Havant
BOROUGH COUNCIL

Southleigh South-west Bridge Link Feasibility Study

June 2026

CELT Civil Engineering & Landscape Team

Contents

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ABBREVIATIONS

CELT	The Civil Engineering and Landscape Team at Havant Borough Council
DMRB	Design Manual for Roads and Bridges
HBC	Havant Borough Council
HCC	Hampshire County Council
HGV	Heavy Goods Vehicle
LTP4	Local Transport Plan
NCN	National Cycle Network
NH	National Highways
NR	Network Rail

GLOSSARY

Bus gate	A means of restricting access on a road to buses only, either by physical layout measures (rising bollards, gates, pinch points) or by camera enforcement.
Healthy Streets	A design philosophy centred on making streets pedestrian and cycle friendly; it is an evidence-based approach to creating fairer, sustainable and attractive urban spaces.
General traffic	All road user types including pedestrians, without access restriction.
Instructions to Drivers	A measure where mandatory instructions are issued to professional drivers – for example, speeds or routes to be observed by bus drivers.
LTP4	The current Local Transport Plan for Hampshire.
Traffic Regulation Order	A legal restriction or permission for use of the public highway. For example, one-way operation, parking restriction, speed limit.

1 Introduction

1.1 The Civil Engineering and Landscape team (CELT) at Havant Borough Council (HBC) has been commissioned to assess and provide estimated costs for three options for a crossing of the railway in the south-west corner of the proposed Southleigh development site.

1.2 The options are to provide a crossing of the railway in the following formats:

- Pedestrian, wheel and cycle ('active travel');
- As above, plus bus ('sustainable transport'); and
- Full access to all of classes of road user – pedestrian, cycle / wheeler, public transport, private cars and commercial vehicles ('general traffic').

1.3 The site of the crossing to be considered is to the west of the existing A27 bridge over the Havant – Brighton railway line, and east of the currently developed areas north and south of the railway, as shown on the plan below (plan 1). Although three options have been identified, each occupies the same crossing point of the railway.

Plan 1 – area of search, railway crossing © Ordnance Survey

1.4 The brief requests that the consideration of each option includes:

- Bridge width and layout
- Land take and ramp design
- Tie-in arrangements and land take
- Ownership, maintenance and enforcement
- Indicative cost
- Deliverability

1.5 Each option identified in this study has been assessed by Network Rail who have also provided guidance regarding the approval process for taking options forward. The highways authorities (Hampshire County Council and National Highways) have also been invited to comment on the proposals in the context of current policy (such as the Local Transport Plan [LTP4]).

1.6 Implementation of any crossing arising from this study will need to be subject to a more detailed design process and cost assessment.

2 Development Context

2.1 This study is driven by the proposed development of the Southleigh site which has been identified as capable of bearing 2,100 housing units, together with associated business and retail development, school and community facilities, and landscaping and open space including drainage infrastructure (plan 2).

Plan 2 – Southleigh development site as proposed in the Local Plan

2.2 In parallel, development of the land south of the railway is currently subject to an application by Barratt David Wilson Homes (HBC ref APP/21/01010). This site includes a 50m wide strip of land alongside the A27 which is safeguarded in the emerging Local Plan (2025 Regulation 18 consultation draft) against development in order to provide a route for any future north-south connection across the railway – this being the only opportunity to provide a new crossing between Southleigh Road level crossing to the west, and North Street B2148 to the east.

2.3 A masterplan layout for the Southleigh site has been developed and is shown below (plan 3). Current indicative plans for development of part of the Southleigh site significantly does not cover the area to the south-west of the site where the proposed railway crossing would be located. A connection is shown but requires third party land to implement.

Plan 3 - illustrative masterplan layout for Bloor Homes' development quantum © Bloor Homes 2025

2.4 The proposed Land East of Castle Avenue development to the south of the railway is served, for general traffic, from an extended St Georges Avenue into Southleigh Road and (via Castle Avenue and Warblington Avenue) Emsworth Road which offers access to the A27. The proposed development also offers a route at the south end of the site to allow an active travel connection (this is currently envisioned to be wide enough to accommodate free flowing buses) into the Emsworth Road spur which connects to the subway under the A27 and is part of National Cycle Route NCN2. This would potentially limit any bus link into the highway network south of the railway unless a suitable route could be accommodated within the development's highway design[1], or some form of bus gate could be accommodated into the active travel link's route (see section 4 below).

2.5 For the purposes of this study it has been assumed that all options would cross the railway at 90 degrees for structural simplicity and to minimise span. All options cross the railway at the same span location, and approaches would be accommodated within the safeguarded land south of the railway. The type of span varies between the three options.

[1] Buses in Urban Developments, CIHT 2018

3 Option 1: Active Travel Link

3.1 This option considers an active travel link suitable for pedestrians, wheelers and cyclists only. There is by its nature the most flexibility around this option in terms of connectivity.

3.2 The option comprises two components, the deck itself and the approach connections.

3.3 **Bridge width and layout:** the deck and approaches should accommodate a 5.5m wide structure. This is comprised of a 2m footway and a 3m cycle track, the latter requiring a 0.5m buffer due to there being a vertical obstruction (the parapet) on one side. The most structurally efficient form for the span is a steel through truss girder, where the upright parapets contribute to the span's structural strength and are connected at the base by cross members supporting the bridge deck. For structural efficiency, each truss should be laid out as a Vierendeel girder, which maintains a vertical design aesthetic. The span would therefore be a similar structure to the bridge at Solent Retail Park across the Lavant Stream (Figure 1), adapted for requirements of crossing the railway.

Figure 1 –Solent Retail Park bridge as example of Vierendeel girder span

The span would need to be sufficient to clear the land owned by Network Rail, with the potential (depending on approach configuration) for maintenance vehicles to pass below on land outside of the Network Rail boundary. For the purposes of this report this has been assumed to be necessary, and so the span required is of the order of 24m. Also for the purposes of this report, it is assumed that the abutments would need to rest on piles due to known ground conditions encountered during the construction of the adjacent A27 overbridge.

3.4 **Land take and ramp design:** for the active travel option there are many options for the ramp approaches. The two main options will be for (1) a structurally 'open' ramp which continues the steel girder design as a steel ramp on both approaches, supported on individual columns and potentially folded to accommodate minimum land take; or (2) earthwork embankments which whilst more aesthetically pleasing

and offering opportunities for landscaping will take up more room, albeit at a lower construction expense.

3.5 The minimum land take for an open ramp approach will be to fold the ramps alongside the railway; this is the design being taken forward on the north side of the proposed Havant Station footbridge, whilst a more relaxed approach to land take within the safeguarded area would allow the ramps to be opened out, more akin to the layout on the south side of the proposed Havant Station footbridge. The ramps could be supplemented by sets of steps to allow able bodied people to navigate to the surrounding links more quickly. For the open design, however, each supporting column must have its own foundation pad and this will add to the expense of this layout, as each pad will have to be piled due to ground conditions. The land take in this instance would be little more than the footprint of the structure above it, viz. 5.5m, but will be affected by the layout of the ramp, e.g. a single folded ramp such as at Fishbourne (figure 2A/2B) would occupy 11m.

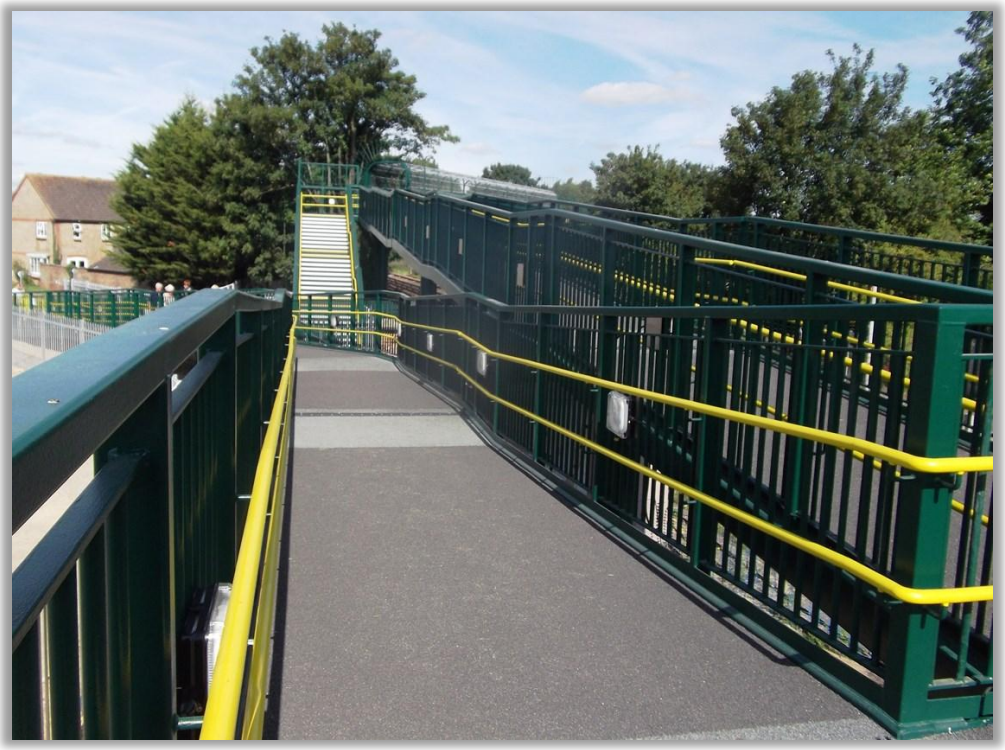


Figure 2A – steel folded span and approaches at Fishbourne, West Sussex © Network Rail

Figure 2B – steel folded span and approaches at Fishbourne, West Sussex © Network Rail

3.6 For earth embankments the need to pile pad foundations is overcome other than for the span abutments. However the horizontal footprint taken by the embankments (even with a 1:2 side slope which in this location could be considered steep) is significantly more; at the abutment for example, the land take would require a minimum width of 25.5m (assuming a 5m rail head vertical clearance).

3.7 The gradients of the ramps will need to meet accessibility standards which should be designed on a 1:20 gradient, or 1:15 with regular level resting places. This gives a minimum indicative ramp length (taking the rail head as ground level) of 100m - 110m. Ground levels will need to be determined to accurately gauge the length of the ramps at a later stage of design. Possible layouts are shown in figures 2C and 2D on the next page, to indicate that the safeguarded land is sufficient for a bridge of this type.

3.8 **Tie-in arrangements and land take:** for either ramp option, the tie in will need to occur at a minimum of two locations – north and south of the railway. An assumption can be made that in this area a connection into the Southleigh development can be made at any suitable point, either by earth or open ramp. To the south of the railway, there are multiple opportunities to connect into the Land East of Castle Avenue development, preferably served by a shared cycle track along its eastern boundary to the aforementioned active travel link at the south end to the subway. In practice, more than one of these should be used to improve permeability of the development.

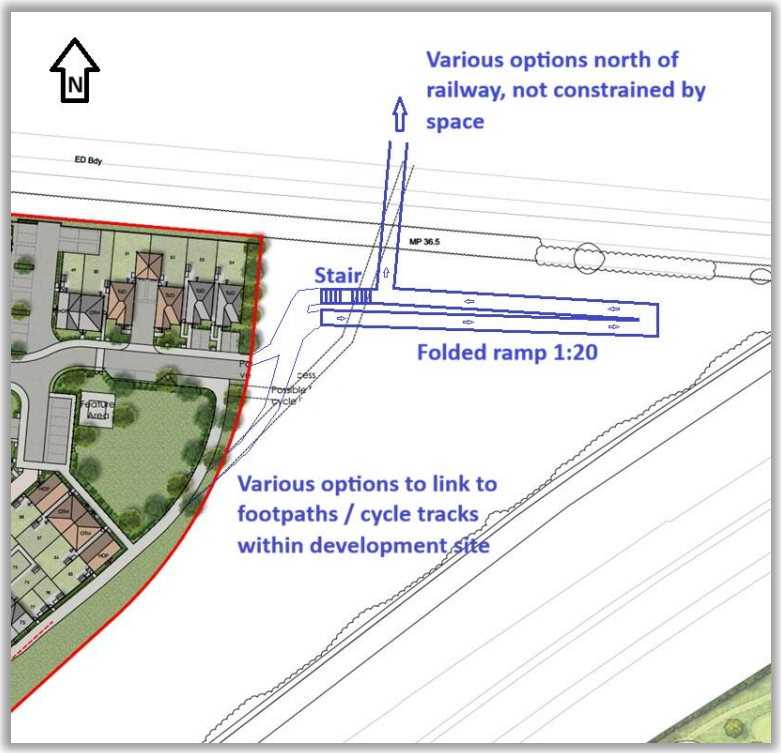


Figure 2C – indicative layout of folded steel ramp south of railway, demonstrating flexibility of land take for structure within the safeguarded land and multiple points of connection to proposed path network

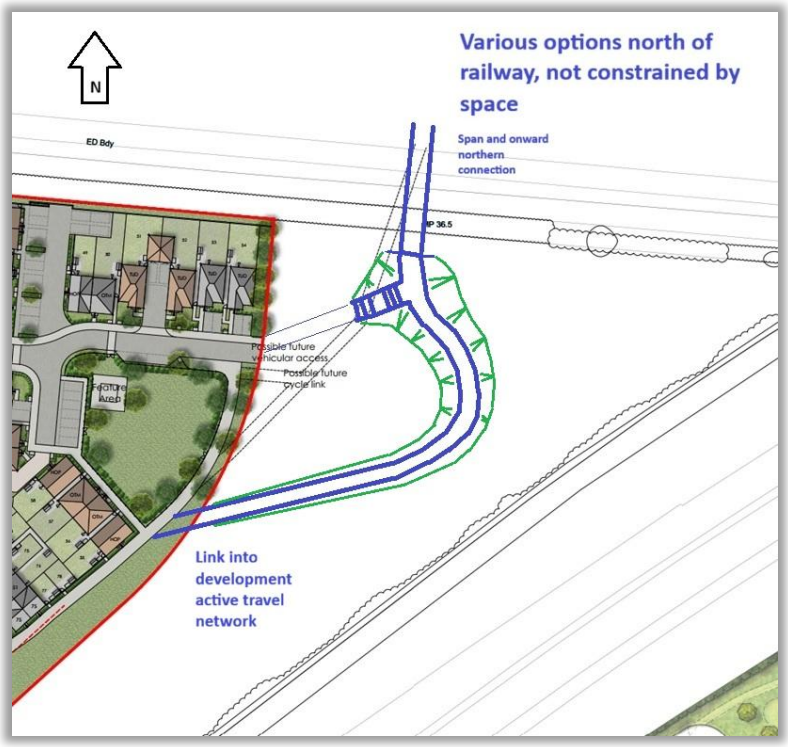


Figure 2D – indicative layout of earth ramp south of railway, demonstrating flexibility of land take for structure within the safeguarded land and multiple points of connection to proposed path network

3.9 **Ownership, maintenance and enforcement:** forming part of a wider active travel network, the structure, span and ramps (in whatever configuration) should be adopted as public highway by the highway authority and maintained as such at the public expense. This will require the structural design of any components, and of any earthwork and linking route, to be constructed to highway authority approved standards, at no cost to the highway authority, and for a commuted sum for maintenance to be paid to the highway authority upon adoption. Paths beyond the immediate structure could either be adopted as public highway, or managed and maintained by the developer's agency through a Management Company, with suitable public access rights implemented.

3.10 **Indicative cost:** Network Rail has been able to furnish cost estimates for similar structures installed fairly recently on their network[2]. These costs will often include some ancillary items and we have tried to identify these and remove them from the broad figures supplied by Network Rail. Ground level connecting footpaths have been assumed to be a relatively minor element of the overall total.

- Steel span, steel open ramps typically 125m long each side: £8.9m - £9.3m
- Steel span, earthwork ramps typically 125m long each side: £7.1m - £7.8m

3.11 **Deliverability:** either the open ramp or earthwork ramp option is deliverable, assuming the land is available to do so, or that there is no overarching restriction in place from the landowner / developer which would restrict the means for connecting to the wider active travel network. A project timeline of approximately 2 years from first engagement with Network Rail is typical, with a single possession needed to be booked for occupying the railway for placing the bridge span being the only working restriction. Possible additional costs relating to railway operation (e.g., adjusting signals on the railway) are not expected to apply due to the headroom and span proposed which oversails the sight lines for signals by a significant distance.

[2] Network Rail prospective project: use reference 0000434011 if further contact required

4 Option 2: Sustainable Transport Link

4.1 This option considers a sustainable transport link suitable for pedestrians, wheelers and cyclists with buses using a dedicated carriageway within the provision. The route could also be used, with appropriate management and enforcement against unauthorised use, as an additional access for emergency vehicles into Southleigh. As with option 1, this option comprises two components, the deck itself and the approach connections.

4.2 The provision of a bus and active travel route into Southleigh would meet the policy objectives of LTP4 very well, by providing a direct bus service from the development into Havant town centre via Emsworth Road (without the bus-only bridge, services have to use Bartons Road, a significant diversion northwards, or Southleigh Road, introducing significant operational issues due to the lowering of the level crossing).

4.3 A bus service to serve the Southleigh development could be provided using the new bridge, which would allow a step change in frequency of service 27 by removing it from the Southleigh Road level crossing. This would require the service to be routed either via Southleigh Road and St Georges Avenue - which would retain the service close to Warblington School but requires a suitable route through the Land East of Castle Avenue development site - or via Emsworth Road and the southern access at the A27 subway, but which would compromise the active travel route at that location due to the lack of available land width. This latter route alternative also removes the bus service from the proximity of the school. In both cases, Southleigh Road north of the railway would suffer a loss of bus service. Early engagement with the developers on both connection options for bus services and the associated (but potentially different) active travel routes is required to determine the preferred approach.

4.4 **Bridge width and layout**: the use of the deck by buses requires a minimum 13.8m wide deck excluding parapets (2m footway on west side against the parapet, 3m segregated cycle route on west side, 0.5m buffer, 5.0m carriageway, 1m buffer to parapet, nominal 1m each side for edge beams) (see Appendix 1(C)).

However, whilst the limited use by buses could offer the opportunity to provide a 5m width carriageway over the span, this would require structural widening at a future point should transport policy change to accommodate a general traffic route on the same crossing. This would lead to closure of the crossing whilst this work was being carried out, curtailing the use of the bridge for the duration of the work, being technically difficult and disruptive and costing far more than building the structure ready for such an eventuality. For this reason, it is suggested that the span and abutments should be provided in a state suitable for use by general traffic with an extra 2.3m of carriageway width (to 7.3m) and wider edge beams to accommodate heavier duty vehicle restraint barriers, resulting in a 17m - 18m wide deck. This overcomes creating a pinch point which a narrower deck would cause and allows for flexibility for bus operation by allowing two-way operation.

The bridge span of roughly 24m would either be constructed using precast concrete beams and deck slab, or as a composite structure with steel beams supporting a concrete deck slab. Piled abutments would be required, and as with option 1 the abutments should be set back from the railway boundary to ensure there is no issue with signal sighting, and also to allow maintenance access. A typical composite structure is shown in figure 3, albeit longer than would be required for the purposes of this Study as this example spans both road and rail.

Also for the purposes of this report, it is assumed that the abutments would need to rest on piles due to known ground conditions, and that for structural simplicity and minimising span, the crossing would cross the railway at 90 degrees.

Figure 3 – Long Road overbridge, Petersfield, showing a typical composite structure © Google

4.5 **Land take and ramp design:** Whilst the ramps would by necessity have to be earthwork structures the layout of these can be more flexible than for an approach for general traffic; this is due to the use limited to buses and by extension, professional drivers to whom can be issued 'Instructions to Drivers', for example mandating a top speed of 20mph. This has a positive benefit for both the horizontal and vertical alignment of the approaches, as these can be tighter or laid out to reduced vertical sighting distances in the knowledge that the speed limit would be observed, unlike under a provision for general traffic (see paragraph 5.4 below).

There is a greater land take for these embanked approaches than for option 1, partly due to the increased width of the deck itself (~16.0m against 5.5m in option 1), plus the fact that the carriageway level will be at a higher elevation due to the span structure lying beneath the carriageway rather than it being 'through' as in option 1. Allowing a nominal 1.5m for the depth of the deck beams, the net effect of these differences is a ground level footprint width (at rail head ground level) of at least 40m. However, a protected buffer of land has been applied to the Land East of Castle Avenue site of a minimum of 50m alongside the A27, which increases closer to the railway to at least 70m as the route turns from following the A27 to cross the railway in the perpendicular, so this can be accommodated.

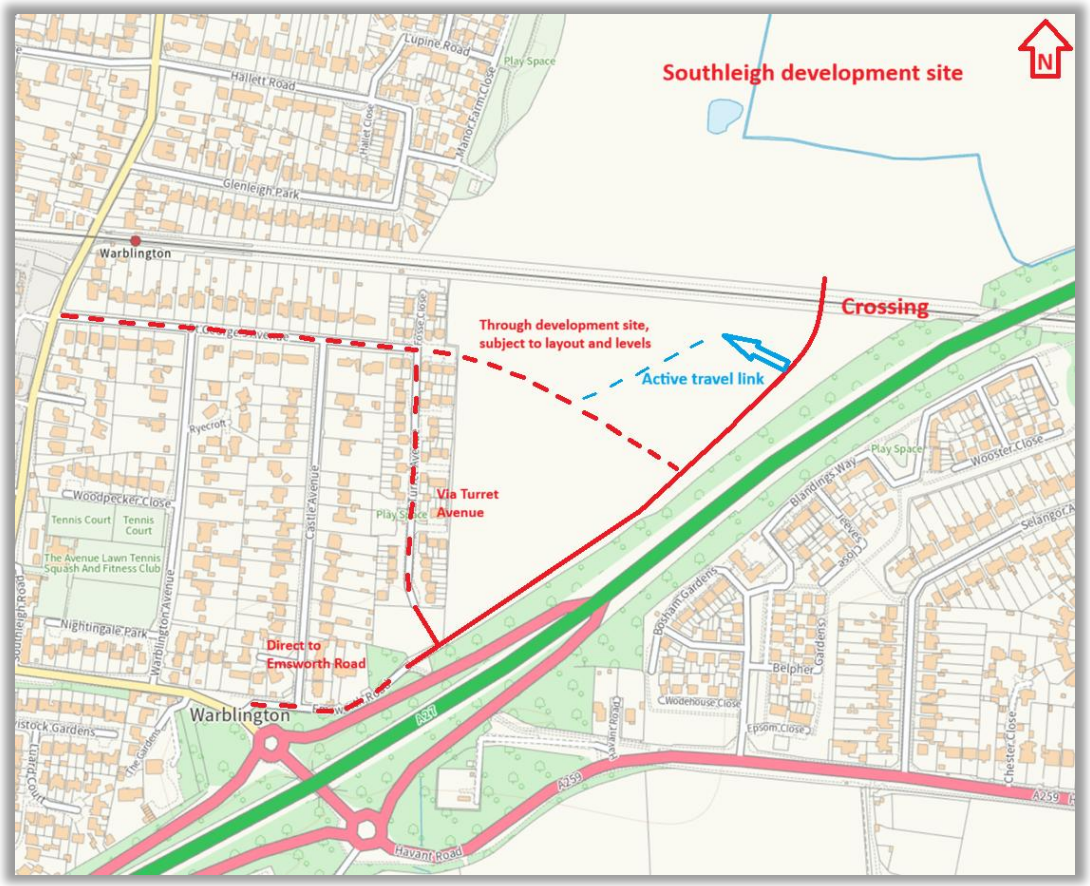
Although the safeguarded offers a significant corridor, if there were to be an issue over land take in light of the final route design, the approaches can be formed of crib walling as per this example at Lyminster in Sussex (figure 4). Whilst this has a significant visual impact on adjacent property in the development sites, this demonstrates that there is flexibility in how the alignment of the route can be achieved.

Figure 4 – Lyminster bypass, Littlehampton showing crib wall solution for approach embankment, with minimal land take © Google

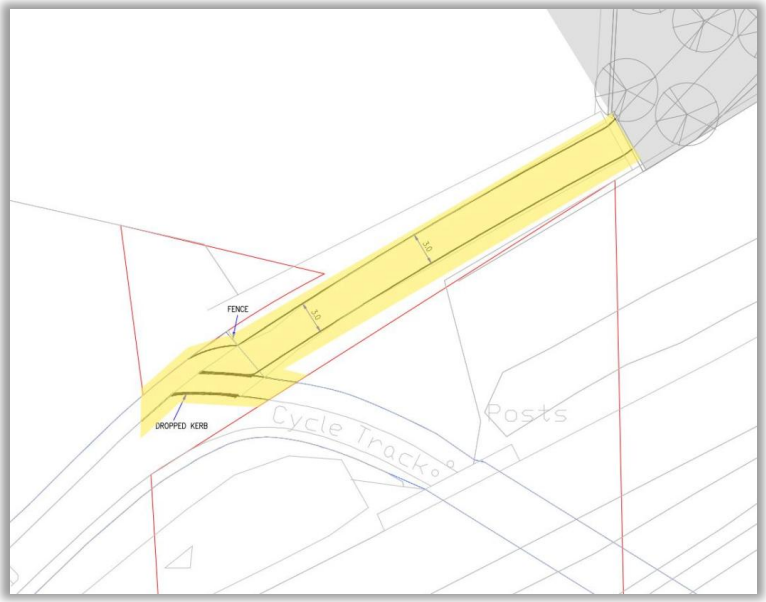
4.6 **Tie-in arrangements and land take:** there is less flexibility to tie in a bus and active travel route into the surrounding road network than in option 1, although more than on a route provided for general traffic. A ramp for active travel use could be provided into the Land East of Castle Avenue development quite close to the railway, but the bus route would be subject to vehicular gradients and minimum horizontal curves for the design speed chosen - at the very least its landing point to ground level would be towards the south of the Land East of Castle Avenue site. Buses could therefore either have to be routed through the Land East of Castle Avenue site through suitably designed internal roads, and connect to St Georges Avenue, or via Turret Avenue from its south end, or would need in some manner to share the route identified for the active travel link in option 1 connecting to the A27 subway and the Emsworth Road cul-de-sac (Plan 4). The current proposed layout for the Land East of Castle Avenue site (under HBC Planning ref APP/21/01010 at the time of writing) would not however accommodate a bus route through that development without an agreement to redesign by the developer. Given the restricted width available at this southern location, a bus gate of some type would have to be provided to prevent buses meeting head on; but it is unclear whether the pinch point would also be able to accommodate active travel (pedestrians, wheelers and cyclists) at the same time.

Either option will require further work with any developer to ensure options are kept open. There is width to accommodate up to a 5.5m – 6.0m link, albeit with some engineering measures required to retain ground either side.

North of the railway there is considerable flexibility into how the route could connect into the highways system within the Southleigh site.



Plan 4A – possible route options for bus service connection to wider road network



Plan 4B – possible connection to Emsworth Road

4.7 **Ownership, maintenance and enforcement:** the bridge span and its approaches would and should be adopted and public highway, maintainable at the public expense. Some of the connecting roads and paths, especially south of the railway, may remain under the management of the developer's agency, with public access rights awarded and maintenance carried out by a management company.

To prevent vehicles other than those authorised from using the route, it will be necessary to engage enforcement; this could be either by physical measures such as rising bollards, gates or layout restrictions such as pinch points, or by virtual measures such as by camera. These measures will be determined through future design stages and in light of emerging technology and highway authority policy at the time of implementation.

4.8 **Indicative cost:** Network Rail has been able to furnish cost estimates for similar structures installed recently on their network[3]. These costs will often include some ancillary items, and we have tried to identify these and remove them from the broad figures supplied by Network Rail.

The example most closely matching what could be built at this location would be the Stonehill Road bridge at Ash, Surrey, a pre-cast concrete beam and in-situ slab construction which included a nominal length of connecting carriageway but is laid out in a very similar format to what could be provided at Southleigh albeit with the footway and (shared) cycle track being on opposite sides of the carriageway – the overall width is the same and the span allows for maintenance access both sides of the railway(figure 5A, 5B).

- Overall total £24M - £28M.

Figure 5A – Stonehill Road bridge, Ash © Volker Fitzpatrick

[3] Network Rail prospective project: use reference 0000434011 if further contact required

Figure 5B – Stonehill Road bridge, Ash © Volker Fitzpatrick

4.9 **Deliverability**: either a fully concrete (e.g. Stonehill Road) or composite (Long Lane) bridge deck structure is deliverable as a stand alone project. The safeguarded strip of land on the south side of the railway is sufficient for the earthwork ramp approaches to the deck, although an engineering option for this to be supported on a crib wall would reduce any possibility of this being insufficient. On the north side of the railway, the only restriction is the footprint required to connect the bridge deck to the new highway infrastructure within the Southleigh development.

The current proposed layout for the Land East of Castle Avenue site would not accommodate a bus route through that development without an agreement to redesign by the developer. The use of Turret Avenue, with its limited width, would require a Traffic Regulation Order to prohibit frontage parking to ensure buses could pass. Junctions at St Georges Avenue with Southleigh Road, and of Castle Avenue with Emsworth Road, are not currently laid out to accommodate full size buses and some off-site work would be required to change these to a more acceptable layout. The proposal at the time of writing within the East of Castle Avenue application site includes a connection only 3m in width, which is not wide enough to accommodate both active travel and bus-only use. Additional width would have to be secured to accommodate a public transport link at this location.

A project timeline of approximately 2 years from first engagement with Network Rail is typical, with multiple possessions needed to be booked for placing the bridge span beams. Possible additional costs relating to railway operation (e.g., adjusting signals on the railway) are not expected to apply due to the headroom and span proposed which oversails the sight lines for signals by a significant distance.

5 Option 3: General Traffic Link

5.1 This option considers a crossing being part of a general traffic route between the Southleigh development and the local road network south of the railway.

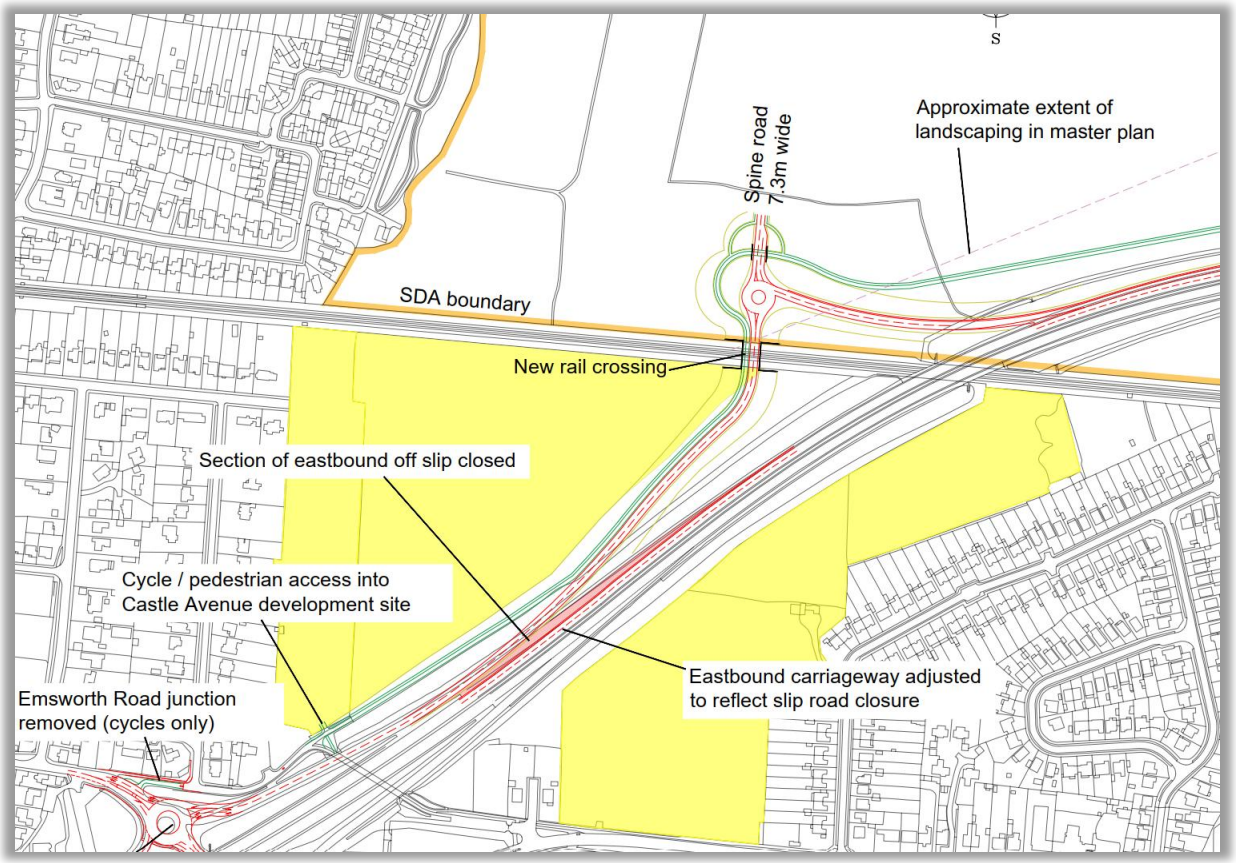
5.2 The major difference between this option and Option 2 (Sustainable Transport Link) is that the ramps and connections to the wider highway network would have to be suitable for use by the general public in motor vehicles.

5.3 **Bridge width and layout**: the width of the deck in this Option would be 16m – 17m, for the reasons explained in paragraph 4.4. Span of approximately 24m.

5.4 **Land take and ramp design:** as with Option 2, the ramps would by necessity have to be earthwork structures. Unlike Option 2, the layout of the ramps needs to be suitable for general traffic use and therefore comply with the requirements for vertical and horizontal curves in the Design Manual for Roads and Bridges (DMRB) with a nominal design speed for traffic of 30mph. With a nominal 6.5m carriageway level above the railhead, the width of the earthworks would be, as with Option 2, some 40m at railhead level, and clearly more than this based on surrounding ground levels especially to the south of the railway. The 50m safeguarding strip alongside the A27, which widens adjacent to the railway, is sufficient to accommodate this width, and there is the option as before that crib walling could be used to overcome any local shortfall, for example if a higher design speed is chosen resulting in more relaxed horizontal and vertical curves.

The provision of a general traffic route would provide a popular route out of the Southleigh development and would attract traffic from other routes especially those through Havant town centre (B2149) and from Rowlands Castle to Emsworth (B2148). This could possibly include the positive routing of HGV traffic onto the new route. For this reason, it may be unacceptable to connect the bridge directly to the local residential road network although a priority junction could be provided with suitable visibility splays and a right turn pocket. Therefore, the main difference between this option and Option 2 is that the carriageway would primarily form part of a wider road network, comprising and including the Warblington Interchange at the A27 / A259 junction.

From work carried out earlier in the development of options for the Warblington Interchange, it is known that the existing primary and trunk road network south of the railway would require adjustment to accommodate the additional traffic from Southleigh through the junction. The additional traffic on the link road joining the Warblington Interchange was modelled and would require potentially significant remodelling / signalisation. A link road from Southleigh could initially follow the route of the A27 eastbound on-slip (converted to 2-way operation) before, once clear of the subway, leaving that route and running alongside the A27 on new earthworks to reach the new bridge. The A27 eastbound on-slip could be provided from this link road via a junction to the north of the railway, direct onto the eastbound A27 carriageway (plan 5). Land has been safeguarded in the Local Plan to the north of the railway which could accommodate this type of connection.



Plan 5 – Option for a Southleigh link road connecting to Warblington Interchange

5.5 **Tie-in arrangements and land take:** the point of connection to the existing A27 eastbound on-slip being north of the existing subway would release the vertical alignment of the new link road from having to reach natural ground level unless a secondary priority junction was installed to serve the Land East of Castle Avenue development; this means that the design of the link road could be separated from the active travel route once south of the railway bridge, the active travel route dropping to ground level and connecting into the Land East of Castle Avenue development as with Option 1.

North of the railway there is considerable flexibility into how the route could connect into the highways system within the Southleigh site. As mentioned in 5.4, accommodating the eastbound on-slip requires a roundabout junction north of the railway and the on-slip would need to be laid out in accordance with National Highways standards. This is subject to the caveat in 6.4 below.

5.6 **Ownership, maintenance and enforcement:** the bridge span and its approaches (viz. the link road) would be adopted and public highway, maintainable at the public expense. Some of the connecting paths forming part of the active travel network, especially south of the railway, may remain under the management of the developer's agency, with public access rights awarded and maintenance carried out by a management company.

Because the route in this option would form part of the primary road network (potentially being an extension of the A259) enforcement of traffic speed and any other supporting Traffic Regulation Order(s) would fall to the Police.

5.7 **Indicative cost:** Network Rail has been able to furnish cost estimates for similar structures installed recently on their network[4]. These costs will often include some ancillary items, and we have tried to identify these and remove them from the broad figures supplied by Network Rail.

The example most closely matching what would be built at this location would be the Stonehill road bridge at Ash, Surrey, a pre-cast concrete beam and in-situ slab construction which included a nominal length of connecting carriageway but is laid out in a very similar format to what would be provided at Southleigh albeit with the footway and (shared) cycle track being on opposite sides of the carriageway – the overall width is the same and the span allows for maintenance access both sides of the railway (see figure 5A, 5B above).

This option however requires much more significant earthworks than Option 2, including adjustments to the A27 eastbound on-slip and the mainline itself whereby to accommodate the on-slip's revised connection point, the widening of the A27 carriageway to three lanes eastbound as far as the service area access in a lane gain / lane drop arrangement, would add further cost and loss of the tree screen along the A27 until this became re-established. This is before considering changes necessary at Warblington Interchange to accommodate the additional traffic movements to avoid delays on other arms of the junction.

- Overall total £55M - £60M (excluding any works required within the footprint of Warblington Interchange).

5.8 **Deliverability**: as with Option 2, either a fully concrete (e.g. Stonehill Road, figures 5A/5B) or composite (Long Road, figure 3) bridge deck structure is deliverable. The safeguarded land on both sides of the railway is sufficient for the earthwork ramp approaches to the deck and for changes necessary to the access arrangements for the A27 eastbound on-slip, although an engineering option for this to be supported on a crib wall (especially to the south of the railway) would reduce any possibility of this safeguard being insufficient (e.g. as a result of horizontal alignment due to design speed choice). On the north side of the railway, apart from the A27 on-slip the only restriction is the footprint required to connect the bridge deck to the new highway infrastructure within the Southleigh development.

A project timeline of approximately 2 years from first engagement with Network Rail is typical, with multiple possessions / closure of the railway needed to be booked with Network Rail for placing the 24m long bridge span beams. Possible additional costs relating to railway operation (e.g. adjusting signals on the railway) are not expected to apply due to the headroom and span proposed which oversails the sight lines for signals by a significant distance. A similar time frame will apply to access to the National Highways network.

The provision of a route into Southleigh open to general traffic would not meet the policy objectives of LTP4, even though such a route could be used by revised bus services. LTP4 clearly envisages a 'vision and validate' approach to access (instead of the previous 'predict and provide') – this means that because the Local Plan vision for Southleigh is one of localised services, good sustainable access and liveable neighbourhoods, the validation approach of this requirement in LTP4 requires the avoidance (or at the very least, discouragement) of through travel by general traffic.

[4] Network Rail prospective project: use reference 0000434011 if further contact required

The provision of a link road of the type required in this option would also create severance issues in the new community with the resulting poor air quality and noise associated with additional, attracted traffic. Although there are benefits by offering alternative routes for general traffic – by avoiding the B2149 Petersfield Road through Havant town centre, and reducing traffic on the B2148 through central Emsworth (which in turn allows traffic calming on North Street) - on balance it is unlikely that Option 3 would be supported in any way as part of the Southleigh transport provision.

Balancing the severance impact of the new link, however, would be the opportunity to close the Southleigh Road level crossing to general traffic by providing the alternative route. This would meet Network Rail's aspirations to reduce the number of level crossings on its network. An active travel structure would be required at the site of Warblington level crossing to maintain the ability for exchange between the two platforms of the station, and along Southleigh Road itself. This has not been costed into the estimate for this option.

6 Caveats

6.1 Network Rail have only been able to provide indicative costs for typical infrastructure, where this crosses or otherwise interacts with the railway these costs will include project governance costs attributable to Network Rail, but which have not been separately quantified within the estimate.

6.2 The estimated costs assume there are no supplementary costs from Network Rail e.g. for signalling changes. The choice of designs has been made to minimise the likelihood of such additional costs, but others cannot be ruled out. This will be validated during later design stages.

6.3 The deliverability assumes no fundamental objections to the proposals from the relevant highway authorities and no design requirements above and beyond what can be reasonably expected in projects of this type (e.g. no special materials etc.).

6.4 The third lane on the mainline A27 required in Option 3 requires a National Highways departure from standard as it is less than the minimum length of lane gain / lane drop in the DMRB. An alternative to the lane gain / lane drop would be for eastbound access to the service area to be taken from the eastbound on-slip before this joined the mainline; in other words, vehicles for the service area would need to leave at the Warblington Interchange and use the general traffic link for access. This may not be acceptable to the service area operator.

6.5 The site of the crossing lies within the 300m buffer for the high pressure gas pipeline between Havant and Emsworth (although the pipe itself is to the east of the A27).

6.6 The Study assumes that developers are willing to accommodate the infrastructure, including links if necessary, within the footprint of their development areas.

6.7 Estimates are nominally at December 2025 prices and, for option 3, EXCLUDE the costs of adjustments within the Warblington Interchange which are indicated as necessary by traffic modelling from earlier studies.

6.8 Estimates **DO NOT** include Optimism Bias (OB) or contingency. The sums quoted are as provided for out-turn of comparable projects at other locations, including design and supervision; these projects may have included other elements not applicable to Southleigh. The design stage will include costs for structures, ecology, environment, drainage etc. At the next stage of design, an OB can be allocated to specific elements of the emerging details, and a more accurate estimate will result.

7 Conclusion

7.1 Three options for delivering a crossing of the railway to serve the Southleigh development site have been assessed in this Study.

7.2 Each type of crossing (active travel, sustainable travel, and general traffic) has been shown to be deliverable but with escalating orders of cost and caveat, which will affect the viability of the development if the cost of the structure falls to the developer. All options can be delivered within the safeguarded land footprint.

7.3 **Option 1**'s strength is that it is the least expensive and quickest to implement and the easiest to accommodate within any land that is available. However, it is likely to carry the highest maintenance costs, being partly or wholly a steel structure. The ramps can be steel structures, folded if necessary to minimise land take, or could be formed of earthworks to include the ability to add landscaping or other elements to contribute towards Biodiversity Net Gain. However, a structure of this type can be relatively conspicuous (see figures 2A and 2B) and may detract from the developer's aspiration for their site.

7.4 **Options 2 and 3** suggest the same bridge structure to be built over the railway, as a road and footway. Such a structure provides (in option 2) a future proofing for any future provision of Option 3 if a link for general traffic finds favour in any future national, regional or local Transport Strategy, as long as sufficient land as in Option 3 is also safeguarded.

7.5 **Option 2** provides an excellent solution for sustainable transport and active travel in accordance with LTP4, allowing bus services to be developed independently of the impact of Southleigh Road level crossing, this being one reason for the paucity of bus service north of the railway. All the benefits of option 1 for active travel would also be delivered under this option. The provision of this option would be less conspicuous against the backdrop of the A27 and offers significant opportunity for landscaping and other ecological measures, due to the ramps having to be earthworks. There is flexibility over the layout of the ramps as in this option they only have to be suitable for buses to use at relatively low speed, and so do not have to accommodate the requirements otherwise needed for general traffic. However, the ability to connect to the local highway network to the south of the railway - either through the 'Land East of Castle Avenue' development site or to Emsworth Road near the A27 subway - is compromised by proposed and existing development layouts and the lack of available width at the south end, to Emsworth Road. Delivery of Option 2 whilst technically feasible as a railway crossing appears to be undeliverable due to land availability or development layout constraints at the present time. Additional width would have to be secured to accommodate a public transport link at this location.

7.6 **Option 3** requires the same bridge span structure as option 2 but extends its use to general traffic. This changes some of the vertical alignment requirements on the approach ramps, although not the span structure itself. A general traffic connection could be made into the 'Land East of Castle Avenue' site through use of a priority junction, but because this option offers an additional route out of Southleigh it should only be considered in conjunction with the provision of the general traffic link road to the Warblington Interchange on the A27, which is not currently supported by Hampshire County Council because it does not meet the policy of LTP4. This is the most expensive option but provides a benefit for general traffic.

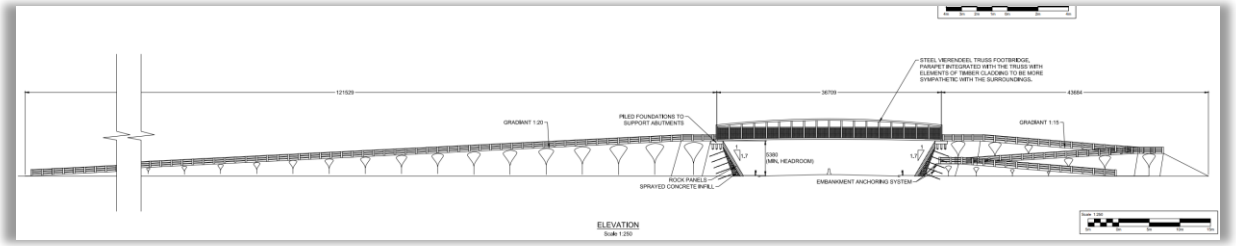
OPTION 1		OPTION 2		OPTION 3	
PRO	**CON**	**PRO**	**CON**	**PRO**	**CON**
Quick to implement	Open ramps carry high visual impact	Fully meets LTP4 policy - supported by highway authority	Expensive for what is delivered	Additional route out of Southleigh for all traffic	Requires additional off-site highway capacity to achieve full benefit
Least delivery cost	Active travel only	Enables development of bus network especially to east Havant	Needs bus network to use it	Could relieve pressure on surrounding road network	Most expensive option
Flexible to implement	Relatively higher maintenance than other options	Flexible to connect to adjoining road network	Issues of enforcement over access	Could be marked as HGV preferred route from New Lane to A27	Does not reflect LTP4 - not supported by highway authority
Accords with LTP4 – supported by highway authority		Additional route for emergency use into Southleigh	Difficulty in connecting to existing road network under current land ownership constraints	Could allow closure of Southleigh level crossing to general traffic	Departure from standard needed for revised eastbound A27 on-slip
					Potential impact on eastbound A27 service area access
					Community severance in new development by major through route

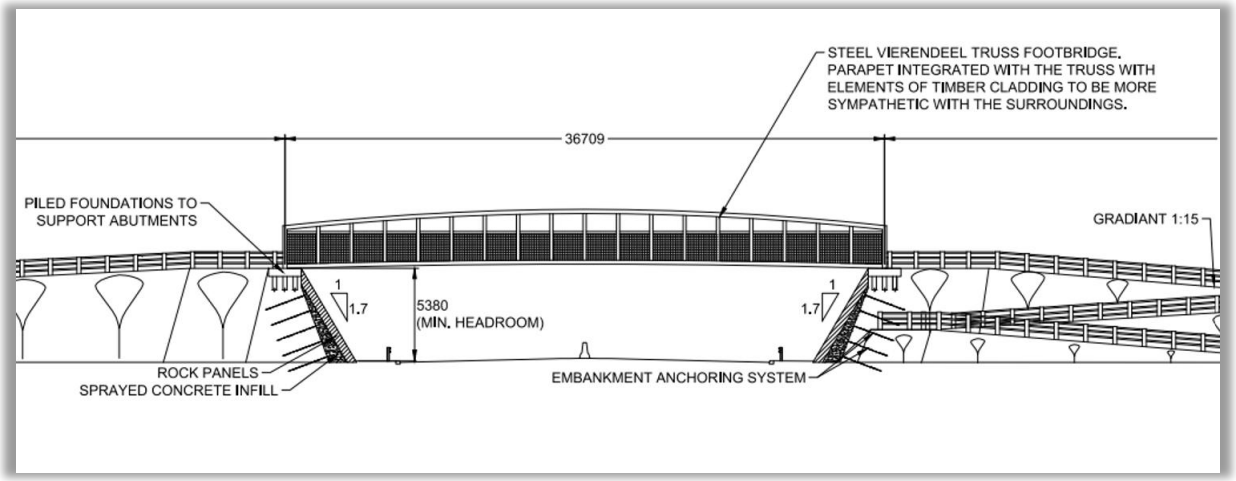
APPENDIX 1

TYPICAL CONSTRUCTION DETAILS

A. FOOTBRIDGE WITH EARTH RAMPS: EXAMPLE FROM ARUNDEL

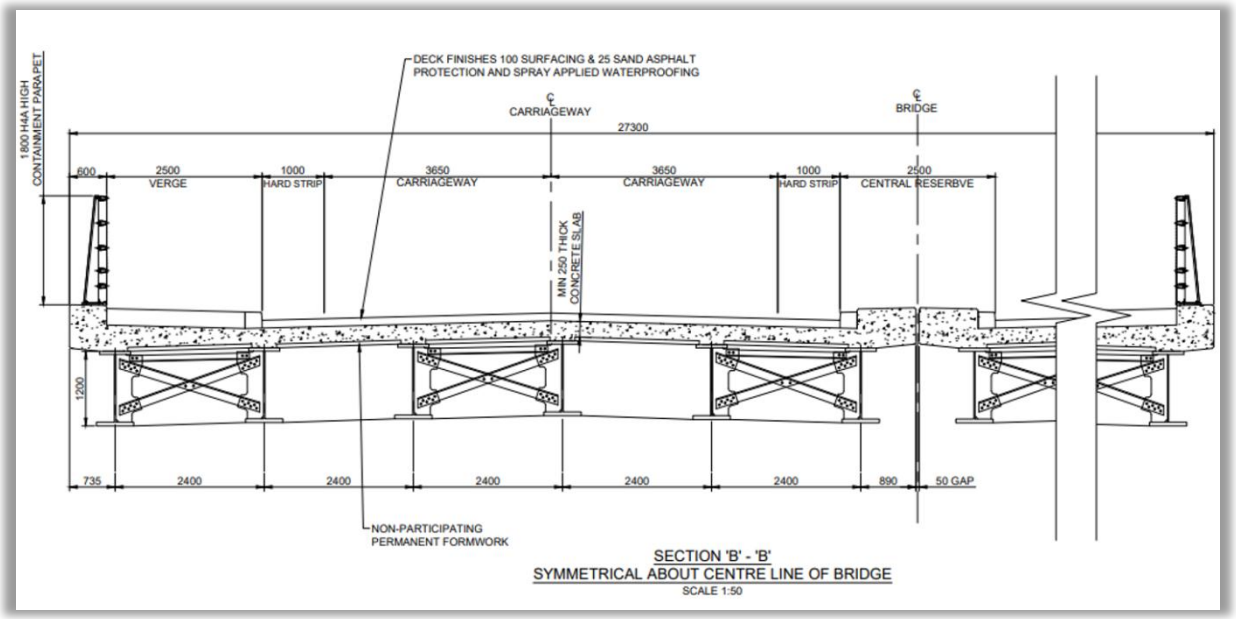
This example shows straight ramp (left) and folded ramp (right). The span is a variation on a Vierendeel girder. This drawing confirms the accessibility requirements of 1:20 without landings, 1:15 with landings. The span of 36.71m and headroom clearance of 5.38m on this drawing is more than would be required at Southleigh (as it crosses a dual carriageway road). These images are in the public domain.

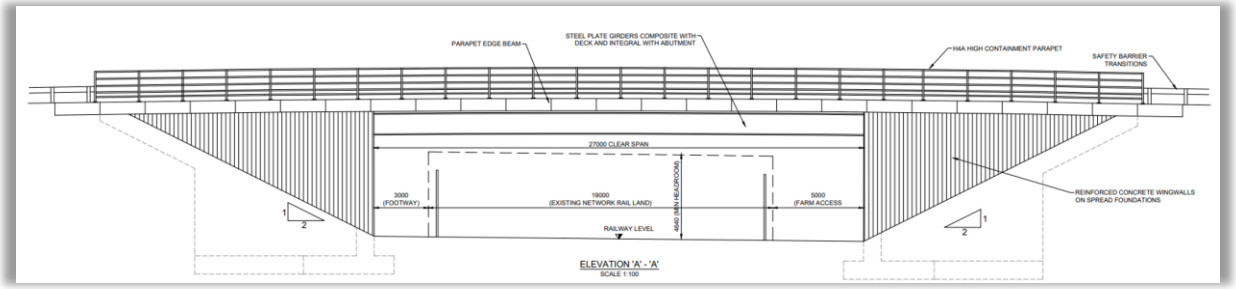




B. ROAD BRIDGE – COMPOSITE DECK OVER RAILWAY: EXAMPLE FROM ARUNDEL

This example shows a composite bridge deck and indicates the type of significant parapet that will be needed for the railway crossing. This has a 27m span including oversail for accesses both sides of the tracks, so is a relatively close match for the Southleigh bridge if a composite design was chosen.





C. ROAD BRIDGE – PRECAST BEAM DECK OVER RAILWAY: EXAMPLE FROM LYMINSTER

This example shows a deck formed of precast concrete beams supporting an insitu deck, and has a similar structural width of 15.975m as would be the case at Southleigh (albeit with different layout for the footway / cycle track / carriageway).