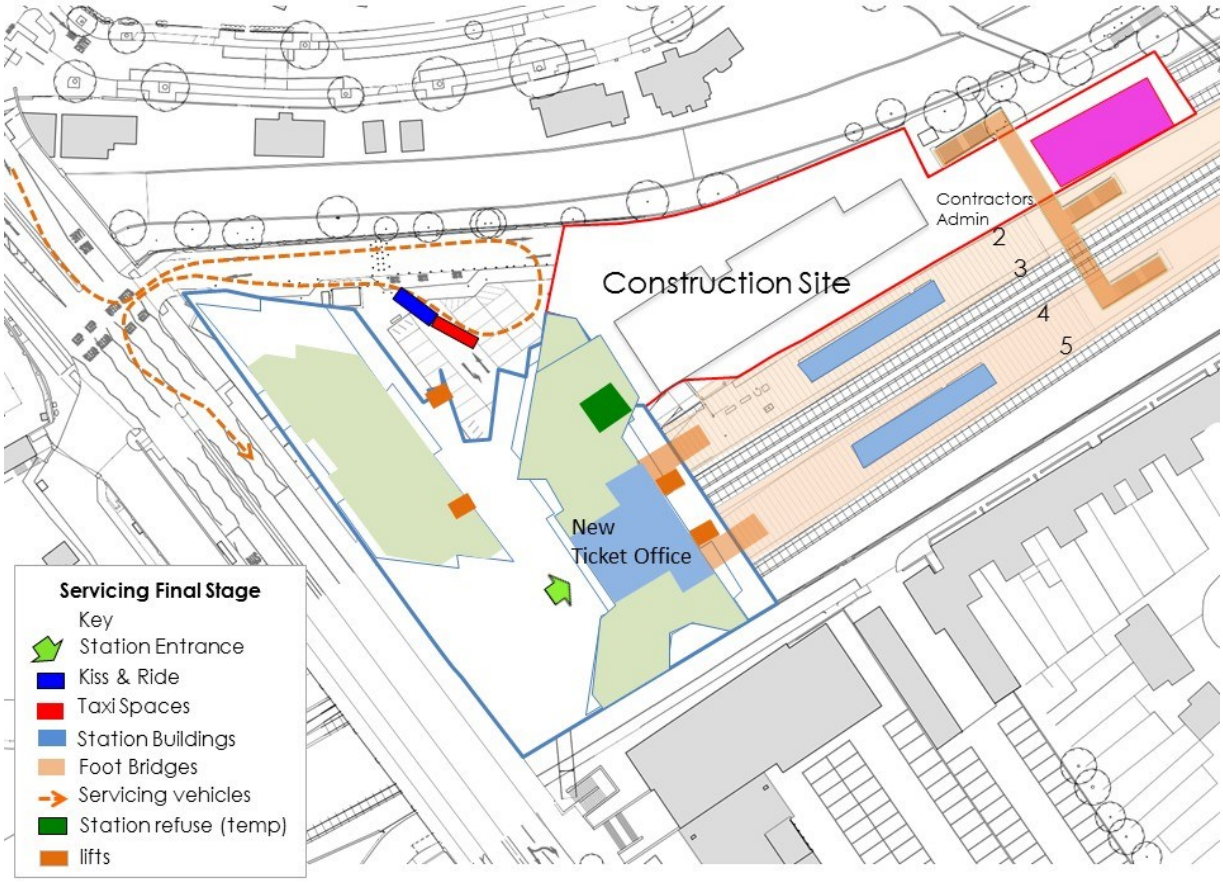


Figure 28 Final Stage Construction Site Layout

As the cladding is installed and the building weathered, the internal fit out will commence with the installation of the services and partitions to allow the flats to be formed. External hoists will be provided on each block to allow for the vertical movement of materials up through the building to each floor. The staircases will be installed as the building structure is completed to give access for the work force.

The main delivery area will be off the mini roundabout at the bottom of the slope for the car park access road. Deliveries will need to reverse in to the more constrained site area for either off-loading by tower crane or by forklift. This will enable delivery vehicles to leave the site in forward gear. A Traffic Marshall will continue to be employed to ensure that the safe operation of deliveries continues. As the entrance to the station will have been relocated to its final position there will be reduced traffic entering the traffic Marshalled area.

Relocation of the temporary bus stop to its final location, hard landscaping and soft landscaping works will be phased accordingly with the completion of the building works.

This Demolition and Construction Method Statement will be reviewed every six months and updated if necessary in conjunction with the section 61.

6.1 Construction Logistics and Traffic Management

In response to NS 50 a detailed Construction Logistics Plan has been prepared for the scheme. The Plan details:

- Drawings showing construction routes for plant and vehicles
- Traffic management layout
- Plans for deliveries, Kiss and ride and taxi
- Plans for match days pre and post match arrangements
- Description of access points to accommodate the swept paths of construction vehicles
- Plans to utilise a logistics company
- Traffic Marshalls
- Plans for suppliers to be only selected on the basis that their delivery partners are committed to best practice and are members of Transport for London's Fleet Operator Recognition Scheme (FORS).

The plan is also in accordance with the following Informative and Planning conditions:-

NS24 - Car park management plan
NS27 - Traffic and Pedestrian Management
NI10 - Construction traffic
NI12 - Ground contamination
NI22 - Construction Logistics Plan, Load Consolidation and delivery times

7.1 Management Systems

7.2 Waste Management:

7.1.1 Construction Waste Arrangements.

For full details of the schemes waste management proposals please refer to Section 7.3.1 of NS50 Construction Logistics Plan and NS28 Site Waste Management Plan.

7.1.2 Station Waste Arrangements

Please refer to Section 7.3.2 of NS50 Construction Logistics Plan.

7.2 Noise and Vibration Management

The projects noise and vibration strategy is detailed in the Draft Noise and Vibration Management plan prepared by the projects specialist consultant. Section 5.1 of NS50 Construction Logistics Plan outlines proposals in relation to mitigation management.

In response to NS36 the River Crane Protection document, and Section 5.7 of this plan, describes positioning of plant, equipment and cabins. It also describes details the proposed acoustic screening measures and Tree Protection to River Crane.

The above documentation and this DCMS complies with the requirements of Informative NI13, NI16 NI17, NI18, NI19, NI20 and NI21.

With reference to IE06 Details of piling-EHO consultation, please refer to Section 5.7 Excavation and Piling of this statement and our Noise & Vibration Management Plan.

Mitigation Measures Please refer to Section 5.2 of NS50 Construction Logistics Plan.

7.3 Dust Management

Please refer to Section 6.0 of NS50 Construction Logistics Plan.

7.4 Water Pollution Prevention

The site is immediately adjacent to the river crane and the flood plane is an aquifer made up of river gravels – the river is canalised with concrete walls and base and water level at about 6-6.5m OD and the water table in the aquifer is at about 3-4m OD. As such water and ground pollution prevention will be a major aspect and consideration of the demolition and construction methodology.

Each area of the site and the main compound has existing Network Rail surface water and foul water drainage system. The surface water discharges through a network of drain runs into the River Crane outfall to the Northeast of the site. Foul water from the station platforms goes to the Southwest of the site, to a heading in Mary's Terrace under the London Road Bridge.

Foul water from the existing ticket hall and café goes North-west into a heading in London Road.

It will be necessary to control discharge of water from site activities and surface water runoff, as well as to provide temporary diversions of water during the demolition and alterations to existing station facilities.

Osborne will take all reasonably practicable means to prevent pollution to watercourses and will follow the industry best practice and EA Guidance:

- Pollution Prevention Guidance 1 – General Guide to the prevention of pollution
- Pollution Prevention Guidance 5 – Works in, near or liable to effect watercourses Pollution Prevention Guidance 6 – Working at demolition and construction sites.
- CIRIA C692 - Environmental Good Practice on Site 2010. (A copy of PPG 6 will be kept on site at all times for reference)

An Environmental Management Plan will be developed for the project that will identify all environmental aspects and impacts and the control measures to mitigate the risks. Each task will be assessed and specific control and mitigation risks associated with that activity will be detailed. The Site Manager will be responsible for ensuring compliance with method statements and that all the measures are being implemented effectively; weekly monitoring will be undertaken and records kept of the results. Osborne will take the following measures to mitigate water pollution on the project:

- All existing drainage has been identified and marked up plans and will be displayed on site.
- Fuel storage will be sited as far from receptors as practicable and in bunded tanks
- No construction activities will take place on the bank of the River Crane except acoustic and tree protection, Japanese Knotweed treatment and landscaping works in accordance with approved plans.
- No storage of plant, cabins or materials within 4m of the River Crane wherever possible. Wherever possible this will be extended to 10m.
- Osborne will both define and confine storage and delivery areas as far away from receptors as possible
- Any Tanks or drums stored in suitable containers or bunded areas – condition regularly checked by Site Management
- Drip trays will be fitted to or used with all plant and equipment
- Covering of any open drainage grates that are within the working zone
- Hard surfacing and existing gulley pots to car park to be retained and maintained as long as practicable during construction.
- Eliminate mud leaving site by road sweeping and mobile jet wash with grey water recovery system on hard standing when conditions require it.
- Sumps, and cut off trenches for excavations
- Silt traps and sumps will be used
- Designated Concrete Washout areas will be identified and silt traps used.
- Discharge licences for Site establishment and temporary site drainage will be obtained
- Spill kits will be available at appropriate positions on site
- Emergency response plan will be prepared in the event of a spillage
- Fully secured boundary with daily inspections by a nominated boundary monitor
- Control of deliveries to and from site by the Gatemen and Traffic Marshalls.
- Cover waste receptacles
- Coupled joints on all hoses and the temporary concrete pumping main to be fully encased in an outer sleeve.
- Sleeves will be used for the bored piles through Kempton Gravels.
- Osborne will construct the attenuation tanks early in the works prior to the route over the attenuation tanks becoming the sole vehicular route into the under-croft space.
- Tool-box talks will be given to raise awareness of the plans to prevent pollution.

7.5 Japanese Knotweed and Ecology Protection

An ecology report was carried out at Twickenham by Wardell Armstrong, which identified the existing ecological aspects and likely impacts on the construction of the new development, during and post construction. This was carried out in July 2010. This initial report has now been supplemented by the submission of a suite of planning condition documentation detailing the projects approach to ecology protection and treatment of Japanese Knotweed.

The following sections outline the ecological impacts and protective measures that will be put in place during construction, particularly the main construction stage and how these will be monitored and reviewed. Should additional or different measures be required for the Final Stage these will be included in later updates of this document.

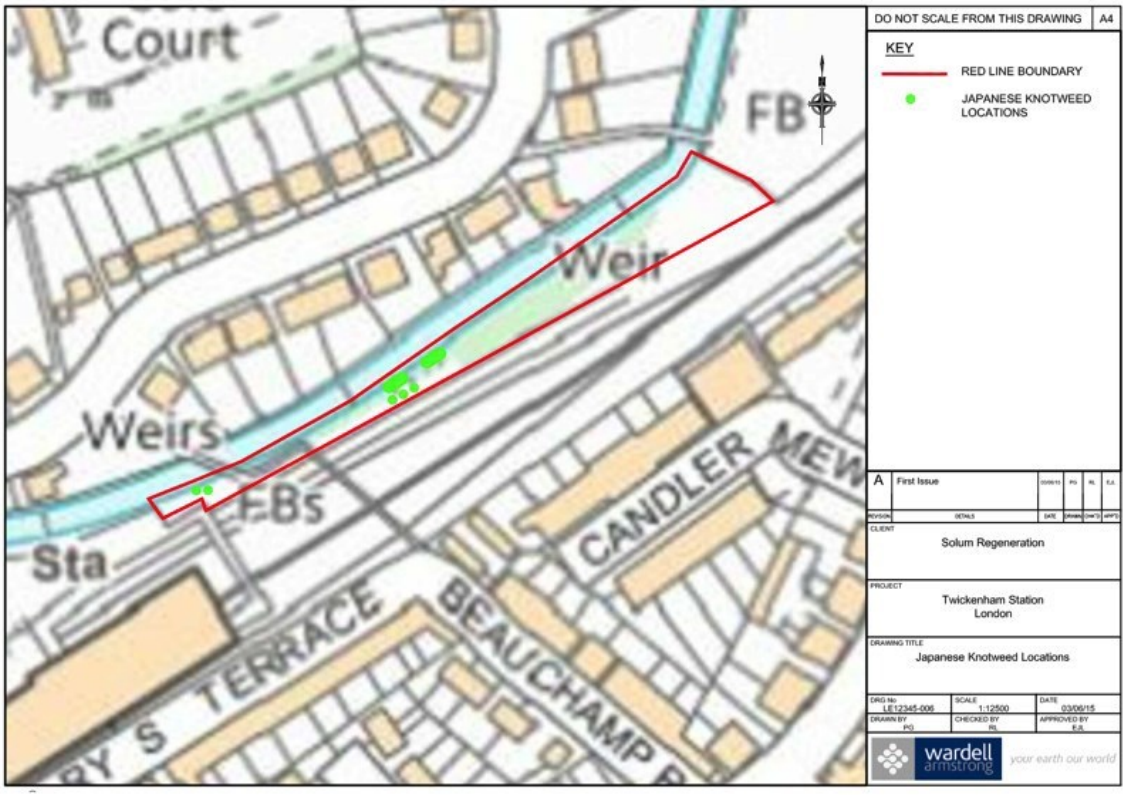


Figure 29 Japanese Knotweed surveyed July 2015

7.5.1 Japanese Knotweed

To ensure compliance with planning condition NS39 a site inspection and report was commissioned by Solum Regeneration in July 2014. This was further to an initial report that identified five areas of Japanese Knotweed on the scheme: Initial treatment has now been carried out and a further addenda report has been produced in July 2015.

A) Along the Riverbank east of the site, beyond the car park in the area to be used for the riverside walk and Play area.

B) Two areas along the bank of the River Crane, behind the boundary wall of the car park

C) Potential Rhizome extent car park side of this boundary wall

D) Adjacent to the station building and cycle racks

E) At track level between the underpass and the station building, near the existing footbridge.

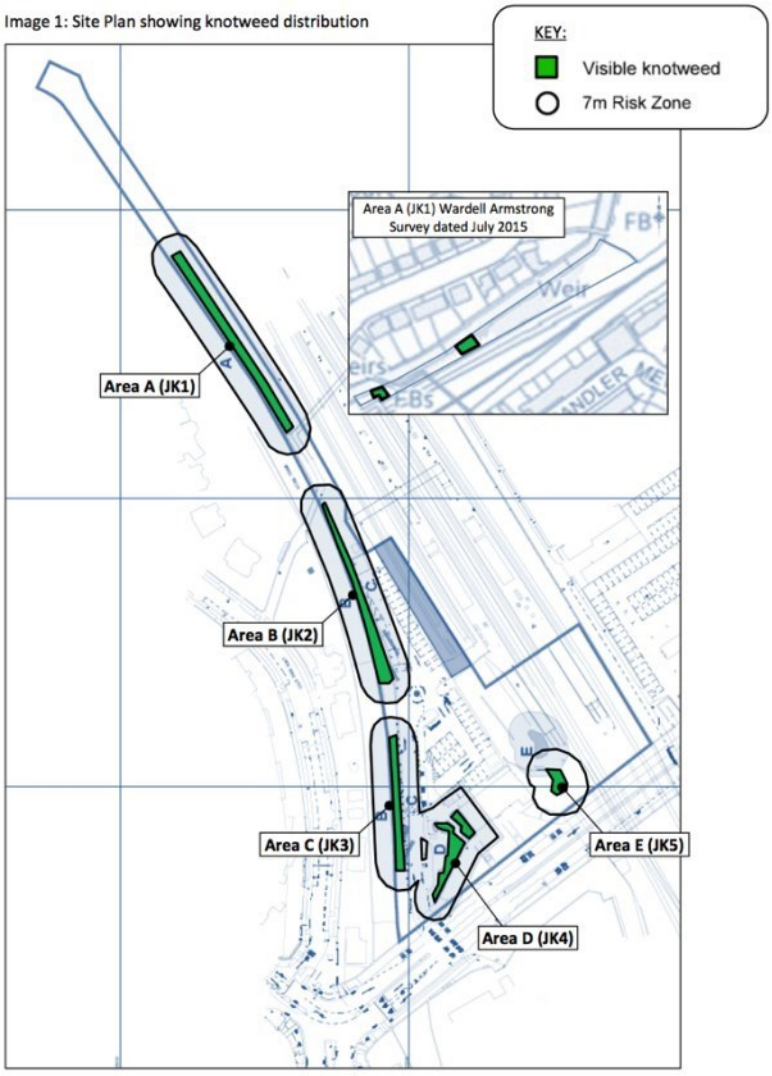


Figure 30 showing the location of the above referenced areas

7.5.2 Tree Protection

With reference to planning conditions NS40, NS61, NS75, LT03, LT15, and U46976 qualified arboriculturalists and landscape architects have been employed by Solum to develop the design, to discharge planning conditions, to produce and agree a scheme for tree and root protection and to monitor compliance and effectiveness of works on site in accordance with Section 7 of BS 5837:2005 Trees in Relation to Construction – the Tree Protection Plan.

The Wardell Armstrong Arboricultural Reports appended to this document addresses the above.

All site works will be carried out in strict adherence with the above report, protection of branches, roots protection, soil compaction and fencing protection are clearly defined and the appointed contractor will comply with the report's recommendations.

Monitoring for compliance with the report during construction will be carried out as detailed in LT15 and Section 3 of the Arboricultural Report.

7.5.3 Other Ecology

Ecology surveys, including the Bat survey, have been carried out by Wardell Armstrong. With reference to NS 42 an updated Bat Survey was carried out in June 2014 and May 2015. The published final reports provide an assessment of the bat assemblage on site. The reports take cognisance of NI 11, Bat Habitats.

The recommendations of the above reports will be strictly adhered to by Osborne during the construction phase.

The species of flora and fauna that needs to be protected is confined to the river bank and riverside walk areas, these will have limited landscape works in the construction of the play area and riverside walk. This will be carried out during the main phase of the project, to comply with planning conditions.

Osborne have an environmental management system certificated to ISO 14401 and an environmental management plan will be prepared for the project, which will include aspects, impacts and mitigation measures specific for the scheme.

7.6 Communication Strategy

The Principal contractor will communicate and liaise directly with the necessary departments at LBRuT and other parties with regard to the construction works and statutory requirements for the project. The Project Manager will be responsible for ensuring compliance with planning and statutory requirements for all aspects and phases of construction and for updating this method statement to reflect these.

A Community Liaison Officer (CLO) will be appointed for the project, who is not employed by the Contractor, also a Community Liaison strategy has been submitted by Solum Regeneration to the LBRuT for approval (Reference Section 106, Part 10)

Osborne will register and manage the site under the Considerate Constructors Scheme and the best practice code and standards. Osborne will seek to exceed the standard set by the scheme wherever practicable

We will nominate a member of the permanent site staff to act as primary contact for community liaison issues and will comply with the requirements of the community liaison plan. A log will be maintained on site of any issues raised and actions taken.

The project manager will produce monthly progress reports on the project that will be incorporated into the reports from the CLO and will take part in monitoring group discussions and meetings.

Regular letter drops to update local residents and organisations on the construction progress, planned works and advance notifications of out of hours working or special activities (possessions and road closures etc.) will be issued by the CLO.

8.0 Cumulative Impacts

The only presently visible scheme likely to overlap in timings within close proximity of

the Twickenham Station Redevelopment is that of the Royal Mail Sorting Office project (Brewery Wharf).

A review of the current St James Brewery Wharf Redevelopment programme has been carried out to consider the likely environmental impacts and cumulative impacts of the projects should the schemes overlap when the main development works commence mid 2016.

From the information received it is forecast that all works on the Brewery Wharf site will be completed in 2016. The only operations in-hand in mid 2016 will be internal fit out of the remaining apartments and final occupations. It is therefore considered that any cumulative impacts of the projects will not occur.

In order to ensure the above assessment remains current, a further joint review of the St James construction programme with the relevant Project Managers is proposed for 4th quarter 2015. This review will re-align both project progress to date and assess any changes to cumulative impacts. At this juncture it is also proposed to carry out a similar review with LBRuT if any other new developments emerge within close proximity of the redevelopment that may need to be considered.

9.1 Appendices

Summary Osborne Programme Rev K
Construction Phasing Drawings & Station Logistics Plans

Reference has been made to the following conditions. Separate documents have been produced to satisfy these.

- NS23 – Service management plan
- NS24 – Car park management plan
- NS25 – Taxi Parking Management
- NS26 – Emergency procedure plan
- NS27 – Traffic and Pedestrian Management
- NS28 – Site Waste Management Plan
- NS36 – River Crane Protection
- NS40 – Protect River Crane
- NS47 – Details of temporary bridge
- NS48 – Details of disabled access
- NS53 – Diagonal Gantry Making Good
- NS50 – Construction Logistics Plan
- NS55 – Mary's Terrace Wall
- DV42 – Details of foundations