Rainbow Industrial Estate:

Potential for a Secondary Site Access Across the Railway

Desktop Assessment of Likely Options & Feasibility

Site Context & Topography

Design Parameters & Constraints

Basic Option 1

Level Crossing Option 2

West Barnes Lane Option 3

Bushey Road Option 4

Conclusions

Site Context & Topography

1. The land on the site and surroundings is generally flat. The site of the industrial estate is completely surrounded by railway lines on all sides. To the north runs the main line at a higher level. To the east and west are the south and northbound lines of the Epsom branch line, which converge at the south end of the site, tapering it to a point at the bridge which carries Bushey Road overhead.

2. To the east of the site are well established residential areas. Firstway is a street of early 20thC houses and Bushey Court is a group of 4-storey blocks of flats from the mid-20thC. To the west is a narrow strip of land between the track and West Barnes Lane. West Barnes Lane runs parallel to, and at approximately the same level as, the track.

3. The land between the railway track and road is approximately 260m long. It varies in width from 18m at its widest in the north, 10m at mid point, tapering to a point at the Bushey Road bridge. For approximately 80m, the northern end of this strip of land is occupied by industrial and office buildings.

4. On the west side of West Barnes Lane is the Carters housing estate, a council-built low-rise medium density development, and West Wimbledon Primary School. One access road serves the school and estate by means of a mini-roundabout junction with West Barnes Lane.

Design Parameters and Constraints

5 For practical engineering and safety reasons, there will be a number of factors that will dictate the design of any bridge over the railway. The key factors are summarised in the list below:

   a. A bridge over a railway will need a minimum clearance of 5.6m.
   b. Clearance either side of the track of 4.0m will be required.
   c. Any gradient for an approach road should be a maximum of 1 in 15 to accommodate a range of goods vehicles.
   d. A bridge deck will be approximately 1m deep.
   e. A two way street to accommodate mixed traffic should be 7.0m wide.
   f. The turning circle for an articulated lorry is approx. a radius of 11.0m. Wherever there is a significant turn in the road alignment, additional width will be required on the carriageway.
   g. Tighter turns require more road width, and turns over 90^0 will require significant areas of tarmac.
   h. A footway 2.4m wide for safe pedestrian access will be required.
   i. Account must also be taken for retaining walls and abutments of approximately 0.5m either side.

j. Where a footway is not provided there will need to be an edge strip approximately 1.0m wide between the carriageway and abutment.

Note: At the top and bottom of approach ramps a 'transition' will be needed between the ramp and level ground/bridge deck. This will increase the basic length of the ramp. For reasons of simplicity this is not taken into account in the calculations in this document. In reality therefore, the ramps will need to be longer than stated, depending on the ease of the transition required.

6 Applying these parameters leads to the following basic design:

- A road must rise 6.6m at a gradient of 1 in 15 to clear the railway.
- This will necessitate an approach ramp of a minimum length of 99m.
- Any turns in the route of the ramp, as it rises then falls to cross the railway, must accommodate the turning circles of the vehicles that need to use it (tracking).

Level Crossings

7 Network rail are currently in the process of removing level crossings and replacing them with bridges. It is therefore highly unlikely that Network Rail will consider installing new level crossings anywhere on the national rail network. For all level crossings, maintaining safety and the operational efficiency of the railway are the key requirements. This is determined by a number of factors, including:

- The busyness of the railway
- The busyness of the road
- The proximity of the crossing to any junctions that may add complexity to the layout
- The type of traffic using the crossing
- The layout and dimensions of the crossing
- The ability to provide appropriate warning signage
- The likely amount and type of pedestrian activity in the area.

Basic - Option 1

8 Based on the layout of the site and location of nearby roads, there would appear to be only two potential routes a new road could take. One would be to connect to West Barnes Lane and one to connect with Bushey Road. In order to do this, the new access road would need to cross one of the operational railway tracks that form part of the busy commuter line to Chessington and Epsom.

9 This option looks at a simple geometry approach to show how the design parameters outlined above look at the same scale as the base map of the site. The maps include a scale bar, key dimensions and the site boundary is shown by a thick red line. A simple straight alignment is shown at a point and position where it might fit onto the site.

10 This clearly shows the following basic design conclusions:

1. The ramp occupies the whole width of the site at its widest.
2. There is barely any space to access the ramp, though this could be remedied by a gentle curve.
3. The ramp splits the site in two.
4. The ramp on the west side would necessitate demolition of numerous houses on the Carters housing estate.
5. In reality the ramp would have to cross West Barnes Lane as well as the railway, further extending it into the housing estate.
6. An access road would need to be provided from the bottom of the ramp back to West Barnes Lane.
7. A huge part of the Carters estate would need to be demolished and re-planned to accommodate the ramp and access road, involving loss of many dwellings.

11 The overall conclusion is that this option is not deliverable as it would render the site undevelopable, it would involve mass demolition of houses outside Council control and the cost would be exorbitant way beyond the point of making development of the site financially unviable.

12 Plan 1 shows the layout for this option.

Level Crossing - Option 2

13 When considering the feasibility of a level crossing, a great deal of regard must be given to how the nearby level crossing operates further south, where West Barnes Lane crosses the Epsom line. The lack of space for an approach road here, and the congestion queuing traffic causes, has led to a very convoluted, compromise highway layout solution.

14 If a level crossing were to be built to access the site, the shape of the site and layout of adjacent roads would suggest a particular design solution, consisting of the following elements:

- It would be most appropriate that the access road should link in to the existing mini-roundabout.
- This has traffic capacity issues as a right turn lane may not be possible
- Depending on traffic levels and safety isues, the roundabout may need to be enlarged or signalised – also having traffic capacity issues.
- There are road safety issues, particularly in such close proximity to a primary school – a pedestrian footbridge may be necessary – there are two further to the south for similar reasons.
- Level crossings in close proximity add to operational complexity for the railway and do not necessarily link communities (note the Mortlake area, where the community is divided and barriers can be down for 10+ minutes at a time).
- Level crossings close to each other also add to road traffic management and congestion issues.

- Crossrail 2 is currently planned to use this line – it is unlikely such a state-of-the-art railway will countenance new level crossings.

15 The conclusions to this option are that Network rail would be unwilling to support a level crossing in this location. These are primarily for safety and operational reasons.

16 Plan 2 shows the layout for this option.

Bridge to West Barnes Lane - Option 3

17 Given the unpractical nature of a straight route across the site, there is only one possible option to accessing West Barnes Lane. This is to accommodate the ramp down to West Barnes Lane in the narrow strip of land between the railway and the road. To achieve the required length this will require some tight geometry and a large bridge deck.

18 It will also require the ramp to descend in a northerly direction as the site is not long enough to accommodate it in the other direction. This is because the bridge deck at the south end is accommodated over the railway, whereas in the other direction it would have to take space from the length of land available for the ramp, due to the proximity of nearby buildings.

19 A design solution for this option would consist of the following elements:

- There is currently insufficient space in the land between the road and railway for a ramp of the required width and length. Achieving this will require the realignment of the northbound railway track. This will be exorbitantly expensive and Network Rail are highly unlikely to permit it.
- The geometry of the ramp will be very tight. The road will have to turn through 180^0 at the south end of the site, necessitating a huge road deck over the railway. This will be very expensive, require track possessions and Network Rail are highly unlikely to permit it.
- Where the ramp meets West Barnes Lane, the geometry will be so tight that it will be physically impossible for larger vehicles to turn south – the main desired route. It would not meet current design standards and would not pass a stage 1 safety audit.
- As transitions to the top and bottoms of the ramps are not accounted for it is unlikely there will, in reality, be sufficient length to accommodate a ramp as suggested.
- The approach ramp within the site, and the realigned northbound railway track will reduce the amount of developable land and make the southern part of the site more awkwardly shaped and hostile to successful development.

20 The Conclusions to this option are that it is probably impractical due to lack of space and is highly dependent on the co-operation of Network Rail. It would disrupt rail operation with no end benefit to the railway. Even if it was allowed by the railway, the costs would be so exorbitant as to render development of the site completely financially unviable.

21 Plan 3 shows the layout for this option.

Bridge to Bushey Road – Option 4

22 Enlarging the existing bridge deck across the tracks to meet Bushey Road could, on the face of it, create a relatively space-efficient second means of access. However, whilst this may be physically possible without alterations to the railway, and possibly with a smaller deck, there are other complications with this option.

23 A design solution for this option would consist of the following elements:

1. Bushey Road at this point is just below the crest of its rise over the railway. Locating a junction at this point will create visibility issues that could severely compromise safety.
2. Any junction here would need to be signal controlled. This would also have safety issues due to the levels and would also have severe impacts on traffic flow and congestion on this busy road.
3. For both safety and capacity reasons it is likely that right turn lanes would need to be added on Bushey Road. This would require widening the road in the vicinity of the existing bridge – probably including the bridge itself.
4. In addition to this, it is likely a new deck crossing the southbound railway track would be in such close proximity to the existing bridge that carries Bushey Road over the railway that it would compromise it's structural integrity and crashworthiness without major, expensive engineering work.

24 In conclusion it is likely that, although this looks like a simple solution on the face of it, in reality there are significant constraints that likely to render it both too expensive as well as unacceptable on safety and technical grounds.

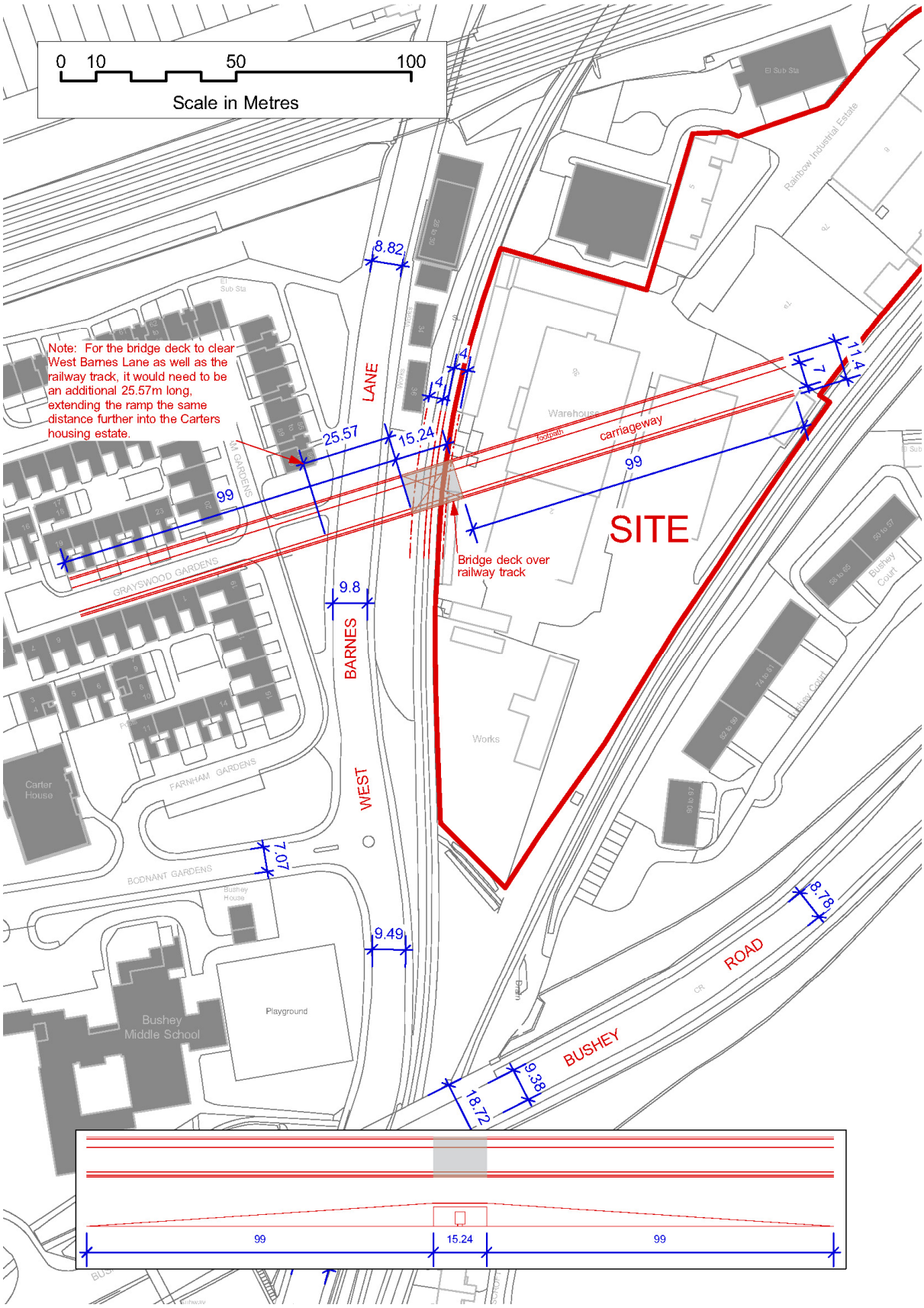
Conclusions

25 All four options discussed above are considered to be the most 'realistic' option available. It has been shown that all of these have severe and fundamental problems on the basis of technical, cost, safety and operational reasons. The overall conclusion is therefore that there is no deliverable means by which a second access to the Rainbow Industrial Estate can be gained.

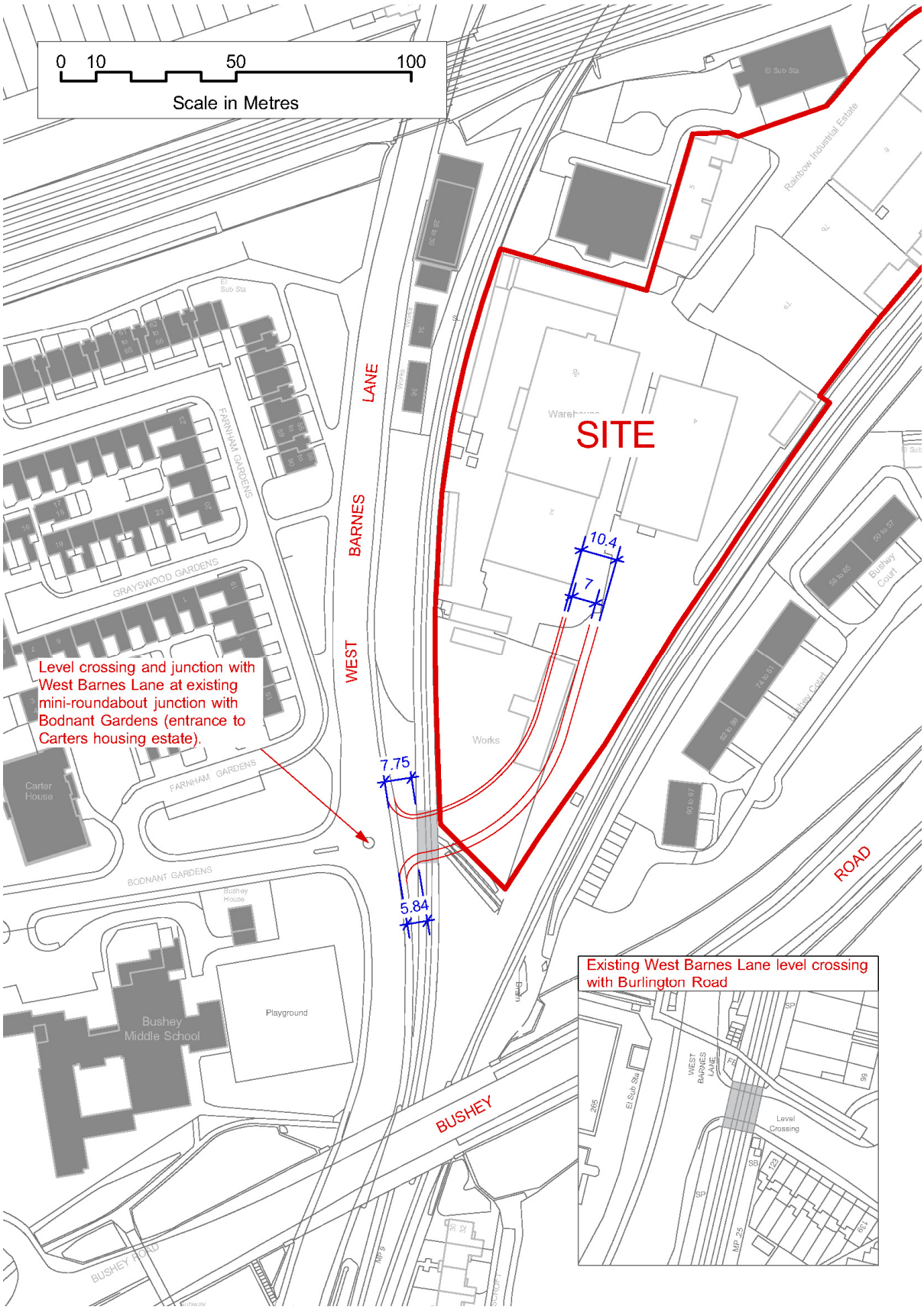
Plans

Plans are shown below. Please use the scale bar to make any measurements.

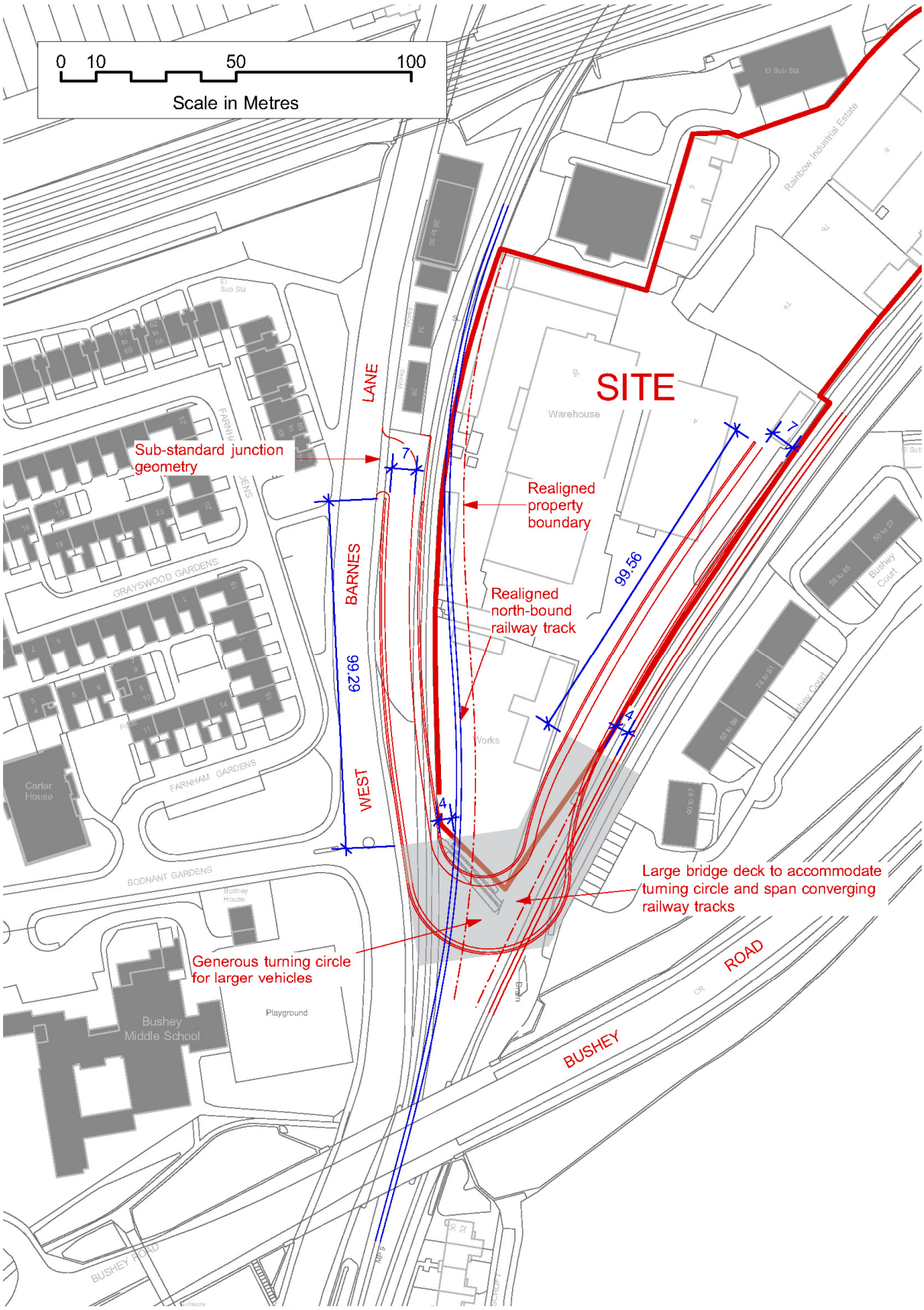
OPTION 1 PLAN



OPTION 2 PLAN



OPTION 3 PLAN



OPTION 4 PLAN