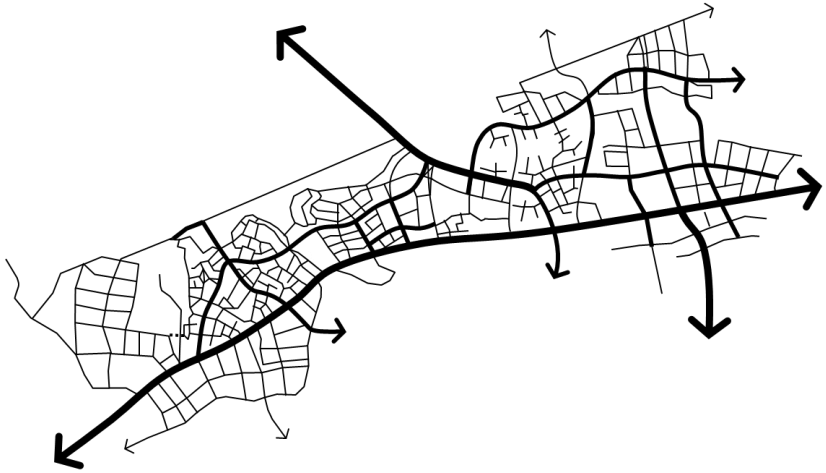
# Cranbrook New Town
## East Devon District Council



# Masterplan option testing

**Final Report**

September 2017

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## DOCUMENT REFERENCE

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# Contents

# Summary Introduction and approach

**Introduction**
East Devon District Council has received NHS Healthy New Towns funding to assess masterplan proposals for Cranbrook.

To date an outline masterplan, has been produced and divided in to a number of phased developments. These developments – which include a new Town Centre - have been progressed to a strategic level of detail by various groups including developers and the council.

Proposals generally set out primary streets and outline uses, which includes 3,000 new homes. Some of these outline masterplans have outline planning approval, but require further design development to propose a secondary street network, distribute uses, active frontages, allocate community services (including health) and distribute densities.

To date approximately 1,500 new homes have been built and this provides some constraints to potential design development.

Space Syntax were appointed to provide design advice in order that masterplan proposals can deliver a successful development which also allows health and well-being outcomes to be delivered.

Our advice is based on the application of spatial modelling to analyse patterns of connectivity in proposed street networks. Using 25 years of research into towns and cities, these patterns of connectivity will be studied to understand how proposals deliver the objectives of development.

The six masterplan proposals listed below were tested:
- Savills masterplan
- NCP masterplan
- Phase 3-4 of NCP masterplan
- Layout of NCP masterplan town centre
- Refined Savills masterplan
- Refined Savills masterplan revised (with and without the Crannaford Crossing)

This report summarises the findings of the analysis for the above masterplans.

**Approach**
Space Syntax analysis has been used to study the properties of connectivity within the network and the hierarchies they create. More detail on the importance of connectivity follows in the Key Findings section with a more technical description of the Space Syntax methodology set out in the Appendix.

Masterplan proposals have been tested within a base model covering an area of 20km radius, to assess how they work within the wider context. In the case of Cranbrook, because proposed development has been partially completed, this base model is defined as a Future Existing Scenario.

Using this Future Existing Scenario as a base, all six masterplan proposals were tested. Proposals were analysed to understand connectivity at two scales -regional (10km) and local (2km). A multi-scale analysis was also carried out to identify those parts of the network that perform well at both levels.

Analysis of the NCP masterplan and Refined Savills masterplan revised (with and without the Crannaford crossing) is included in the body of this report. This is presented as a set of annotated analysis maps. Based on these analyses a set of recommendations and design principles have been put together as a set of diagrams. The detailed analysis of all masterplans is included in the Appendix.

# Key findings Basis for assessment

**Key Findings**
Our comments on design proposals have been set within three categories: Layout, Land use and Landscape. Some key characteristics of these design components are described below:

**Layout**
Layout describes the network of streets, pedestrian routes and spaces. Layout can be analysed using spatial network models to describe different properties of connectivity.

The patterns of connectivity created by layout have been found to be highly influential on the distribution of activity (typically 60-80% of pedestrian movement follows the patterns of connectivity rather than the pattern of land use distribution).

The connectivity of a layout can be analysed at both a local scale (relating to potential pedestrian movement), and a wider scale (relating to potential vehicular movement). Successful high streets and town centres in the UK have been found to be the streets that are highly connected at both of these scales – this is known as “Multi-Scale Accessibility”. For a town centre to work it requires this combination of connectivity at two scales.

The layout of streets is the most difficult component to change once it is in place, and it is therefore seen as fundamental that this is as strong as possible, before land uses are distributed within it.

Analysis does not take road width or land use in to consideration, it shows how important every street is as part of the wider network of streets. While the capacity and quality of a street can affect the amount of movement that passes through that street, it has to have the connectivity in place to allow movement in the first place. Capacity and quality can amplify the effects of connectivity but cannot replace it.

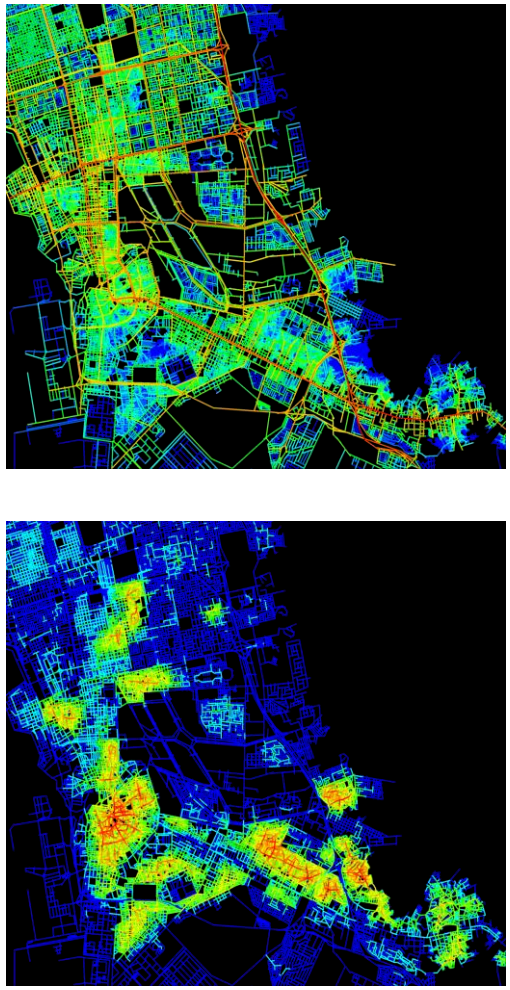
**Land use**
Land use has been found to have strong relationships to connectivity. Certain land uses can be sustained economically in locations where they have access to people who pass by chance, rather than making a dedicated trip to this specific use.

Because connectivity has been found to relate to movement, it follows that certain land uses need to be located with suitable levels of connectivity. This is indeed the case and in London, 80% of retail land uses are located along the top 20% of the best connected spaces.

Where retail is not located in these streets it is very difficult to sustain it, and often these units will repeatedly go out of business. The implication of this is that the designation of an area in planning terms does not mean it will necessarily function as intended. Similarly there may also be areas which emerge as suitable for uses such as retail which may not be designated as such.

Public transport benefits from being located in the areas of highest connectivity. These will be the places which are easiest for more people to access. They will also be the most legible places to arrive at and be where the uses that people are travelling to are most likely to be located.

Higher levels of density, or instead smaller housing typologies are better located in areas with better connectivity. From these locations it is easier to access the wider area, and locating higher densities in these areas encourages walking, and also provides local populations to support retail uses.



**Above:** Example spatial analysis showing how well connected every street is to the entire city (top) and how well connected every street is within a 10 minute walk (bottom). Well connected streets are shown red, poorly connected streets are shown in blue.

# Key findings Basis for assessment

**Landscape and public realm**
Landscape and public realm are the easiest element of urbanism to change and adapt over time. For the masterplan to generate the optimum outcomes however, the design of landscape and public realm must be aligned with the wider design of layout. For example, carelessly placing street furniture or landscape elements that block wider pedestrian desire lines makes walking inconvenient.

Mixing different modes of movement within the same spaces has been found to have benefits in terms of encouraging walking. When pedestrian networks are segregated and pass through green areas away from active uses they have been found to discourage walking as part of everyday activity.

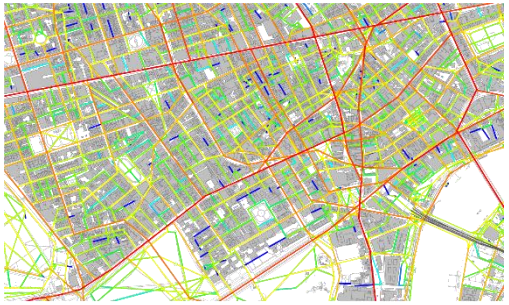
The ideal solution to mixing modes is to design streets. The key to successful streets is to manage the interfaces between modes of movement and ensure that vehicles do not move too quickly, and that the presence of pedestrians is emphasised. This can include public realm ideas such as using shared space, however this has to be matched very carefully to the levels of vehicular movement.

Clear pedestrian crossings located on pedestrian desire lines are also essential.

Active public spaces, both hard and soft, have been found to be those where wider pedestrian movement passes through the space itself rather than around it. This means that people sitting in the space do not feel isolated or vulnerable, but close to other people. This type of stationary activity also provides natural surveillance.

A further factor that increases natural surveillance, and encourages the use of public spaces, is the design of the building frontages that define the edges of the space. Locating entrances and active frontages to engage with public spaces should be encouraged.

As with the discussion in the layout section around quality and capacity of spaces, good public realm can encourage the use of public spaces, but by itself it cannot replace the need for connectivity



**Above:** Research has shown that layout consistently relates to the distribution of movement, (pedestrian and vehicle), and land use. Typically, 80% of retail (middle, red plots), are located on the top 20% of most accessible spaces (bottom, red lines).

# Key findings Layout

**Layout**

**1)** Analysis of all masterplan proposals consistently highlight that London Road is the most important connection at both the local and wider scales. This indicates that it would be the strongest place for a Town Centre to be located that could sustain itself.

This location allows the benefits of being easy to access for the local community, and mixing these users with those from a wider area who will pass through as part of a wider journey. This mix of users provides a wider economic base to support uses such as retail.

It is understood however that constraints within the site and planning approval mean that it is not possible to develop this as the spine of the new development.

**2)** The implication of not developing along London Road is that it will be very difficult to develop a Town Centre that does more than support the local residents. This will make sustaining higher levels of retail difficult. The town centre location currently requires people from outside the local area to make a dedicated trip to access it.

**3)** Within the masterplan, the proposed diagonal north-south route Cranbrook is the strongest connection that is closest to having “multi-scale” connectivity. This is consistent in all masterplans.

This indicates that the Town Centre is poorly located as the streets in the proposals with multi-scale characteristics currently bypass it. The strongest routes pass around it rather than through it. If the town centre is required to support retail land uses – where exposure to passing trade is vital – it may be difficult in its current form.

The existing Crannaford Lane is restricted width and would benefit from widening. Ideally the level crossing across the railway would be grade separated, however it is recognised this would be an expensive solution. It forms another gateway into the town and would benefit from public realm improvements if it remains as a level crossing.

It is important that the connection is maintained and strengthened. When it is removed the Town Centre reduces in connectivity by 21%. Closing this route increases pressure on Southbrook Lane, where accessibility increases by 17%, however it is even narrower than Crannaford Lane (p22-26).

**4)** The relatively large block sizes of the Town Centre decrease its permeability, which makes it less easy to walk around.

**5)** Within the existing development, a local spine linking the existing development to the proposed town centre is formed by Tillhouse Road and its connections back to London Road. This indicates that there is some internal hierarchy that connects development locally.

**6)** The Town Centre is also poorly connected to the later phases of development to the east of the masterplan. The secondary network in this area is fragmented and there is a less clear spine in this area. It is therefore likely that the town will end up functioning as a few distinct local areas – West of Tillhouse Rd by Cranbrook Station (A), Central Tillhouse Rd around the Town Centre (B), and East of the Town Centre (C) on opposite page.

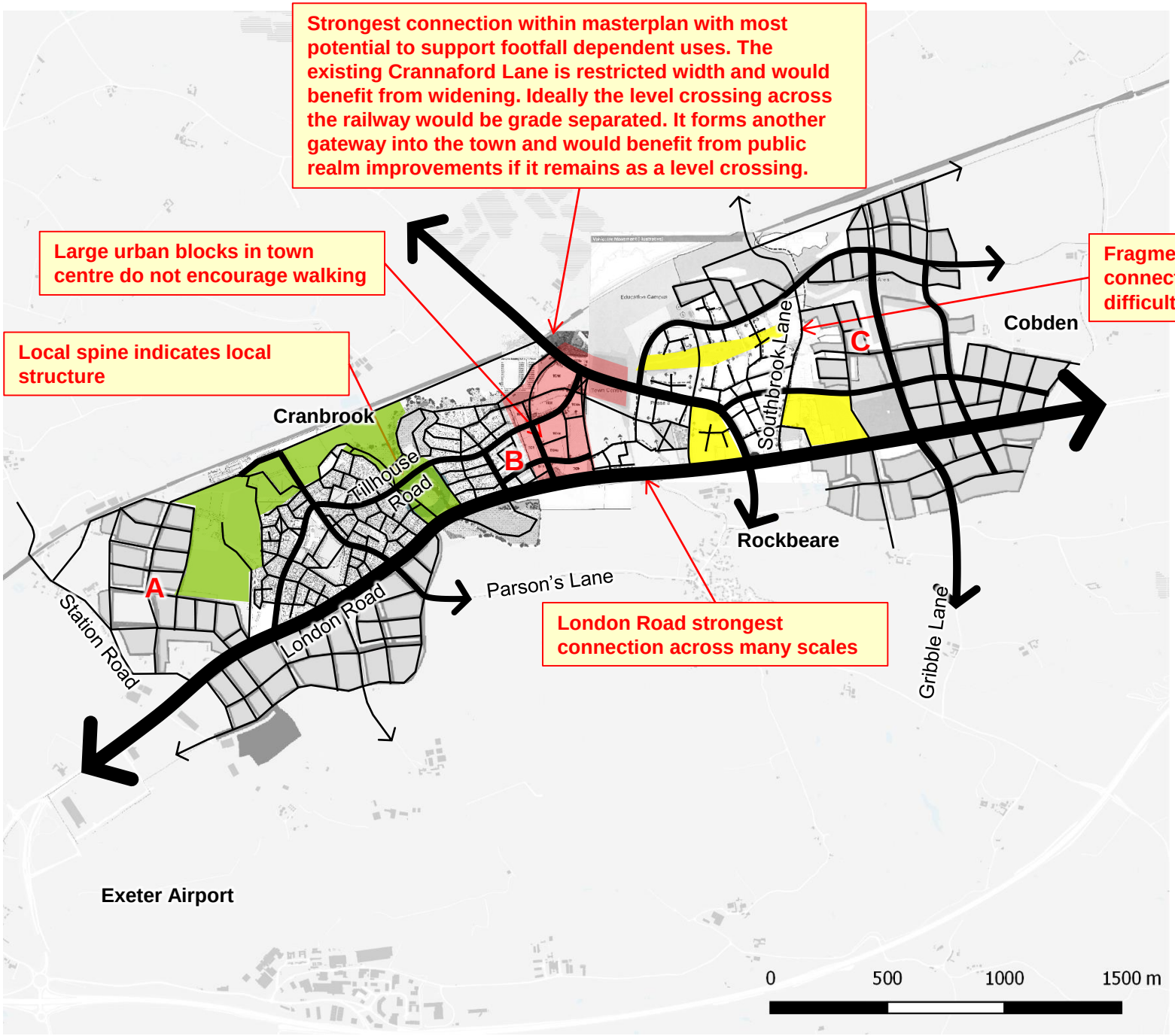
One of the causes of this is that development is proposed as a number of almost independent areas. The populations of each of these areas are likely to be too low to support very much of their own retail activity, and they also make it difficult to integrate the Town Centre within the wider masterplan. Further more, this increases the distances to access the town centre, which makes it more difficult for people to walk to it. This is partially a result of large green spaces creating blockages (green).

**7)** Phases 3 and 4 of the development repeats this pattern by creating a fragmented secondary route network with a high number of dead-ends and limited connectivity to the town centre. These characteristics indicate that it will also be difficult to access the town centre on foot from this area.

**8)** Of all options tested, the refined Savills masterplan is the strongest performing, It creates a more legible, better connected, layout within the expansion areas.


**Above:** Analysis of the NCP proposal at regional scale (top) and local scale (bottom). Full analysis of each option is shown in the body of the report.

# Key findings Layout



# Key findings Land use, Landscape and Public Realm

**Land use**

**1)** The diagonal route through Phase 3-4 has the spatial conditions to support Town Centre retail uses at ground level. It could potentially also support more intense levels of other land uses including residential. It is therefore very positive that the idea of requiring the structural design of buildings on this route to allow flexibility to separate ground and first floor levels of use. This would enable them to adapt over time to these retail opportunities.

**2)** Other town centre land uses which are less reliant on footfall, for example the youth and children centres, the library and the health and well-being centre, could function within the designated town centre.

**3)** To overcome the lower levels of connectivity of the Town Centre, it is also important to encourage any movement from London Road in to the town centre. Therefore the gateway spaces in to the development need careful design to allow views to penetrate development as far as possible.

**4)** Some convenience retail would be needed outside of the town centre to serve local population but this should be small scale to avoid competing with the town centre.

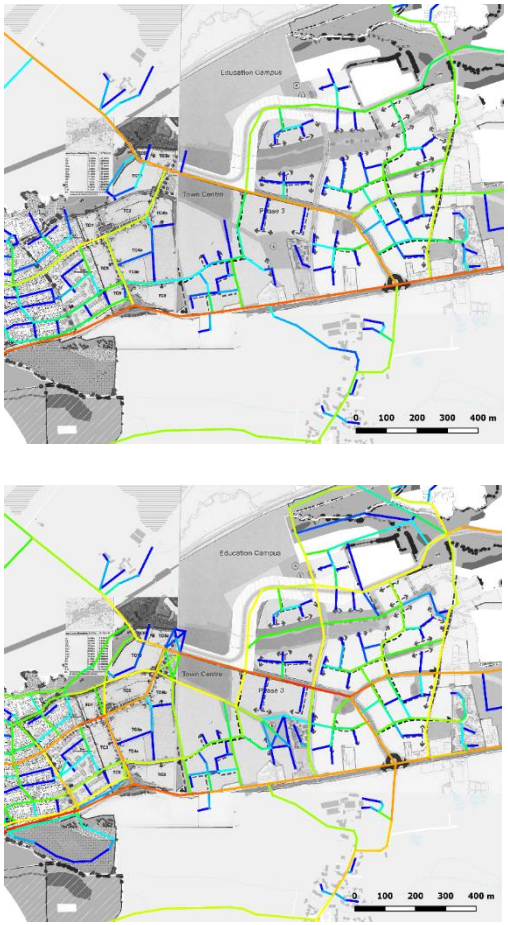
**Landscape and public realm**

**1)** London Road does not have the character of a typical regional link, and it appears that the A30 takes on this role. The character of London Road needs to vary in relation to whether the development is on one side or both sides.

**2)** When the development is on both sides it should have the characteristics of a street which integrates pedestrian crossings and pavements (see A and C on opposite page).

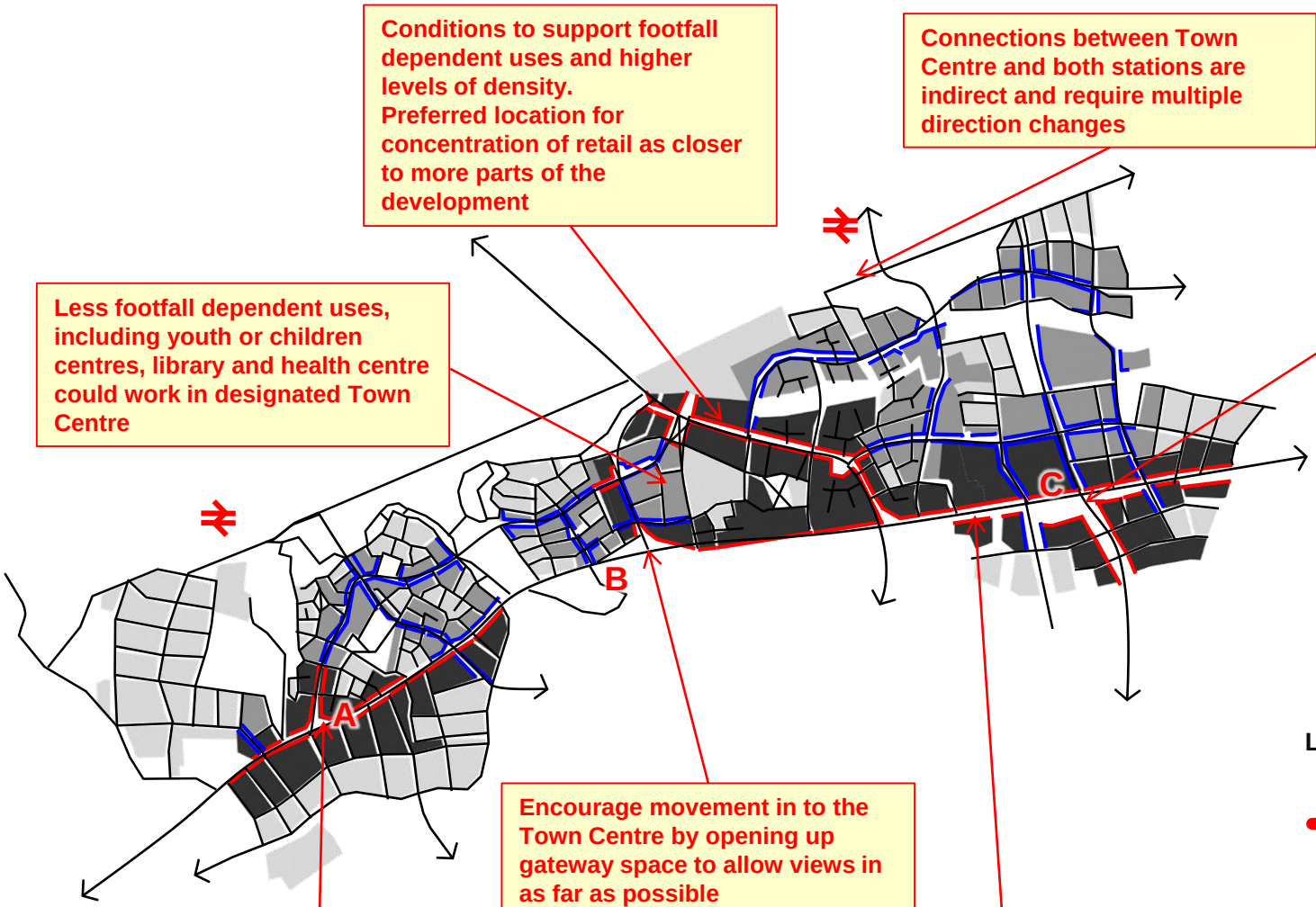
Public realm upgrading and intervention would be required to transform this into a street designed for vehicles as well as pedestrians and cyclists. Therefore, roundabouts that generally prioritise the continued speed of traffic over pedestrian convenience are not recommended along this road. A signalised junction at east and west ends of the development would be preferable.

**3)** When the development is on one side pedestrian and cyclist space is still required but it could be segregated (B on opposite page).




**Above:** Analysis of Town Centre proposals at regional scale (top) and local scale (bottom). Full analysis of each option is shown in the body of the report.

# Recommendations Savills masterplan revised Land use and landscape




**Land use/Density/ Frontage**

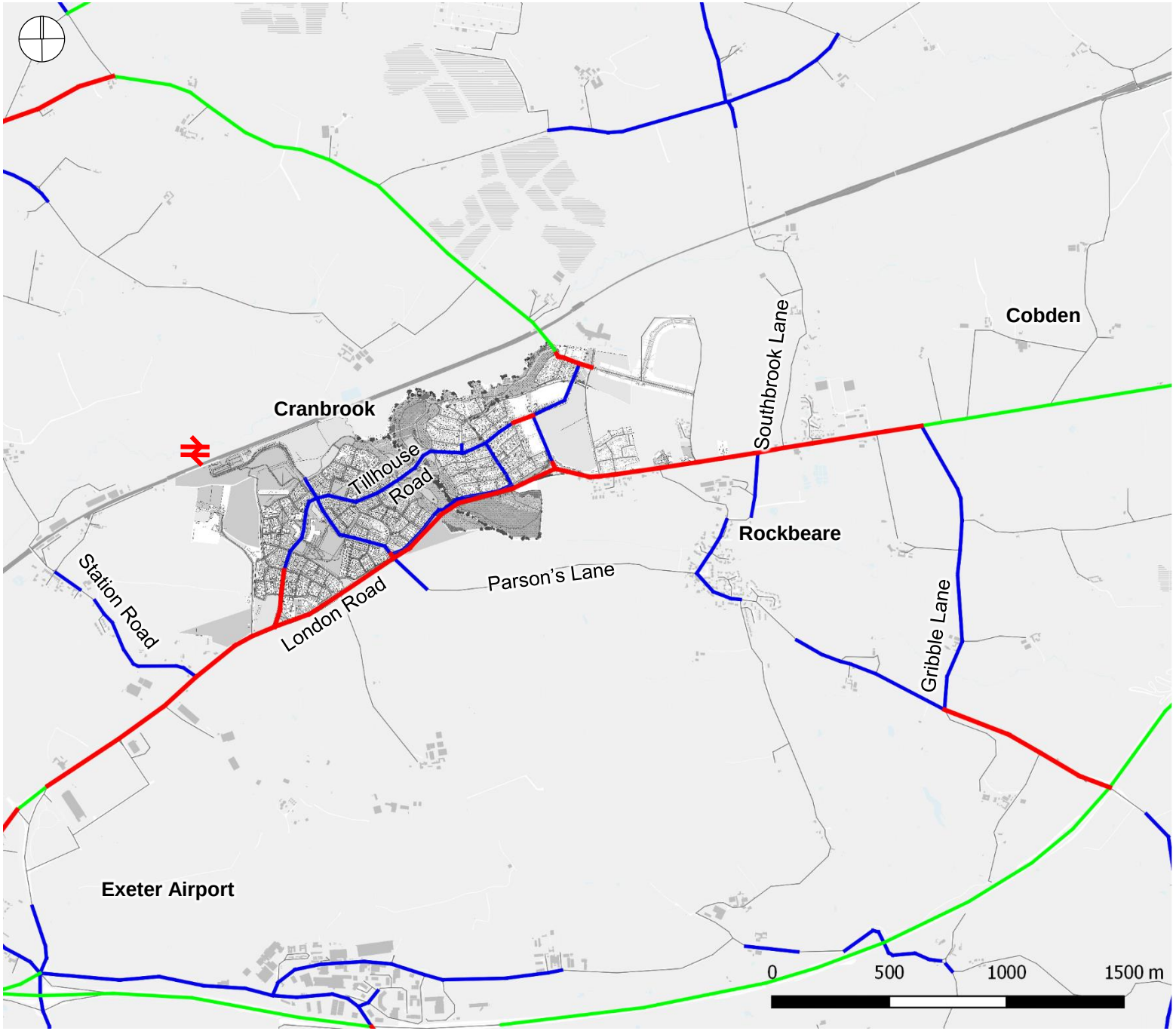
**Conditions for footfall dependent uses**
Retail (mixed)
Commercial
Public transport
Public space
Residential
(higher density)

**Conditions for locally important uses**
Social infrastructure
Retail (convenience)
Residential
(medium density)

# Future existing analysis

Analysis of existing development, outline permissions and proposals that are unlikely to change substantially

# Future existing Multi-scale spatial accessibility




NACh10km > 1.2 , NACh2,000m > 1.2

The spatial accessibility analysis highlighted London Road as an important connection at both scales - regional and local. Across the UK these streets with "multi-scale" accessibility are found to be high streets and town centres.

London Road is the main connection between Cranbrook and Exeter. It connects with the A30 motorway to the west, where the Exeter Airport is, and to the east leading to London.

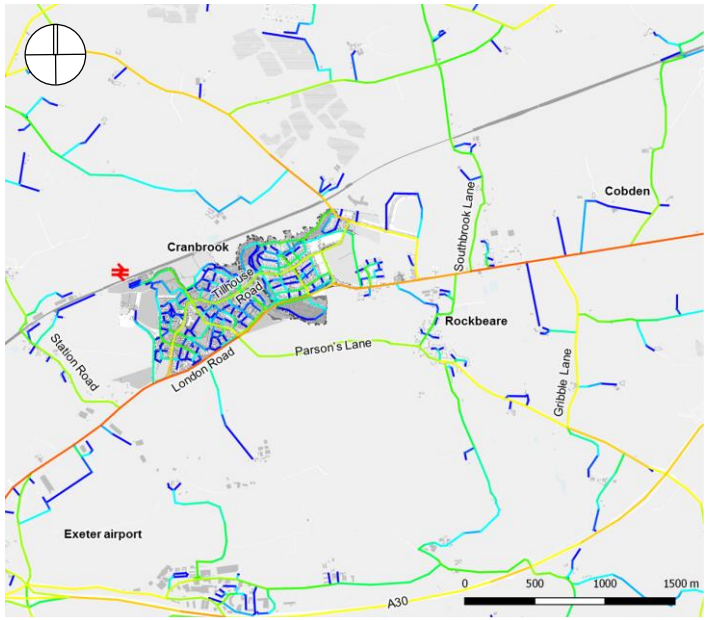
Because the A30 dual-carriageway is almost parallel to London Road, London Road does not have the character of a typical regional link, but is a rather small road approximately seven metres wide.

It has underlying spatial characteristics for urban development in that it can support both regional and local movement, however it will need some upgrading/intervention.

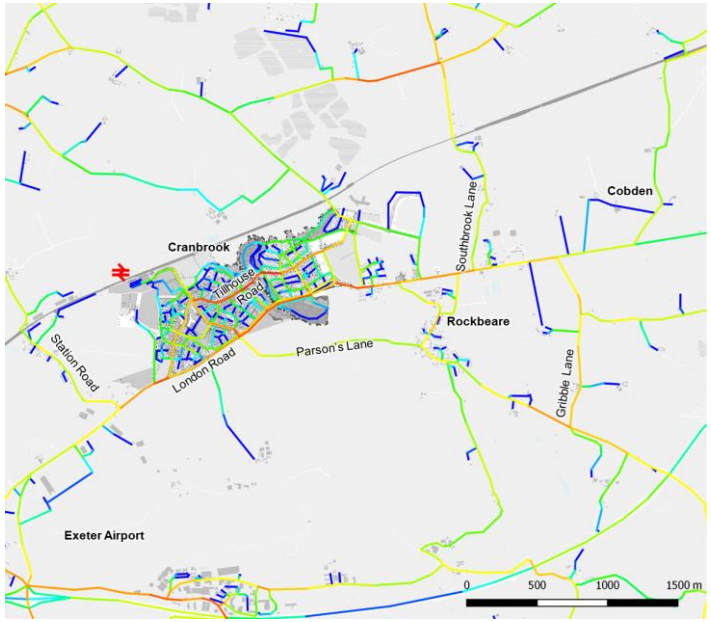
**Primary route**

- Regional and local
- Regional
- Local

# Future existing Regional and local spatial accessibility




**Regional spatial accessibility**




**Local spatial accessibility**

At the regional scale, the proposed diagonal north-south route leading to Dog Village is picked up. With the extension of Cranbrook towards the east, its local connectivity can be further improved to also support both scales of movement.

Other connections to nearby settlements include Parson's Lane and Gribble Lane to the south.

Within the development, a clear local structure is formed by Tillhouse Road and the connections back to London Road, indicating that there is internal hierarchy and legibility to the development.

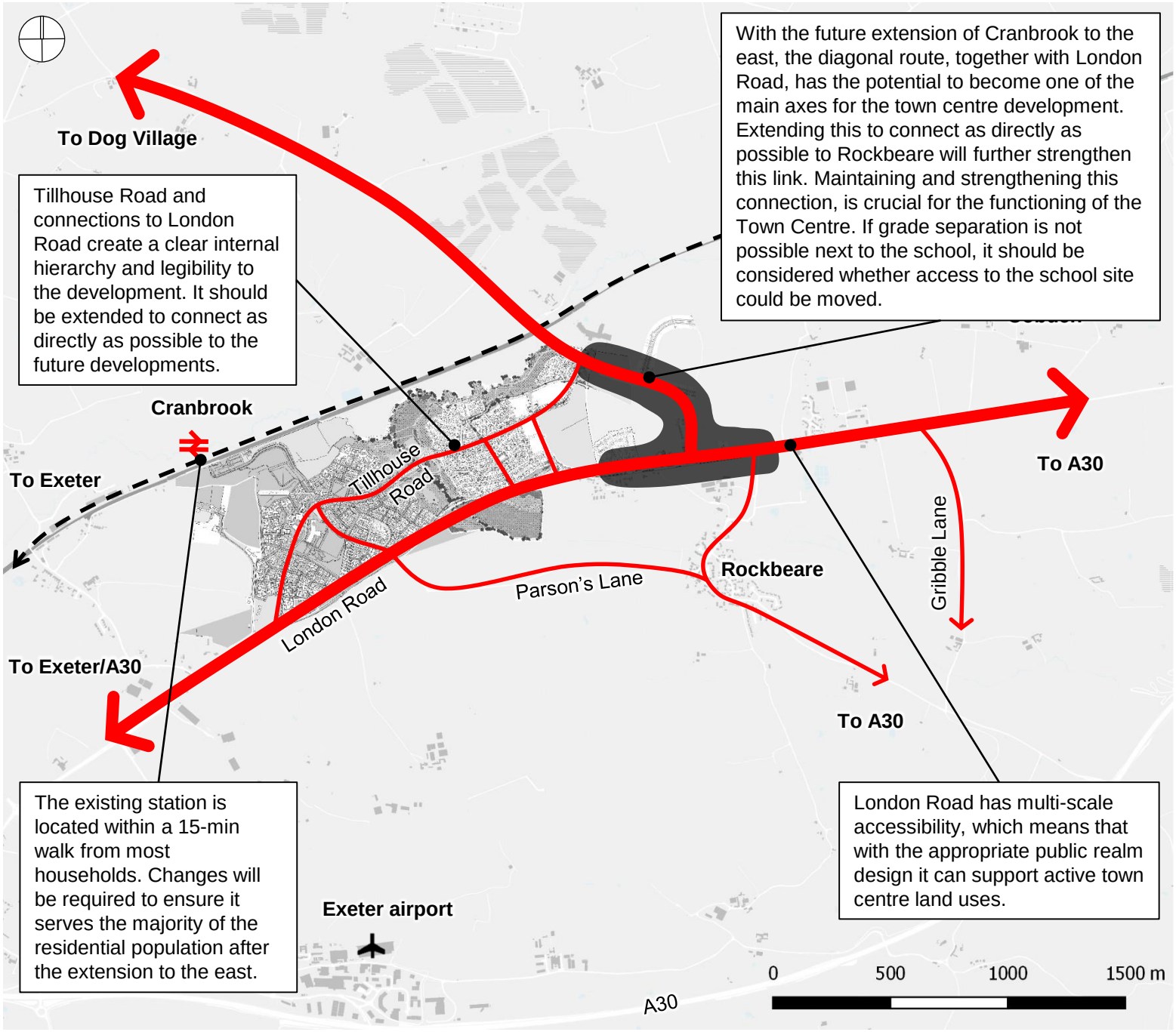
Railway station

**Spatial accessibility**

high

low

# Future existing Summary




Railway station

Potential for town centre development

Primary route network

# Masterplan analysis

NCP masterplan

Phase 3-4 of NCP masterplan

Layout of NCP masterplan town centre

Refined Savills masterplan revised

Refined Savills masterplan revised with Crannaford crossing closed off

# Masterplan options

The six masterplan proposals listed below were tested:
•Savills masterplan
•NCP masterplan
•Phase 3-4 of NCP masterplan
•Layout of NCP masterplan town centre
•Refined Savills masterplan
•Refined Savills masterplan revised (with and without the Crannaford crossing)

Analysis of the NCP masterplan, Phase 3-4, Town Centre and Refined Savills masterplan revised (with and without the Crannaford crossing) is included in this section. The detailed analysis of all masterplans is included in the Appendix.

The level of detail in proposed masterplans is not consistent. Depending on the level of detail of the proposed masterplans, the modelling methodology has been adopted to be able to work with the available data, using either a strategic (primary only network) or a detailed model (secondary and tertiary routes included) as the base.

All pedestrian links were removed from the regional scale analysis.

**Savills masterplan**
A strategic model has been used as the base to test the initial Savills masterplan that proposes only a primary route network. Using the existing model as a base to test options would not provide an accurate analysis as results would be skewed towards the areas with a more detailed street network.

Therefore to test this proposal the future existing model has had secondary and tertiary routes removed from it (image top right). This means that it cannot be used for analysis at a local scale (2km). To be able to work around these constraints an intermediate scale of analysis (5km) was used to represent both regional and local hierarchies.

**NCP masterplan**
In order to test the NCP masterplan at all scales, an assumed secondary network has been added to the NCP expansion areas that proposed only a primary network. The secondary and tertiary routes of the existing model and the proposed secondary network of Phase 3-4 and Town Centre has been included in this analysis.

**Refined Savills masterplans**
The refined Savills masterplan and the revised option proposed a secondary route network, and therefore a detailed spatial model has been used.

At this stage, analysis does not include data related to the attraction of land use, transport or demographic data.

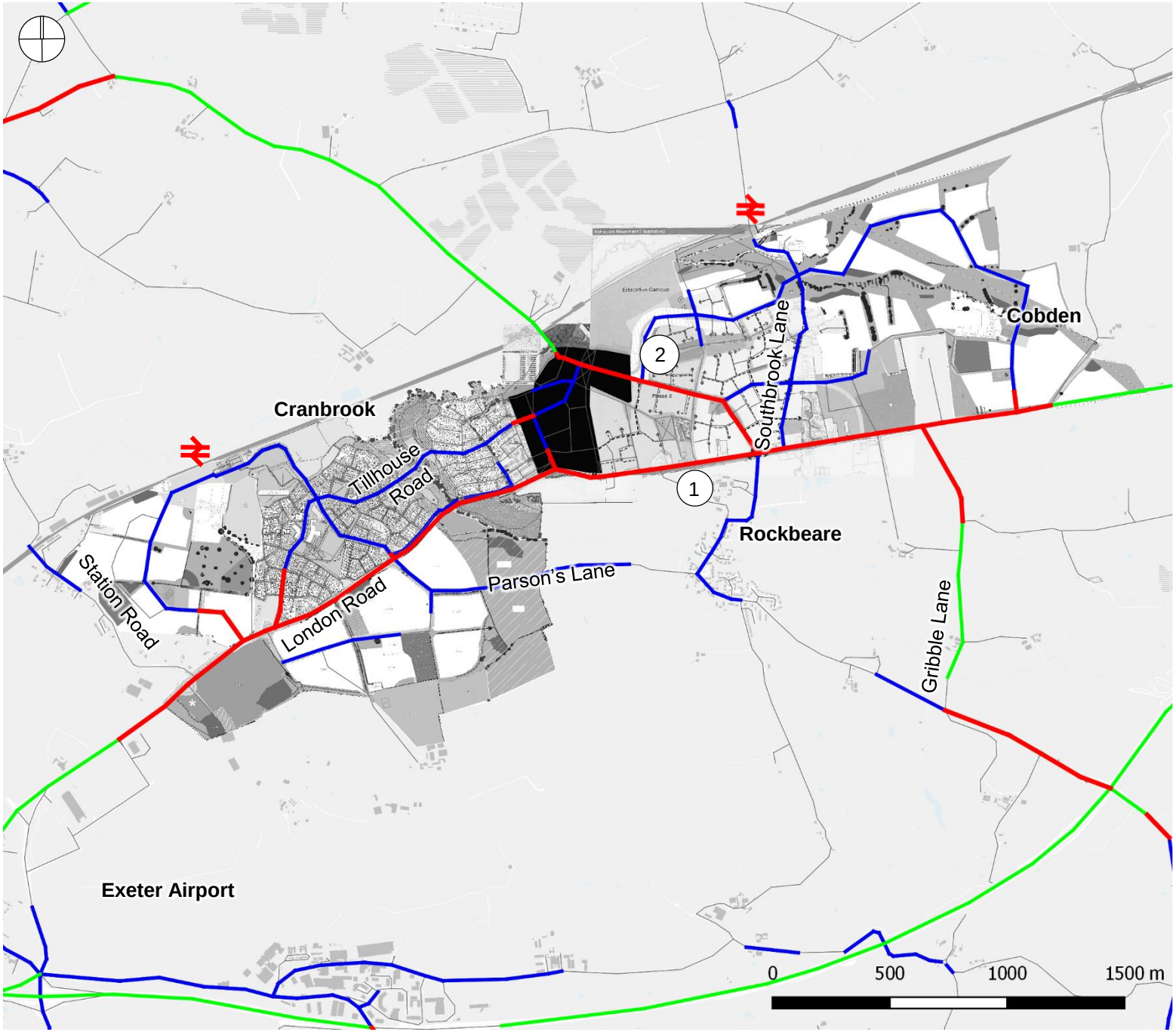

**Savills masterplan strategic model, including only the primary route network of the future existing scenario.**

- Primary routes (future existing and proposed Savills masterplan)


**NCP masterplan detailed model, including an assumed secondary network for the NCP expansion areas, highlighted in red.**

- Primary routes (future existing and proposed NCP masterplan)
- Future existing and proposed secondary routes
- Phase 3-4 & town centre proposed secondary routes
- NCP expansion areas assumed secondary network

# NCP masterplan Multi-scale spatial accessibility




London Road is consistently highlighted as a highly accessible route at both scales of movement (1).

With the extension of Cranbrook to the east, the diagonal north-south route (2) also becomes part of the multi-scale network of streets that can support town centre development.

However, the designated town centre land uses are not located at these highly accessible locations in the masterplan.

The connection between the new station and the town centre is indirect and illegible.

Town centre

Railway station

**Primary route**

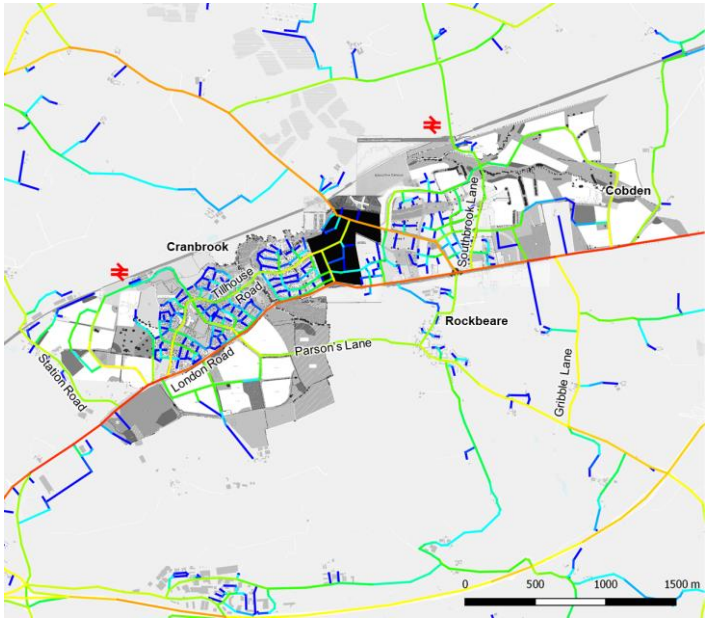
Regional and local

Regional

Local

NACh10km > 1.2 , NACh2,000m > 1.2

# NCP masterplan Regional and local spatial accessibility




**Regional spatial accessibility**


**Local spatial accessibility**

Overall, the route structure of the proposed NCP expansion areas is fragmented and does not directly connect to the town centre.

More direct and continuous connections between the NCP expansion areas and the town centre, as well as London Road and other settlements in the vicinity, would help create a more legible network.

Town centre

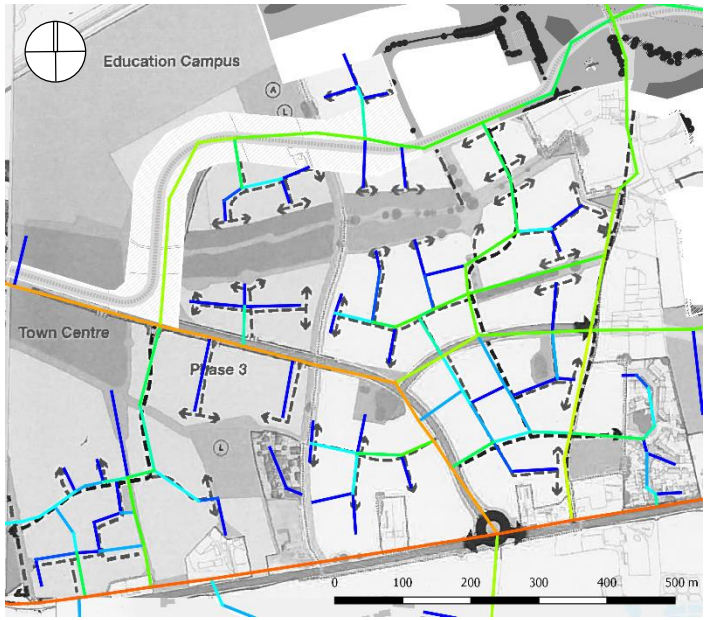
Railway station

**Spatial accessibility**

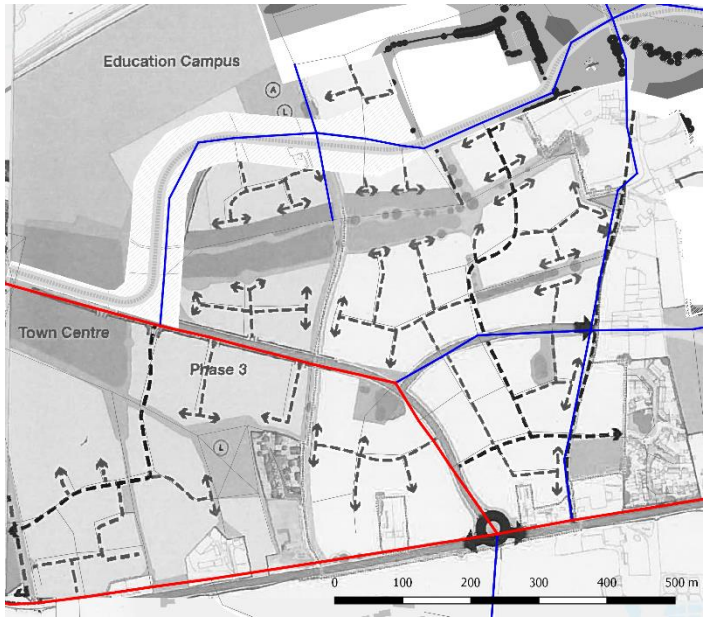
high

low

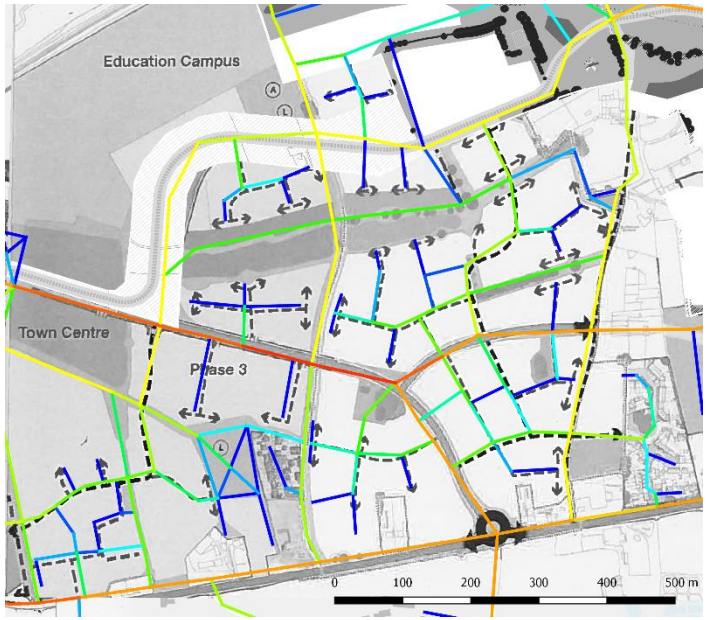
# NCP masterplan Spatial accessibility Phase 3-4




**Regional spatial accessibility**




**Multi-scale spatial accessibility**




**Local spatial accessibility**

Railway station

**Spatial accessibility**

high

low

**Primary route**

Regional and local

Regional

Local

Phase 3-4 of the NCP masterplan are designated as mainly residential areas.

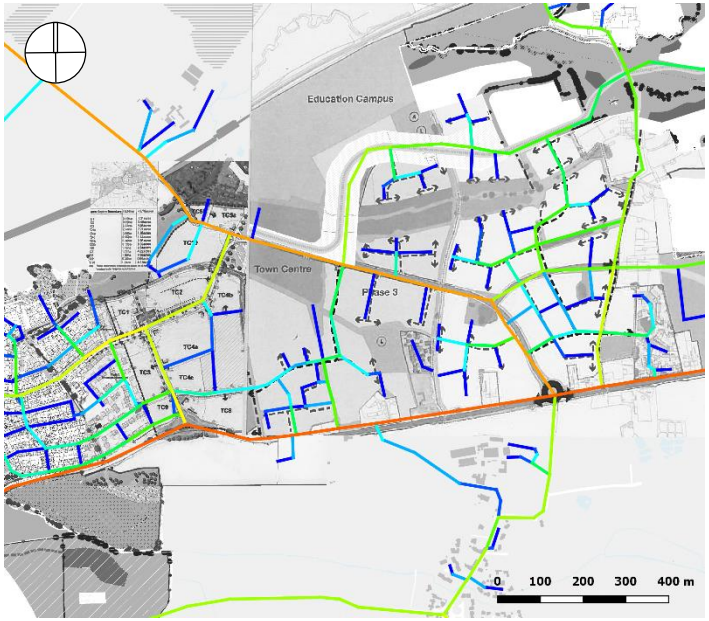
As identified in the previous analysis the highly accessible diagonal route through Phase 3 has the spatial conditions to support active land uses at ground level as well as intense levels of other land uses including residential.

Therefore, the design of the ground level development along this route should allow flexibility in terms of programme.

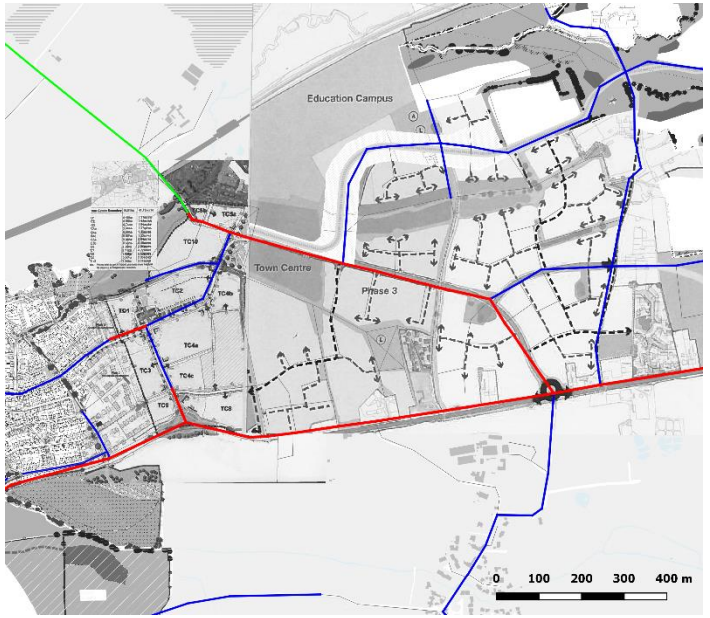
Internally, the secondary route network of Phase 3-4 is fragmented and has a high number of dead-ends.

There is limited connectivity between Phase 3 and 4 as well as between these and the town centre.

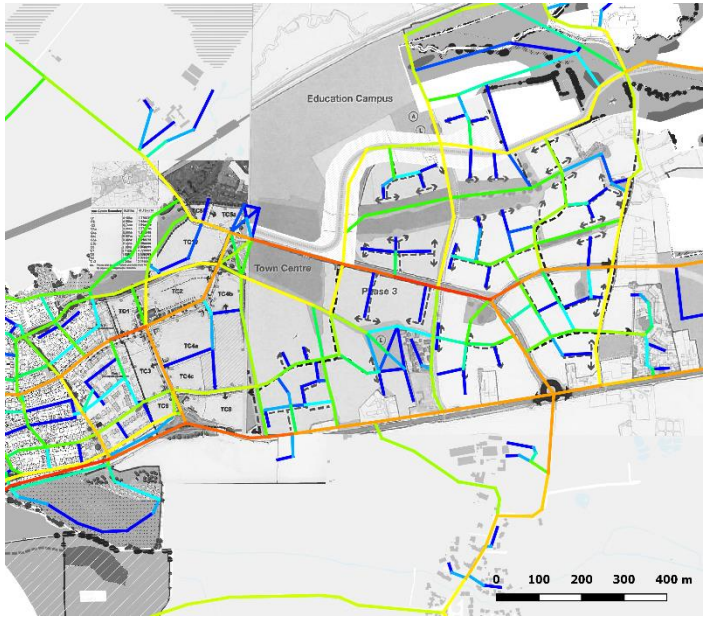
# NCP masterplan Spatial accessibility Town Centre layout




**Regional spatial accessibility**




**Multi-scale spatial accessibility**




**Local spatial accessibility**

Railway station

**Spatial accessibility**

high

low

**Primary route**

Regional and local

Regional

Local

The location of the designated town centre block is problematic and its land uses are not located along the most highly accessible locations.

With the exception of the connection to London Road, which has multi-scale accessibility, the highly accessible London Road and the diagonal route currently by-pass the designated town centre block.

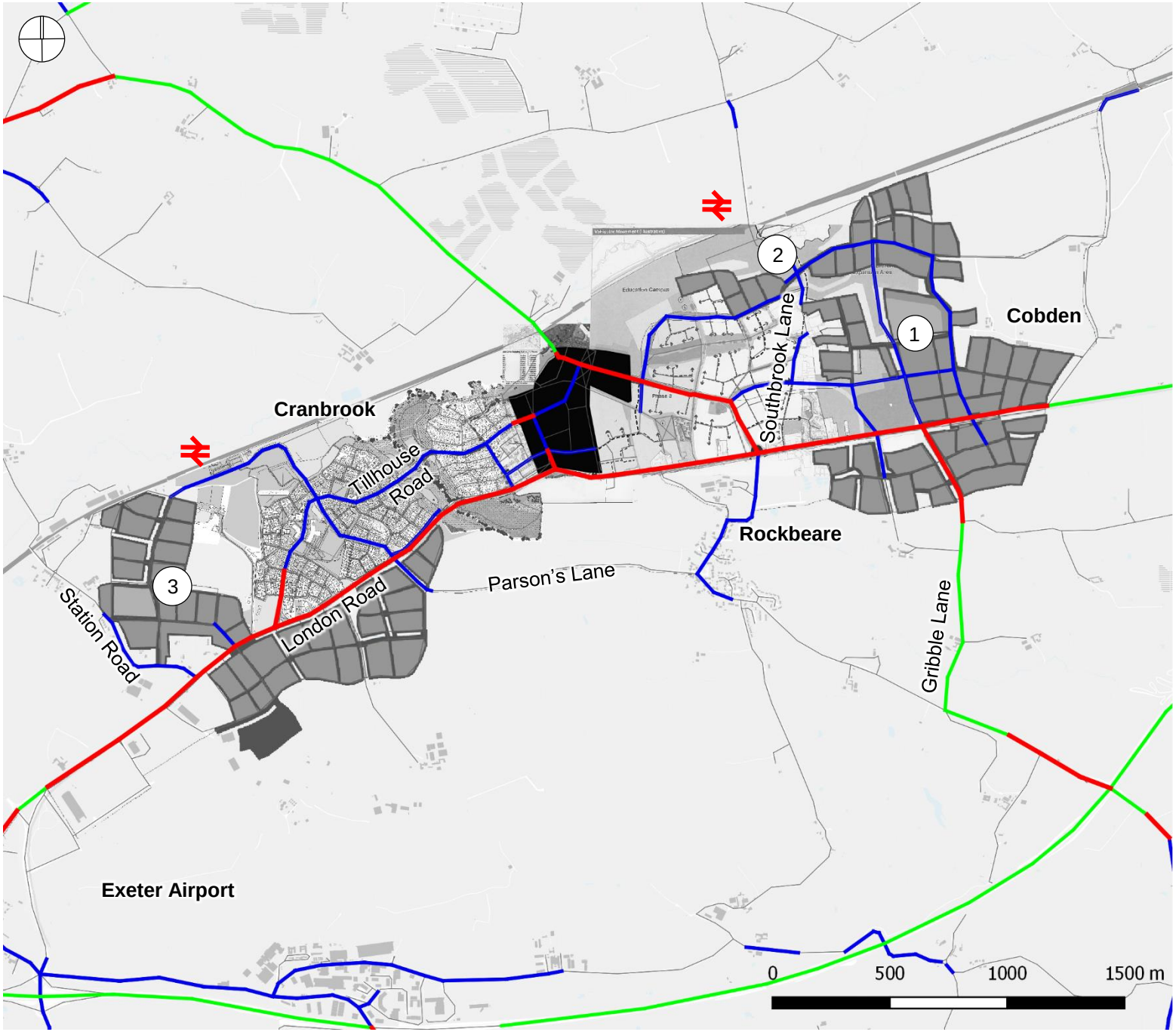
The eastern end of Tillhouse Road has good accessibility levels at the local scale only and the town centre internal routes are segregated.

It is recommended that town centre retail uses that rely more on passing footfall are located along the highly accessible diagonal route. Other town centre land uses, for example the youth and children's centres, the library and the health and well-being centre can be located along the locally accessible routes of the designated town centre.

It is important to encourage movement from London Road to the town centre. Gateways to the masterplan need careful design to enable this to happen.

Connectivity to the station and the proposed development, particularly to the east should also be enhanced by providing as direct and continuous connections as possible.

# Savills masterplan revised Multi-scale spatial accessibility




The Refined Savills masterplan revised creates a more legible grid-like internal route structure in the expansion areas.

The realignment of the north-south connection (1) in the eastern expansion area creates a strong local route and improves overall connectivity of the expansion area, including the east-west connection to the north (2). A more continuous internal route structure between the different parts of the expansion area starts emerging.

The local centre to the west (3) is isolated. Links to the existing Cranbrook route structure across the open space could help improve that.

Town centre

Railway station

**Primary route**

Regional and local

Regional

Local

NACh10km > 1.2 , NACh2,000m > 1.2

# Savills masterplan revised Regional and local spatial accessibility


**Regional spatial accessibility**


**Local spatial accessibility**

Town centre

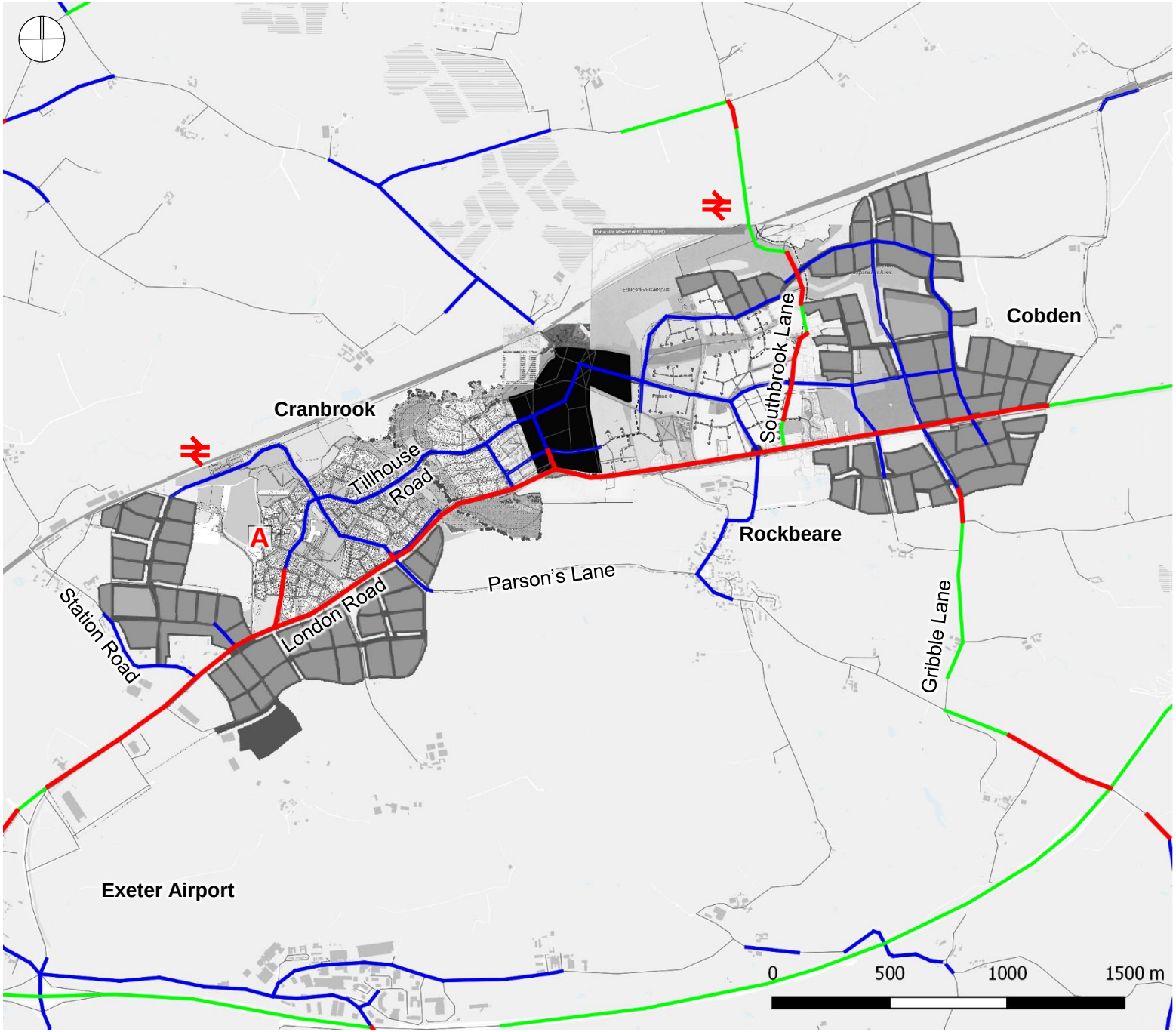
Railway station

**Spatial accessibility**

high

low

# Savills masterplan revised - Crannaford crossing closed off **Multi-scale spatial accessibility**




Closing off the Crannaford crossing significantly reduces spatial accessibility along the diagonal, which becomes important only at the local scale. This reduces the potential of the diagonal to support footfall dependent town centre uses.

Southbrook Lane becomes part of the multi-scale network of streets that can support town centre development. However moving the town centre to this location is not recommended as it is to the east of the development and a minimum of 15min walk from approximately a quarter of the residential units (A).

Town centre

Railway station

**Primary route**

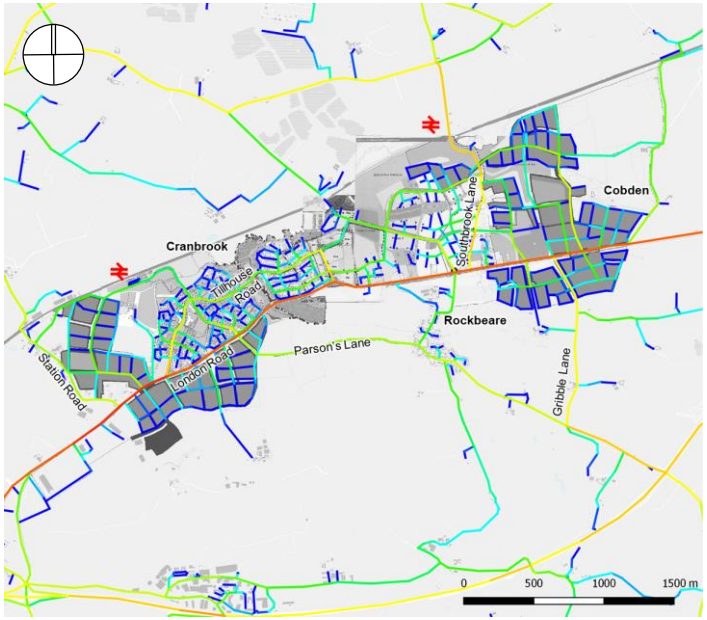
Regional and local

Regional

Local

NACh10km > 1.2 , NACh2,000m > 1.2

# Savills masterplan revised - Crannaford crossing closed off Regional and local accessibility




**Regional spatial accessibility**


**Local spatial accessibility**

Town centre

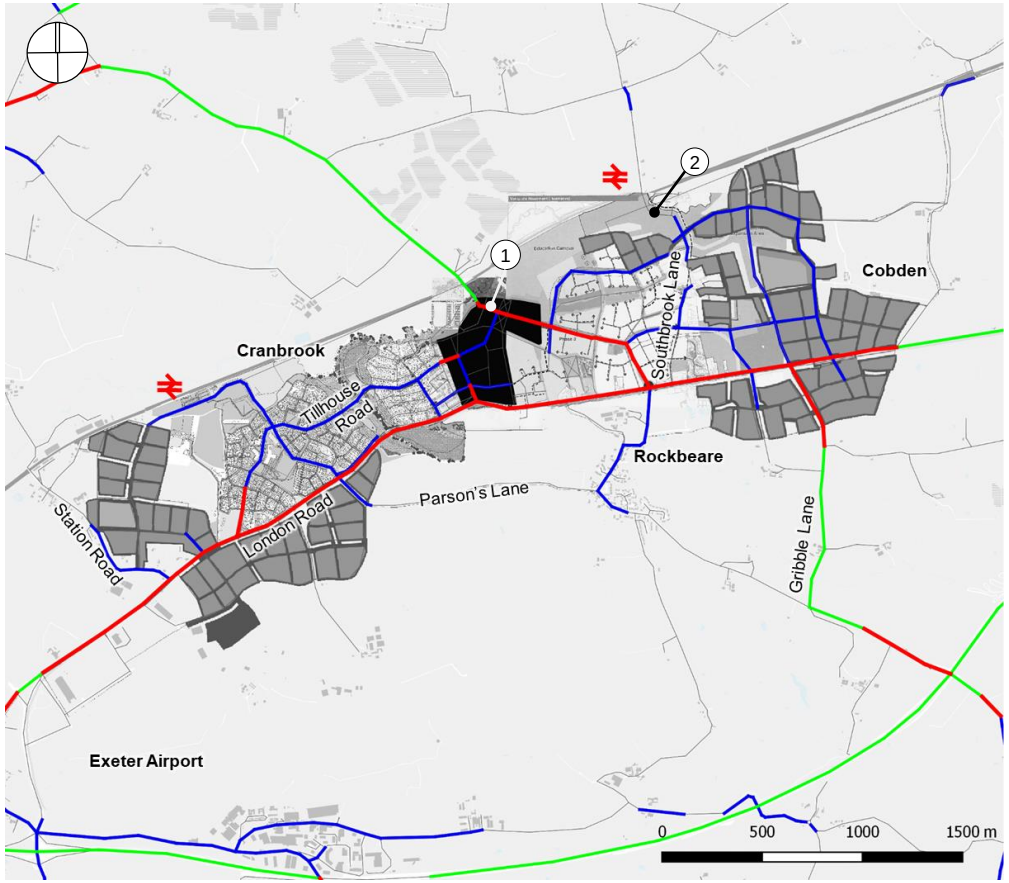
Railway station

**Spatial accessibility**

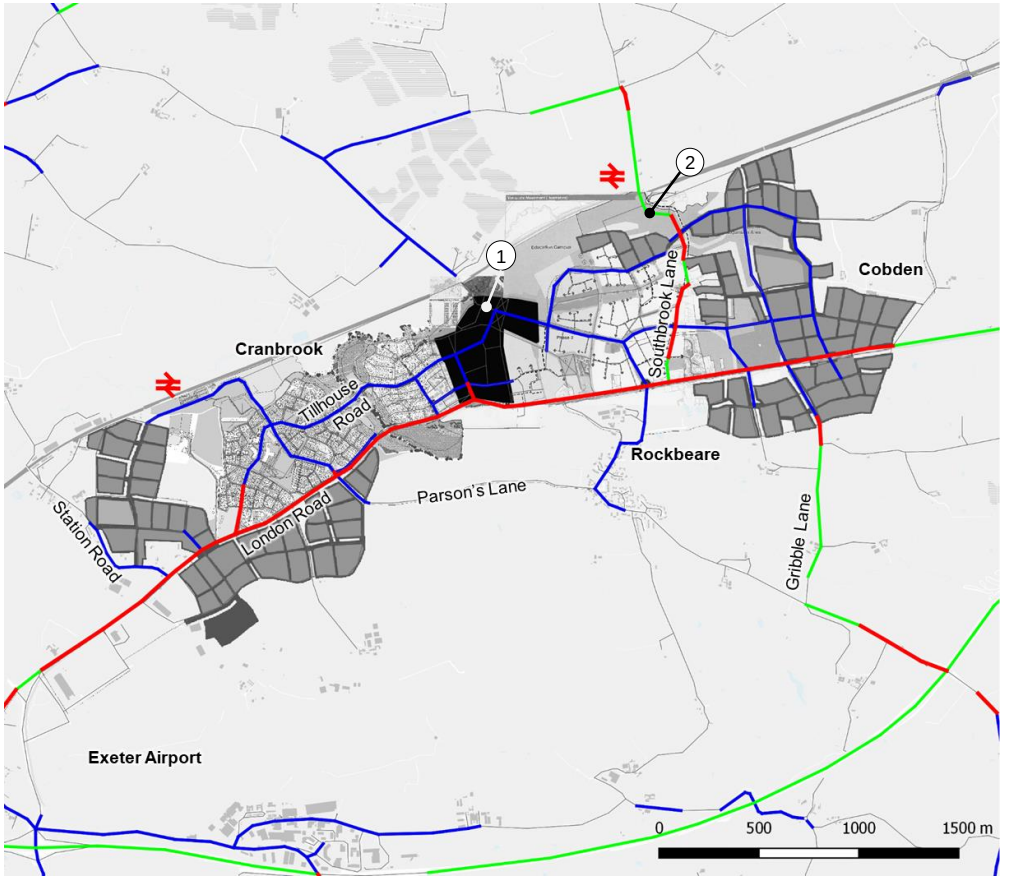
high

low

# Savills masterplan revised Comparison Multi-scale spatial accessibility




**With Crannaford Crossing**




**Without Crannaford Crossing**

Closing off Crannaford crossing will put pressure on Southbrook Lane at a regional scale and leads to an accessibility increase of 17%. This is likely to increase traffic on Southbrook Lane (2), which is narrower than Crannaford Lane. Furthermore, the accessibility of the Town Center connection (1) reduces by 21% which makes it more difficult to support retail uses.

| | | with Crannaford crossing | | without Crannaford crossing | | % Difference | |
|---|---|---|---|---|---|---|---|
| | | **Local** | **Regional** | **Local** | **Regional** | **Local** | **Regional** |
| **1** | **Crannaford Lane** | 1.230939 | 1.298266 | 1.147534 | 1.030414 | -7% | -21% |
| **2** | **Southbrook Lane** | 1.109842 | 1.059658 | 1.112989 | 1.240509 | 0% | 17% |

Town centre

Railway station

**Primary route**

Regional and local

Regional

Local

# Design guidelines and Recommendations

# Design guidelines

This section sets out some design guidelines to develop the primary network into a more detailed masterplan proposal.

Design guidelines have been structured according to the following five themes, ordered according to scale:

**Location**
What are the key features (centres, uses etc) in the wider context?

**Linkage**
What are the key macro scale links to connect with/to?

**Layout**
How should the spatial network respond, how should a secondary and tertiary network be developed, what level of permeability is suitable?

**Land use**
Where should retail or commercial uses be located, which location offers the most advantages for public transport, where should higher densities be positioned?

**Landscape (and Public Realm)**
What should the character of spaces be, how should transport modes be accommodated, what should the interface be between public and private?

Design guidelines are given to provide general direction as to how a proposal should develop. As such, general principles have been illustrated in this section until the primary network is developed around the constraints on site.

As a result of the existing constraints and level of detail in proposals, the categories of Location and Linkage have been addressed through the option testing of the primary network.

# Design guidelines Layout

**Create a clear hierarchy of streets**
Some spaces will be more accessible at regional/citywide scales, some at local scales. It is important to create a range of accessibility values to create a clear hierarchy. This will make the area easier to navigate and accommodate different levels of activity and use.

The small selection of streets that are very accessible at both local and city-wide scales (multi-scale) should be the centres of a development.

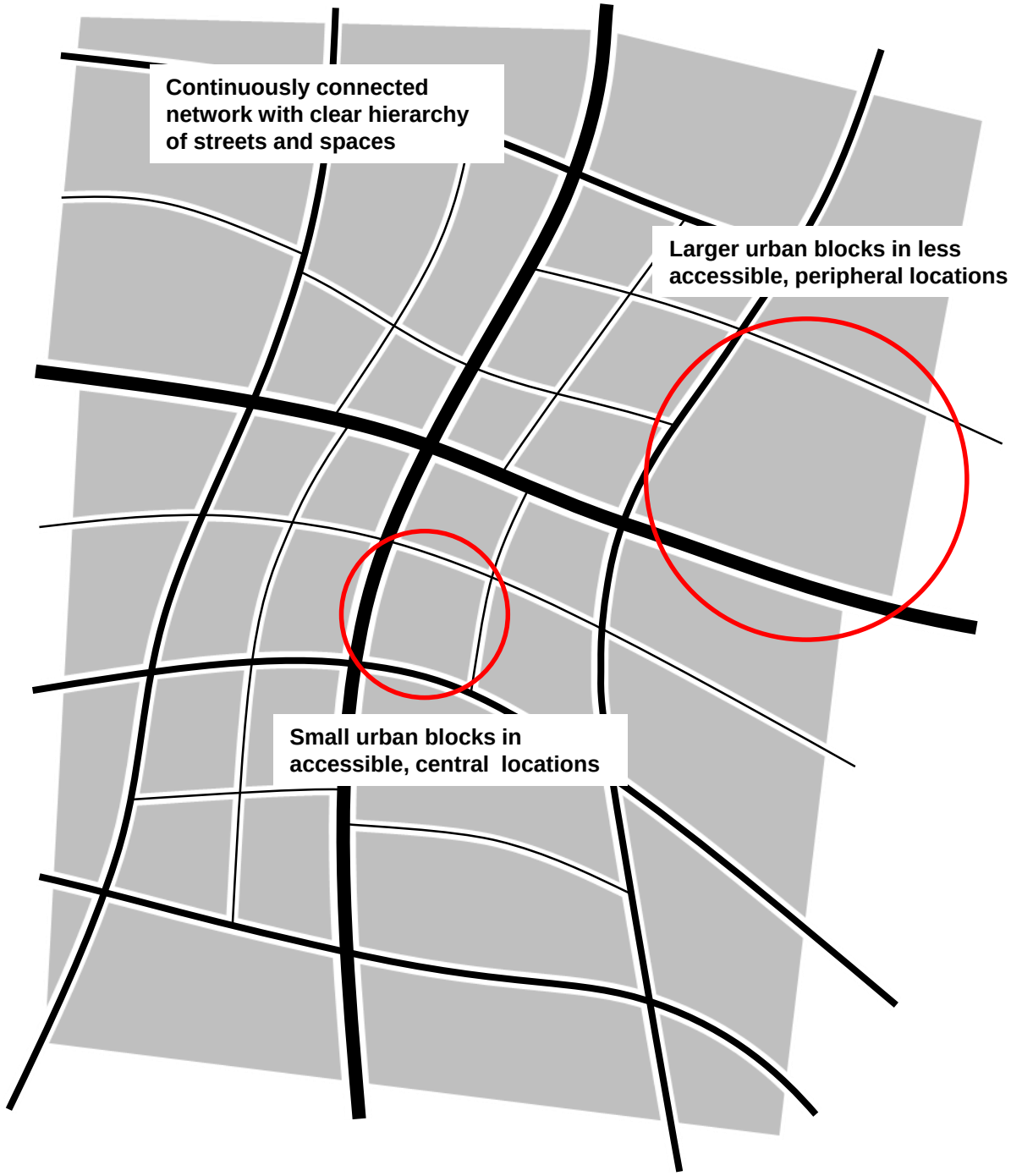
**Create a legible network of streets**
Develop a secondary and tertiary network that is continuously connected.

This doesn't mean that all streets should be straight lines, but legibility from a user perspective will be improved if it is possible to see the next decision point, or junction, from each location.

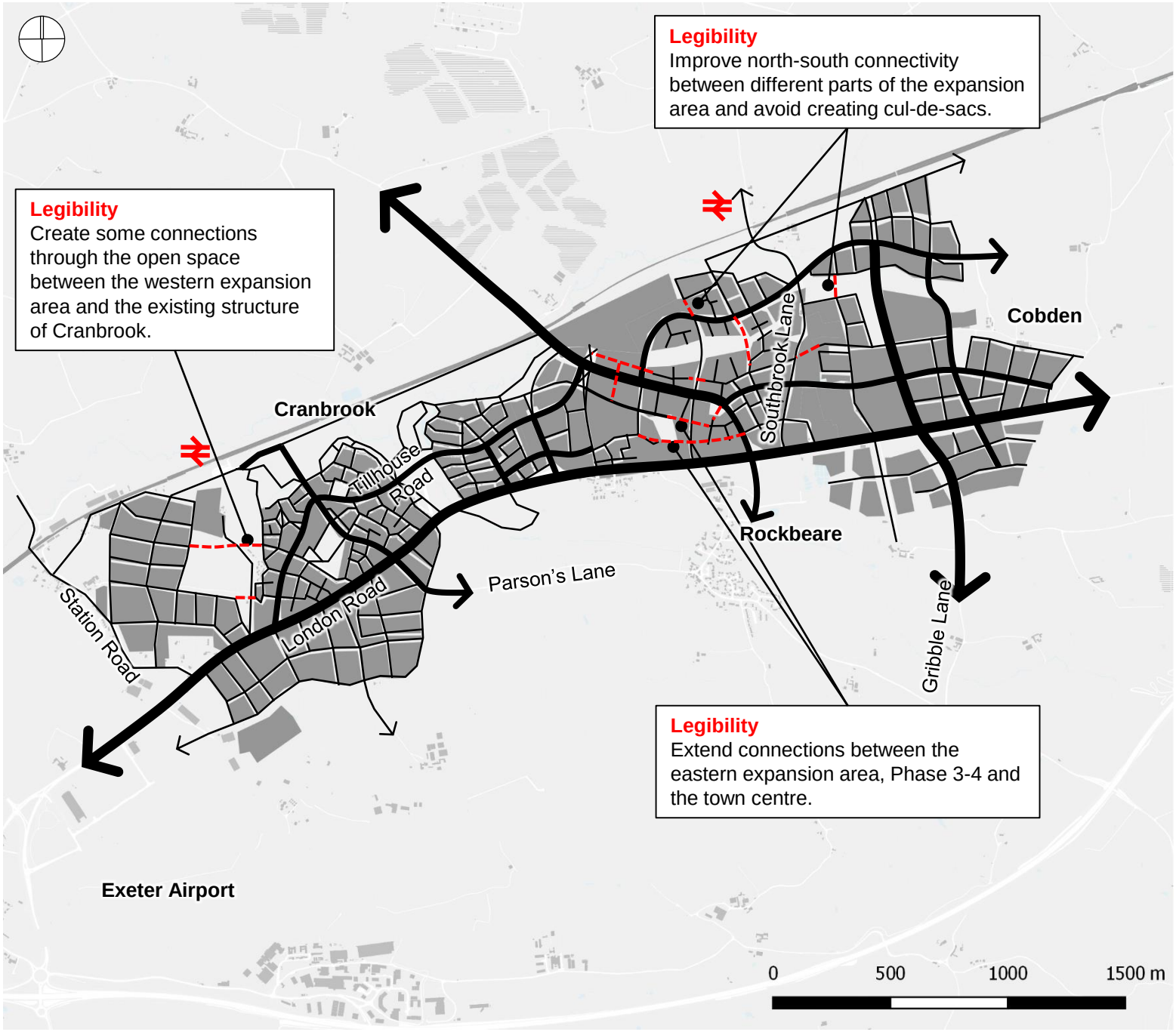
**Match permeability to accessibility**
Central areas with active uses tend to have a finer urban grain providing more permeability. Residential areas, by contrast, are typically less permeable as they will accommodate less movement.

Smaller urban blocks (250-400metres perimeter) should only be placed in more accessible locations suitable for centres.

Larger urban blocks (up to around 1km perimeter) should only be placed in less accessible locations outside of centres.



# Recommendations Layout Savills masterplan revised



# Recommendations Layout Savills masterplan revised


The analysis highlights the appropriate permeability levels based on the multi-scale accessibility.

**Permeability**

High
Smaller blocks
240-400metres perimeter
3-5 minute walk

Low
Larger blocks
800-1200metres perimeter
10-15-minute walk

# Design guidelines Land use

**Match land use to accessibility**
Town centre land uses (especially retail) require exposure to footfall. They should therefore be located in the places with multi-scale accessibility (high citywide and local accessibility).

Public transport stations and stops should be in spaces that are highly accessible at the citywide scale. This will enable them to be reached by a wider set of users.

Social infrastructure that serves the local population, such as schools, should be located in places which have high local scale accessibility.

**Match density to accessibility**
Higher densities should be located in areas which are more accessible at the city scale. This will enable them to be accessed more easily from a wider area and place less pressure on the local network.

| Multi-scale accessibility | Route hierarchy | Urban blocks | Land use/Density/Frontage |
|---|---|---|---|
| | Primary (routes that are important at both regional and local scales) | Smaller blocks 240-400metres perimeter 3-5 minute walk | Town centre uses Retail (mixed) Commercial Public transport Public space Residential (higher density) |
| | Secondary (Routes that are important at local scale only | | Social infrastructure Retail (convenience) Residential (medium density) |
| | Tertiary (Routes that are not important at any scale) | Larger blocks 800-1200metres perimeter 10-15-minute walk | Residential (lower density) |
| | Regional connections (non-urban routes) | | |

# Design Guidelines Landscape and public realm

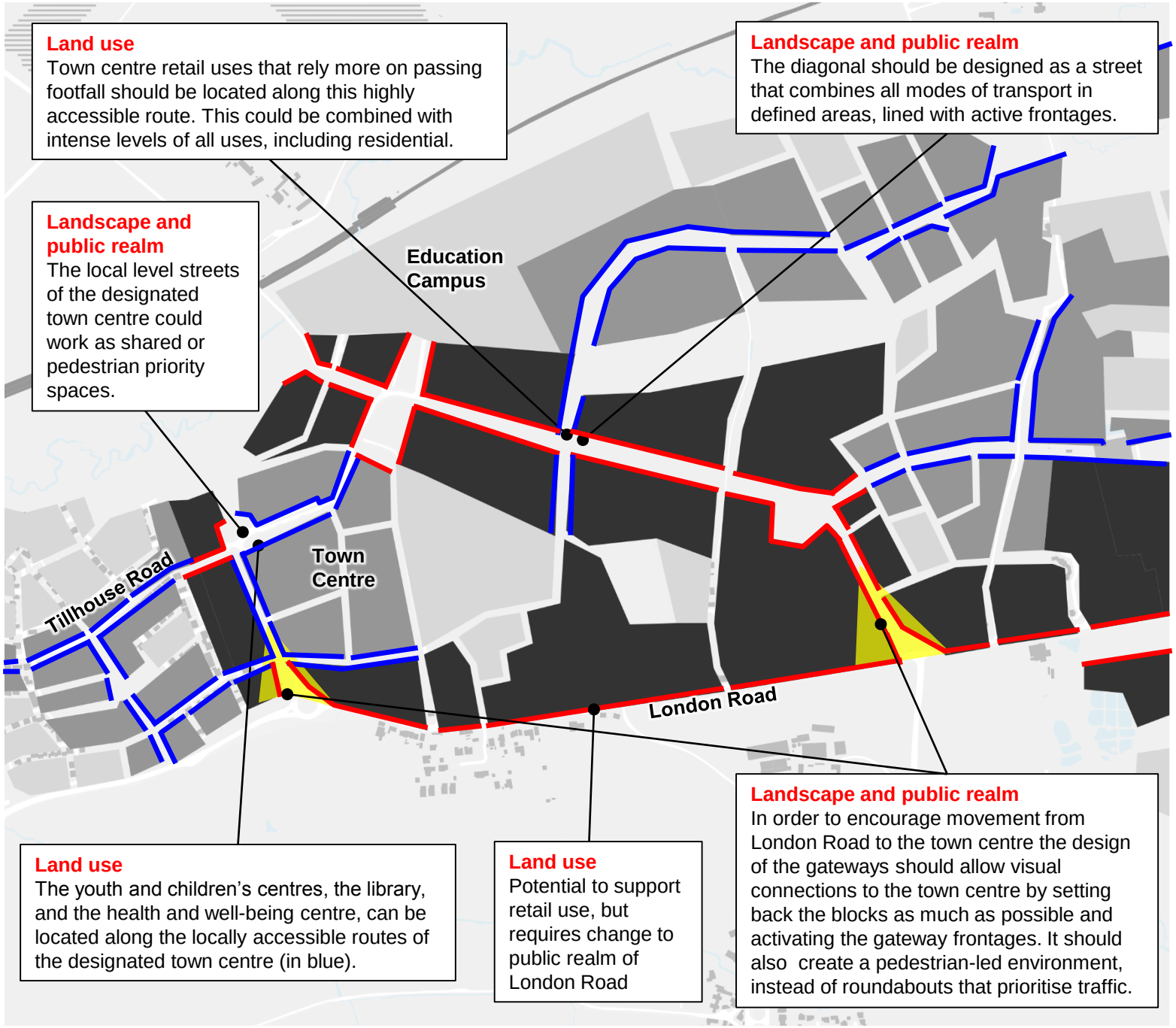
**Create active public spaces**
Public spaces are occupied and used more when they are located in highly accessible locations where at least one desire line passes or crosses the space.

**Mix modes of transport in the same streets**
Segregating movement networks reduces the number of people in a street. Even people in vehicles provide a level of natural surveillance.

The key to mixing modes in the same space is to manage the interfaces between them. In streets which are very accessible at the citywide scale it may be suitable to segregate cyclists from vehicles. Streets with high multi-scale accessibility should combine all modes in defined areas, while local level streets could work as shared space.

**Use active frontages and building entrances to create natural surveillance**
Increasing the number of entrances and windows directly overlooking the street will increase the amount of 'eyes on the streets' and natural surveillance. Natural surveillance increases the feeling of safety and deters crime because it provides a risk factor for the criminal to be seen. Unused parking garages and high opaque fences should be avoided. Commercial and retail frontages, in particular, specifically will only work if they are located in spaces which are highly accessible.


# Recommendations Land use, landscape and public realm Savills masterplan revised




Gateway

**Land use/Density/Frontage**

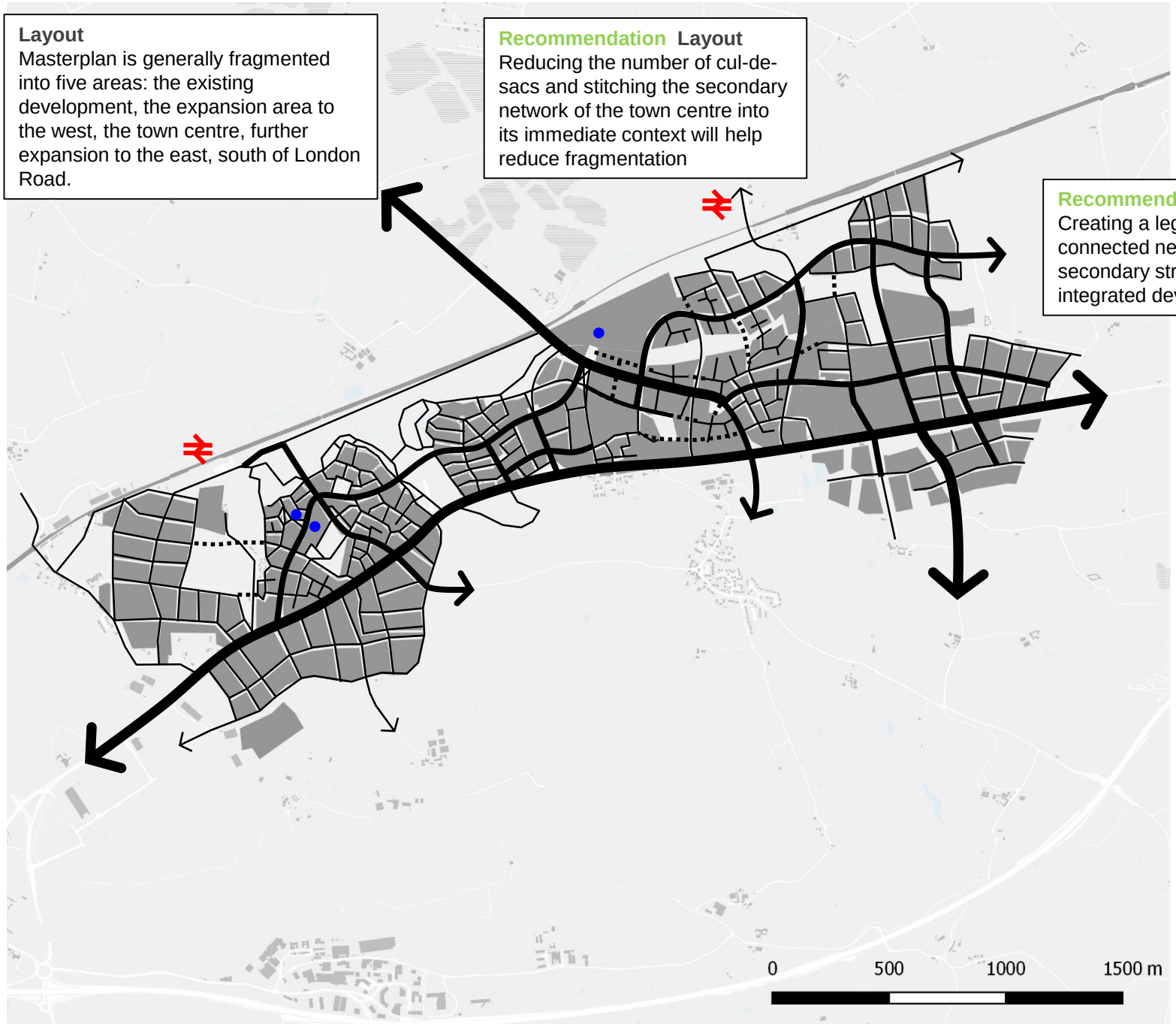
- Town centre uses
  Retail (mixed)
  Commercial
  Public transport
  Public space
  Residential
  (higher density)
- Social infrastructure
  Retail (convenience)
  Residential
  (medium density)
- Residential
  (lower density)

# Recommendations Savills masterplan revised Layout

**Layout**
Masterplan is generally fragmented into five areas: the existing development, the expansion area to the west, the town centre, further expansion to the east, south of London Road.

**Recommendation Layout**
Reducing the number of cul-de-sacs and stitching the secondary network of the town centre into its immediate context will help reduce fragmentation

**Recommendation Layout**
Creating a legible and continuously connected network of streets adds secondary structure and creates more integrated development




Existing educational and community facilities

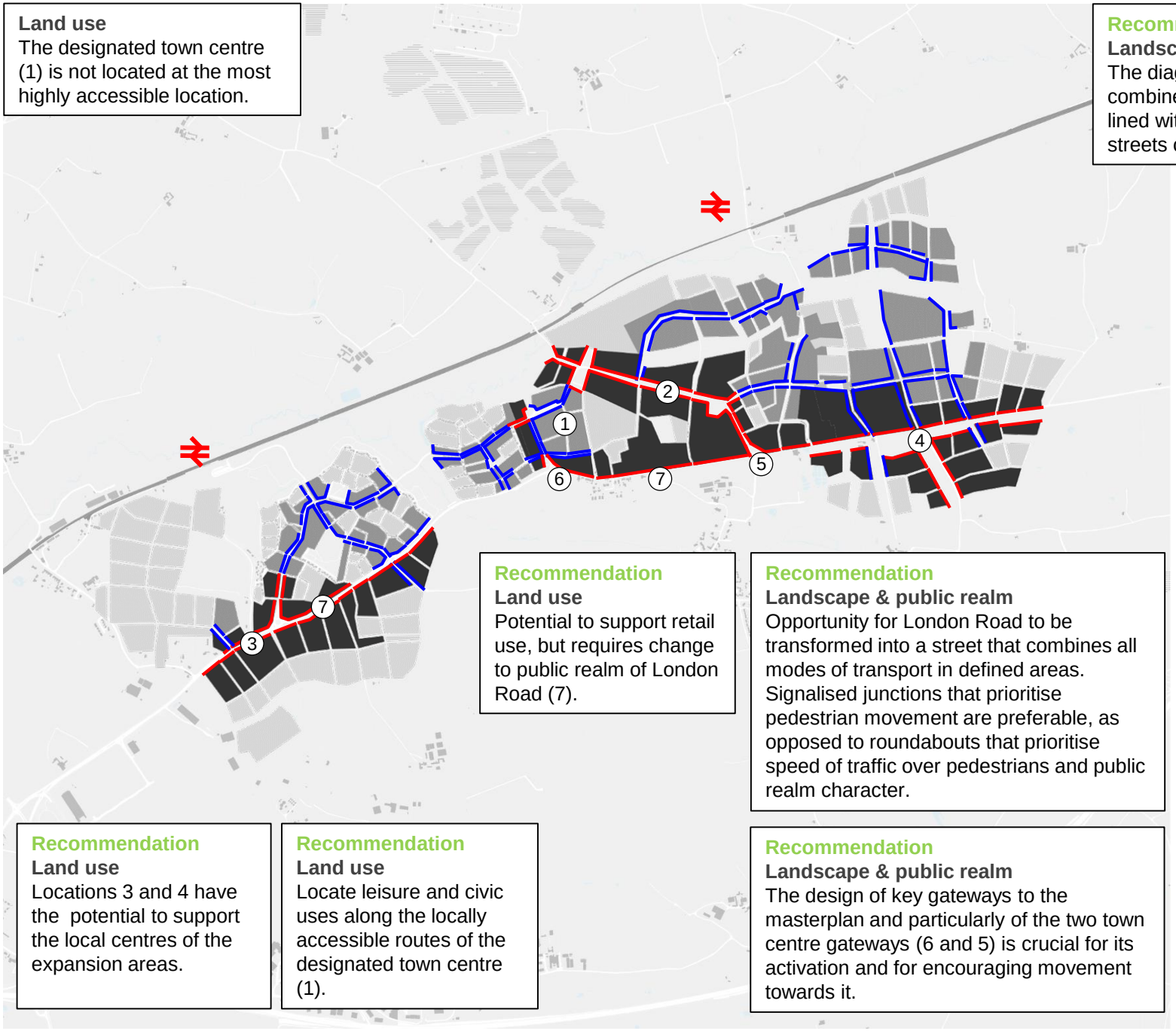
Recommended links

Proposed route network hierarchy

# Recommendations Savills masterplan revised Land use and landscape

**Land use**
The designated town centre (1) is not located at the most highly accessible location.

**Recommendation**
**Landscape & public realm**
The diagonal should be designed as a street that combines all modes of transport in defined areas, lined with active frontages, while other local level streets could work as shared spaces.




**Recommendation**
**Land use**
Potential to support retail use, but requires change to public realm of London Road (7).

**Recommendation**
**Landscape & public realm**
Opportunity for London Road to be transformed into a street that combines all modes of transport in defined areas. Signalised junctions that prioritise pedestrian movement are preferable, as opposed to roundabouts that prioritise speed of traffic over pedestrians and public realm character.

**Recommendation**
**Land use**
Locations 3 and 4 have the potential to support the local centres of the expansion areas.

**Recommendation**
**Land use**
Locate leisure and civic uses along the locally accessible routes of the designated town centre (1).

**Recommendation**
**Landscape & public realm**
The design of key gateways to the masterplan and particularly of the two town centre gateways (6 and 5) is crucial for its activation and for encouraging movement towards it.

**Land use/Density/ Frontage**

- Town centre uses
  Retail (mixed)
  Commercial
  Public transport
  Public space
  Residential
  (higher density)
- Social infrastructure
  Retail (convenience)
  Residential
  (medium density)
- Residential
  (lower density)

# Appendices

Methodology

Detailed analysis

# Space Syntax analysis

**Overview**
Over the last twenty years, Space Syntax has pioneered a unique, space-based approach to the modelling of human activity patterns in buildings and urban systems. Our models integrate multiple influences on behaviour, including:

a) spatial layout hierarchy, from more accessible to less accessible places

b) the distribution of object attractors and land uses

c) the location of transport nodes.

Space Syntax models simultaneously analyse pedestrian, cycle and vehicle movement networks and have been applied in planning and design projects worldwide. Applications include the creation and evaluation of proposals for urban and architectural change at every scale, from regional urban analysis and the planning of entire cities to the design of street intersections and room layouts.

Space Syntax's approach combines this extensive global experience with robust and continuously developing technologies to forecast the effects of planning and design decisions on the movement and interaction of people in buildings and urban areas. Highly graphic and capable of providing rapid feedback to planners and designers, models are used to test proposals from concept design through to delivery.

**Spatial accessibility modelling**
The approach works by transforming the street pattern of an area, or room layout of a building, into a network "graph". In urban systems, the road centreline map of the area is often used as a starting point, where the network is divided into individual "segments" of space, each segment being the street or path between two intersections. In buildings or convex open spaces, the network will typically be divided into individual "tiles" of space within each space.

Each segment or tile is then evaluated using a mathematical algorithm to calculate its interaccessibility within the network, ie how relatively easy or difficult it is to reach that segment from all other segments, or how likely it is that movement between different parts of the network is likely to pass along that segment. In this way, the software calculates both the "to movement" and the "through movement" characteristics of each segment.

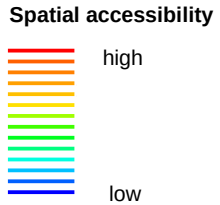
**Key feature 1: analysis of "angular movement"**
Key to the success of this approach is the discovery that movement in buildings and cities often follows a "least angle" path between origins and destinations. In other words, many people minimise the angular deviation from their origin to their destination, even if this means they sometimes take a slightly longer route.

**Key feature 2: evaluation of multi-scale activity**
A second key aspect of the Space Syntax approach is the multi-scale analysis of spatial layouts, allowing short- and long-distance journeys to be simultaneously evaluated and showing how different parts of the same network are differently used, depending on the scale of journey. Frequently, the same parts of the network are used on short- and long-distance journeys. Land use analysis shows that these multi-scale places are typically successful commercial locations, thus demonstrating the importance of careful spatial layout design in creating multi-scale opportunities for shops to trade to more than one scale of movement.

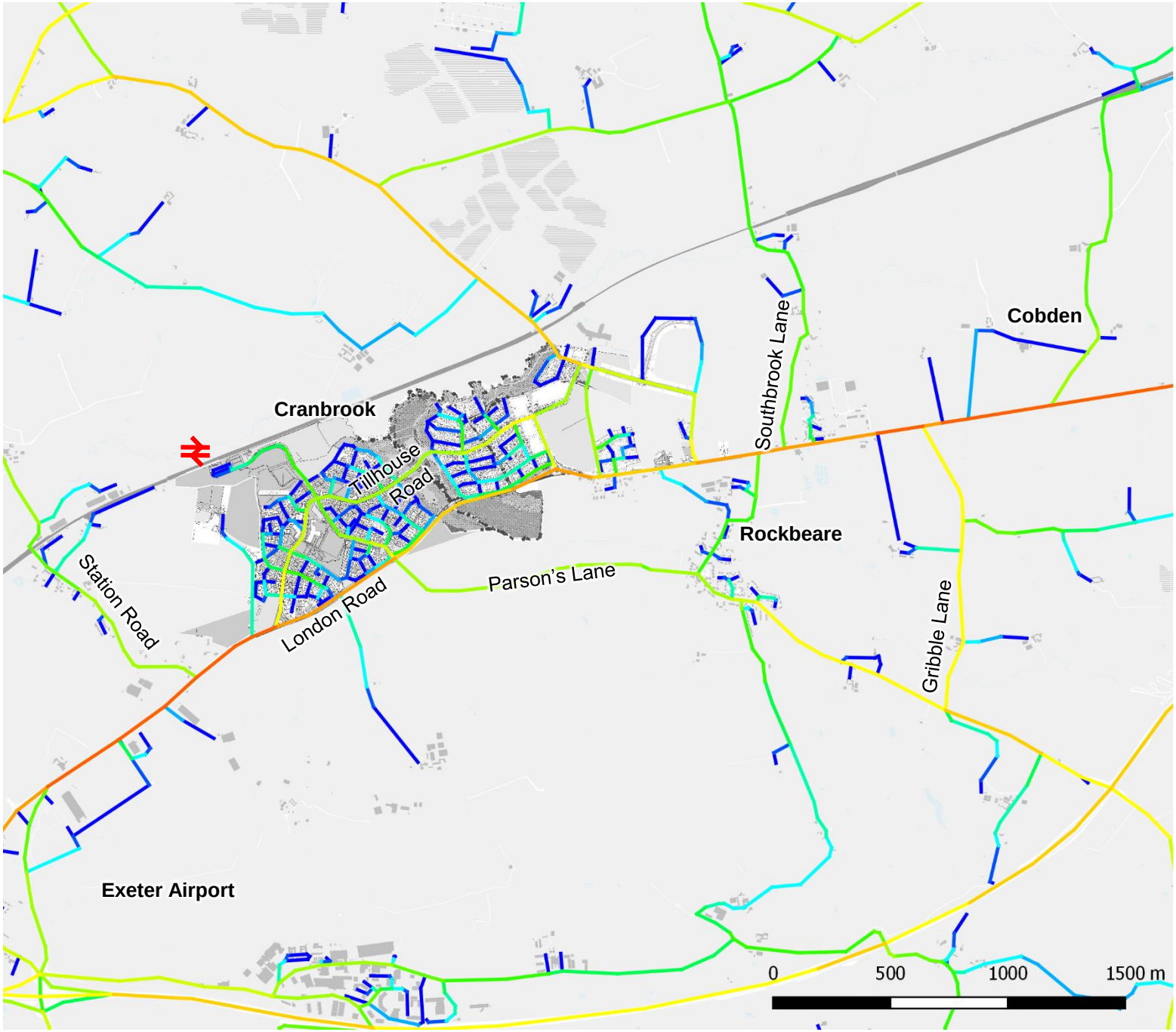
**Key feature 3: integration of spatial layout, land use & transport factors**
The simultaneous analysis of spatial layout, land use and transport factors is a third key factor in the uniqueness and success of Space Syntax models. By demonstrating the fundamental role of space in determining land use potentials, then showing how the specific location of individual land use attractors and transport attractors exploits these potentials or not, Space Syntax models make it possible to integrate the three essential aspects of planning and design: spatial, land use and transport.



**1.** Example of an unprocessed spatial accessibility map
**2.** Example of a processed spatial accessibility map, after values are assigned to each line



# Future existing Regional spatial accessibility




The spatial accessibility analysis highlights the accessibility patterns of the wider area. The red lines show the primary grid structure of the area: London Road and the northern route to Dog Village.

London Road is the main connection between Cranbrook and Exeter. It connects with the A30 motorway to the west, where the Exeter airport is and to the east leading to London. As the analysis suggests, London Road is the most regionally accessible route related mostly to large-scale vehicular movement.

Because the A30 motorway is almost parallel to London Road, the London Road does not have the character of a typical regional link, but is a rather small road approximately seven metres wide.

It has underlying spatial characteristics for urban development in that it can support both regional and local movement, however it will need some upgrading/intervention.

Other connections to nearby settlements include Parson's Lane and Gribble Lane to the south. To the north the route leading to Dog Village is picked up.

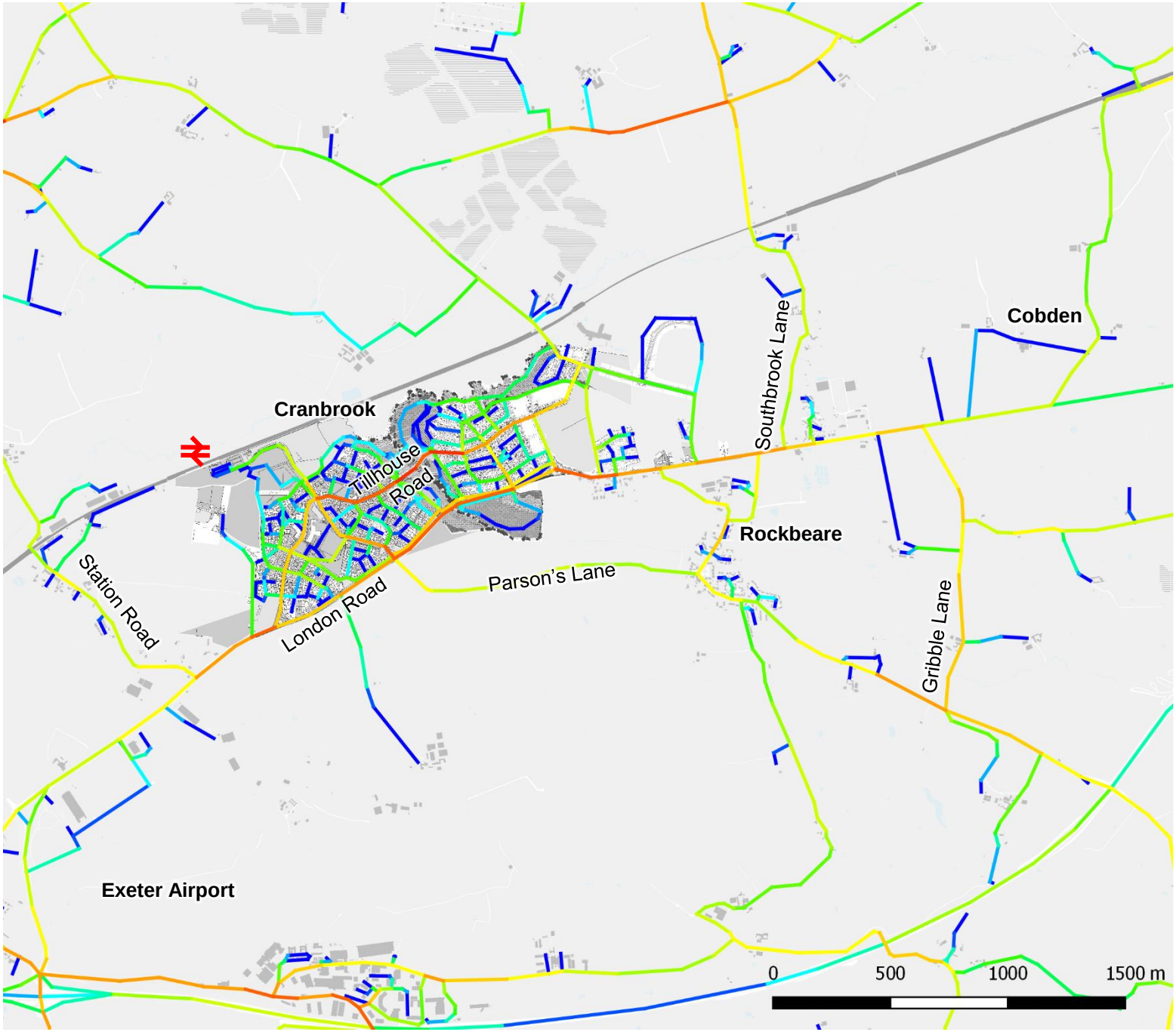
Railway station

**Spatial accessibility**

high

low

# Future existing Local spatial accessibility




At 2,000metres accessibility analysis, the most accessible spaces are London Road and Tillhouse Road.

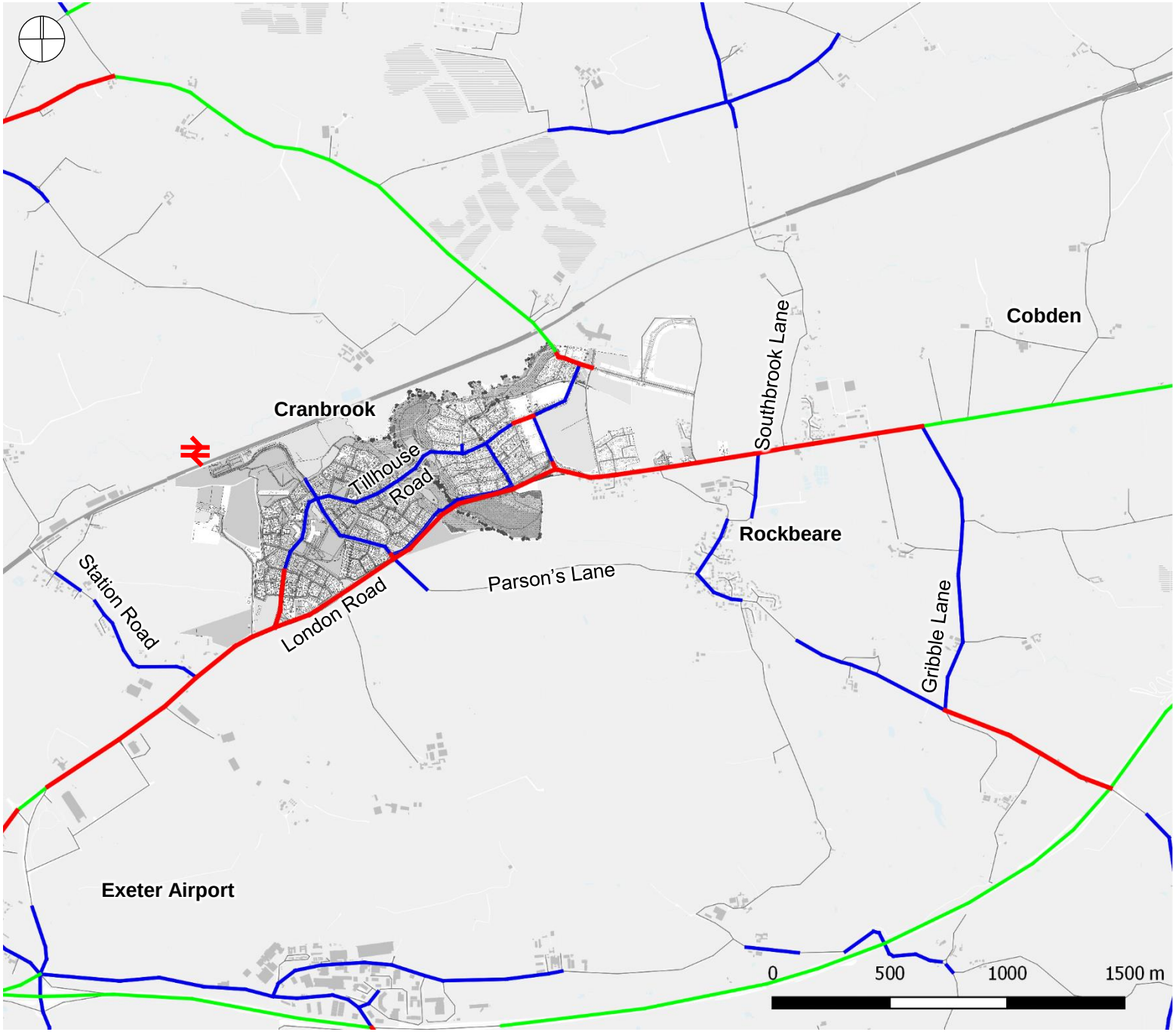
This indicates that there is internal hierarchy and legibility to the development.

**Spatial accessibility**

high

low

# Future existing Multi-scale spatial accessibility




NACh10km > 1.2 , NACh2,000m > 1.2

This analysis identifies the most accessible streets at the regional scale (10km) shown in green, the local scale (2km) shown in blue, and those that appear in both of these groups in red.

Across the UK these streets with "multi-scale" accessibility are found to be high streets and town centres.

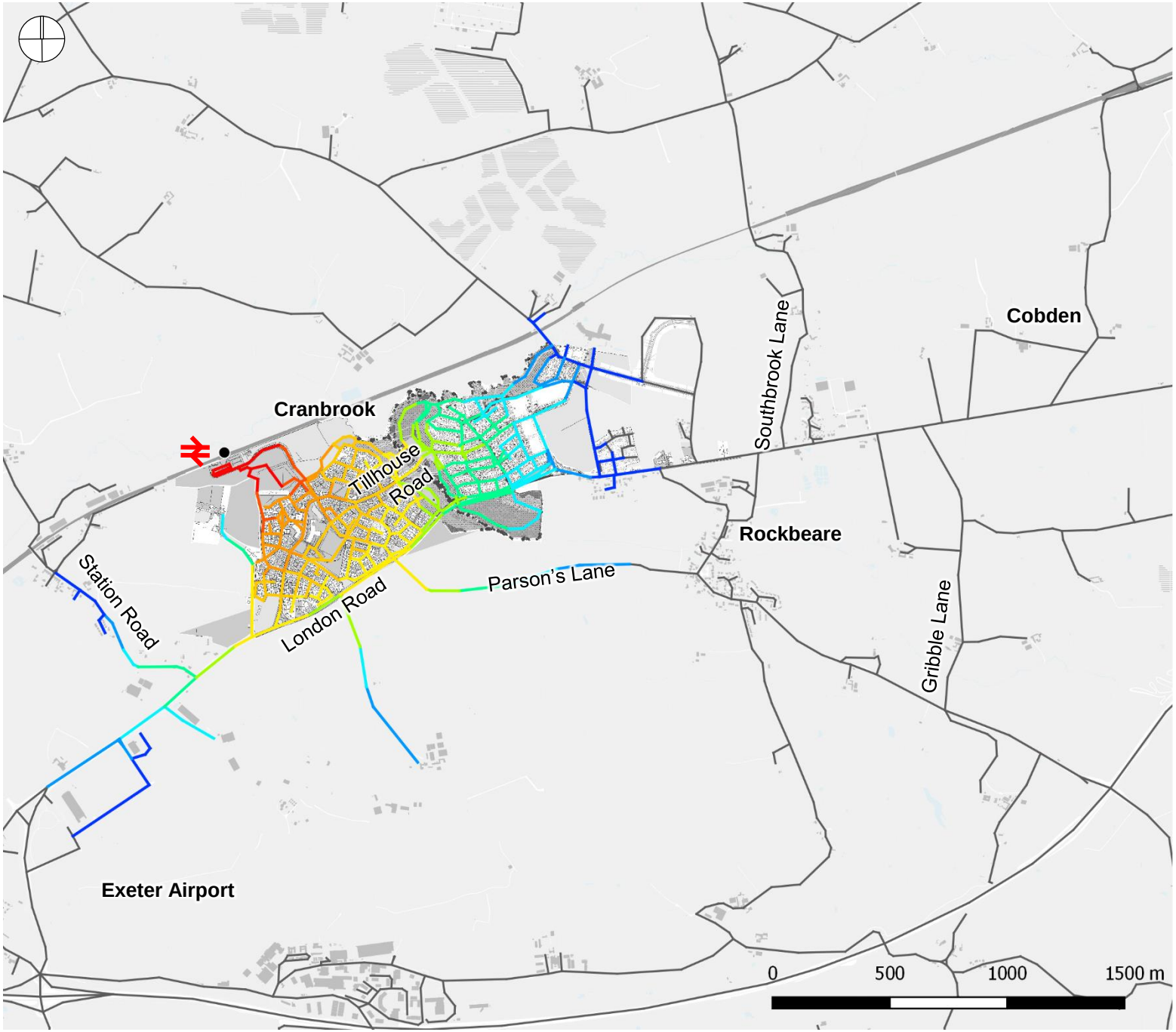
The multi-scale accessibility analysis confirms the importance of London Road.

Within the development a clear structure is formed by Tillhouse Road and the connections back to London Road.

**Primary route**

- Regional and local
- Regional
- Local

# Future existing Access to railway station




The existing station serves the residential population of Cranbrook well, with most households within 15 minutes' walk to the station or less. However, with the extension of Cranbrook towards the east, changes will be required to ensure that the majority of households are close to the train station by walking.

**Metric distance (m) and walking time (min)**

| | |
|---|---|
| 1,200 – 2,000 m | 20-min walk |
| 1,000 – 1,200 m | 15-min walk |
| 800 – 1,000 m | |
| 600 – 800 m | 10-min walk |
| 400 – 600 m | |
| 200 – 400 m | 5-min walk |
| 0 – 200 m | |
| Origin | |

# Savills masterplan Methodology

**Strategic spatial accessibility analysis**

The Savills Masterplan proposes a primary route network without details for the proposed secondary network.

The methodology has been adapted to work with available data. Using the existing model as a base to test options in would not provide an accurate analysis, as results would be skewed towards the areas with a more detailed street network.

Therefore, to test proposals the future existing model has had secondary and tertiary routes removed from it (image top right). This means that it cannot be used for analysis at a local scale (2km). To be able to work around these constraints, an intermediate scale of analysis (5km) is used to represent both regional and local hierarchies.

This adapted model has been used as the base to test the Savills masterplan (image bottom right).

All pedestrian links were removed from the regional scale analysis.

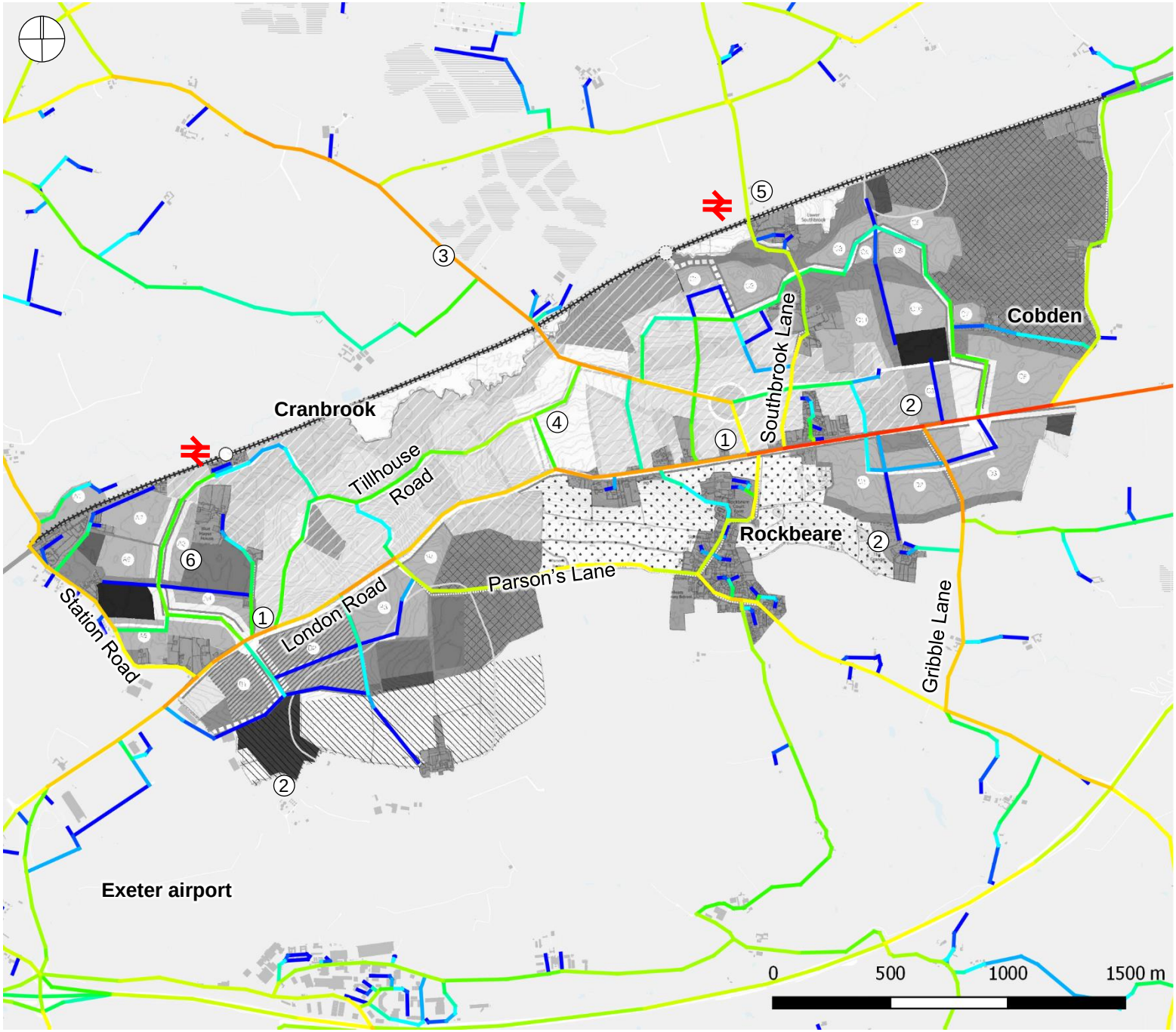
Details of Space Syntax analysis are set out in the Appendix.


**Future existing strategic model**

- Primary multimodal routes (kept)
- Secondary multimodal routes (removed)
- Secondary pedestrian routes (removed)


**Savills masterplan strategic model**

- Multimodal routes
- Pedestrian routes




The accessibility analysis highlights the significance of London Road.

Parson's Lane, Gribble Lane and the northern route to Dog Village are strong, however, the potential to inform development is not used. Connections should be made as direct as possible (1), avoiding staggered junctions.

There are further potentials to add additional north-south links that connect Cranbrook with smaller settlements in the vicinity. These links are currently missing or broken (2).

Typically 90% of retail land uses is located along the top 10% of the most spatially accessible streets. While the north-south route that traverses Cranbrook (3) and the London Road are likely to be the most prominent regional links, they bypass the designated town centre. The orientation of the town centre is introverted and the highly integrated routes pass only around its periphery (4). In addition, the location of the new station will not support the town centre as there is no direct link between them (5).

The other local centres to the west and east of Cranbrook have a better connection with the stations. However, there is a lack of continuity between the existing grid of Cranbrook and the proposed local centre (6).

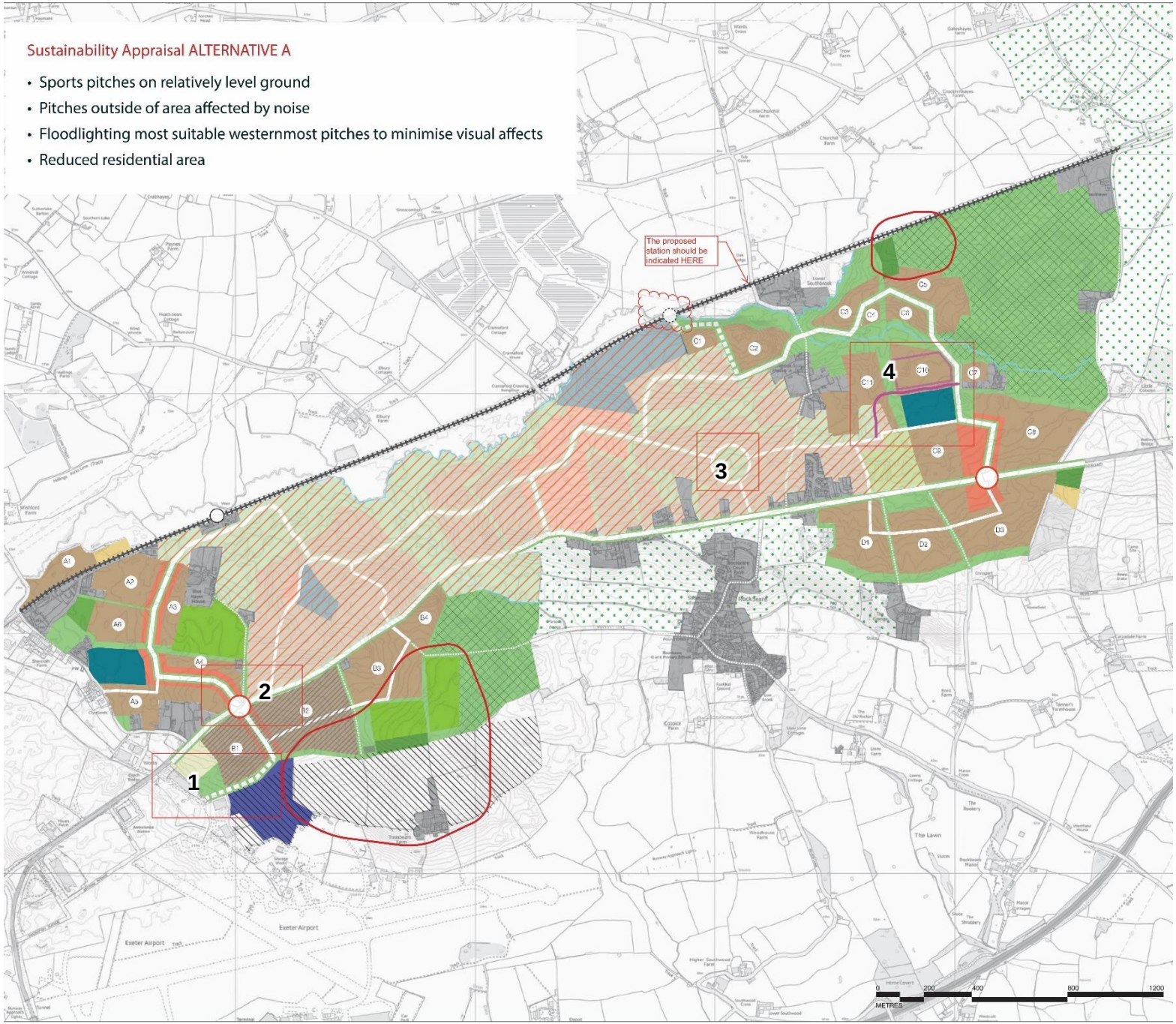
**Spatial accessibility**

high

low

NACH5,000m

# Savills masterplan Key questions




1. The spatial accessibility analysis shows that the potential route is not an important link. However, it is recommended to try to link the business park with the existing settlement and airport to the south, and the train station and the proposed local centre to the north.

2. It is not recommended to create a new roundabout. Roundabouts generally prioritise speed of traffic over pedestrians and public realm character, which makes the longer term transformation of London Road difficult. A signalised junction at the east and west ends of the development would be preferable.

3. For an open space to work, routes should traverse it. Therefore, the proposed change to a square with intersecting routes is positive.

4. This potential connection is not of significance, it is not continuous nor does it extend to meet other connections. It should therefore not be an issue if it is lost from the primary network. This means it can be realigned around site constraints if required.

# Savills masterplan recommendations Approach

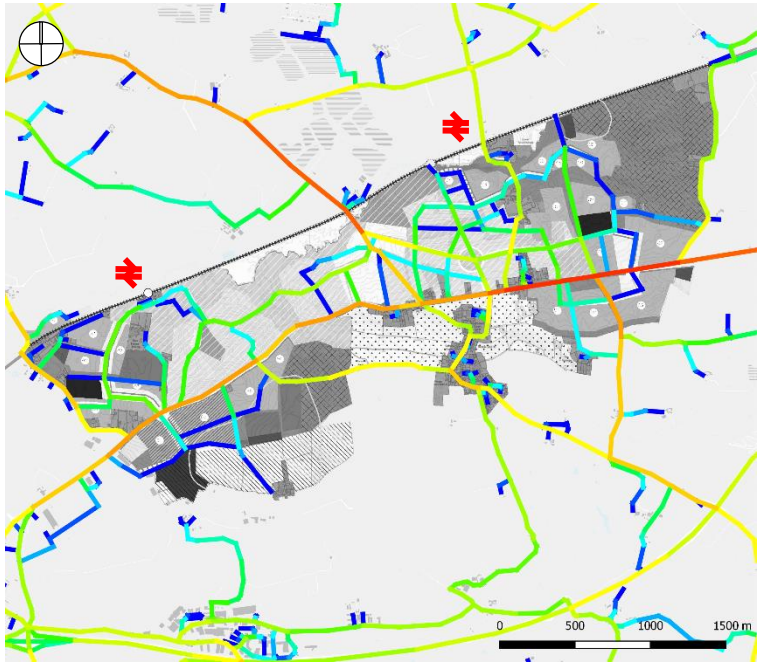
Recommendations to improve the current masterplan have been proposed on the basis of two approaches:

**Approach A**
In approach A, the options tested are based on a minimal change. Options using this approach only include changes to the spatial network. As such, changes to land uses or the location of the station remain as in the proposed Savills masterplan.

**Approach B**
Approach B adopts a higher level of intervention. Options using this approach propose changes to the spatial network and also the location of land uses to match patterns of high accessibility. This approach also proposes the relocation of the town centre.

**Assumptions**
There are a number of constraints on the site around topography, ecology, infrastructure and ownership. It should be made clear that these constraints have not been taken into account in the development of these options. Instead they seek to create an optimal spatial network which describes the key connections. These can then be adapted around constraints on site.

# Option A1


**Savills masterplan analysis option A1**

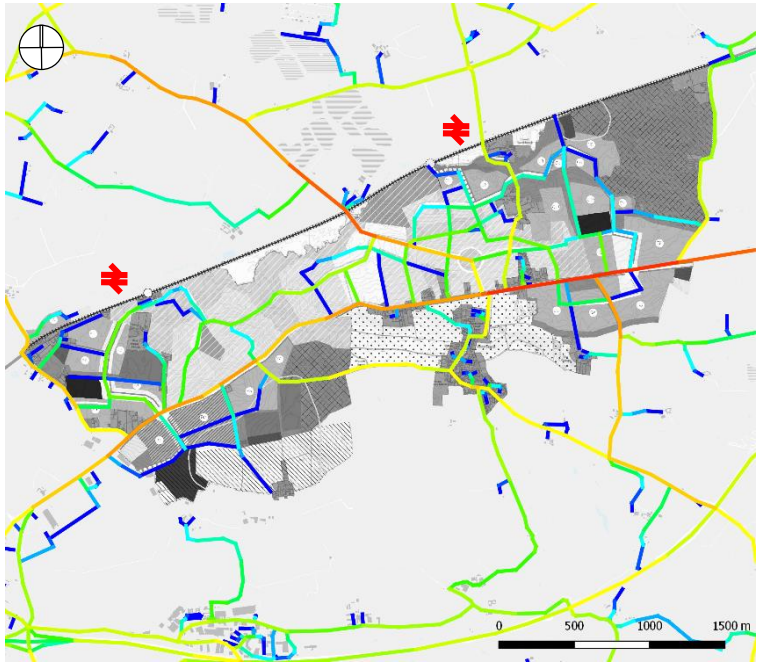
**Spatial changes**

- Links with no change
- Removed links
- New links

**Spatial accessibility**

high

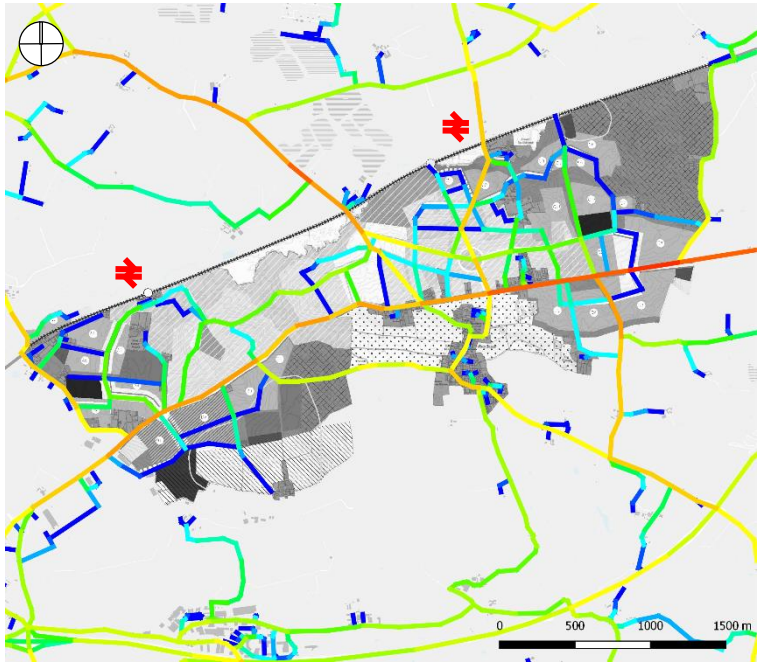
low




**Savills masterplan analysis**

NACH5,000m

# Option A2


Savills masterplan analysis option A2

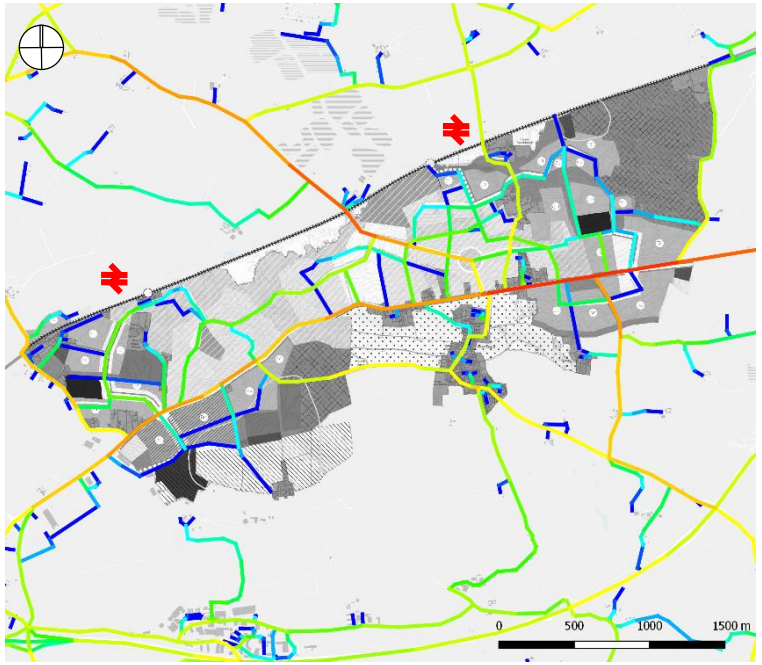
**Spatial changes**

- Links with no change
- Removed links
- New links

**Spatial accessibility**

high

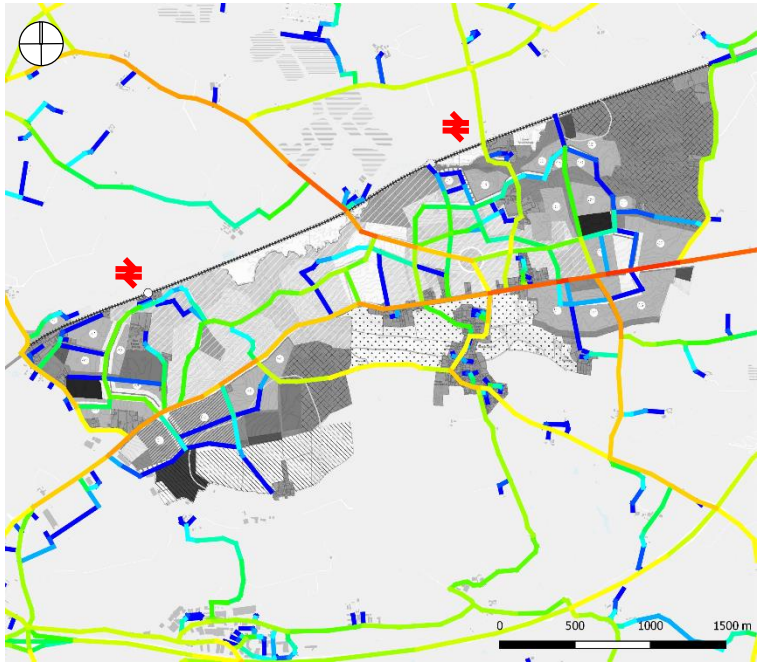
low




Savills masterplan analysis

NACH5,000m

# Option B1


**Savills masterplan analysis option B1**

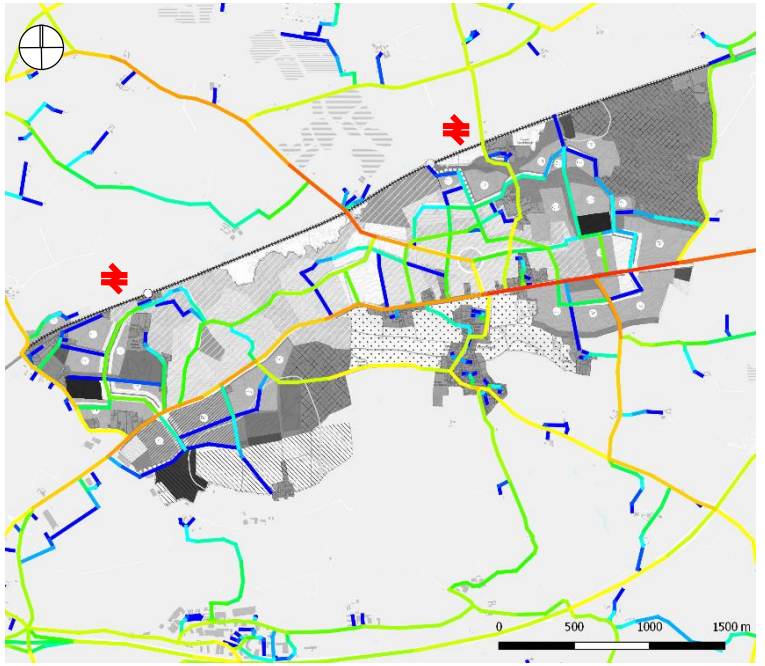
**Spatial changes**

- Links with no change
- Removed links
- New links

**Spatial accessibility**

high

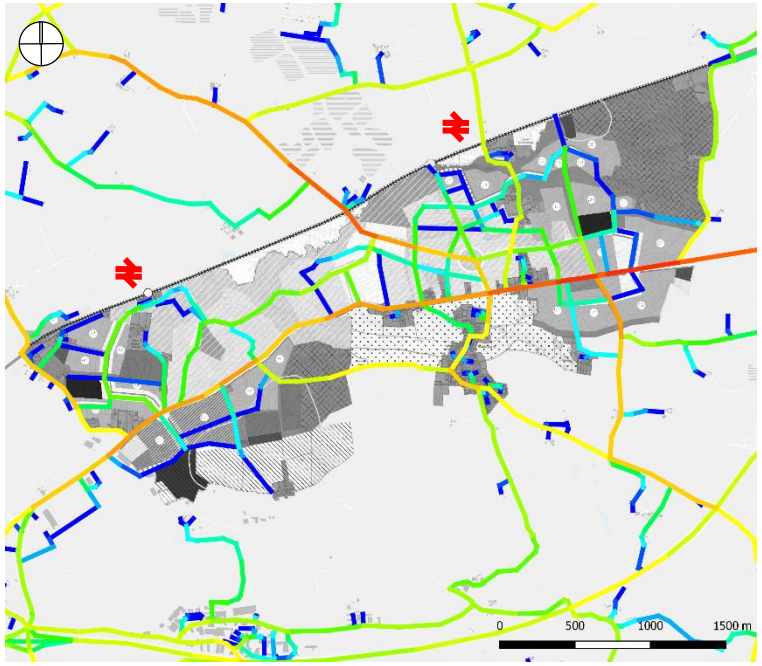
low




**Savills masterplan analysis**

NACH5,000m

# Option B2


**Savills masterplan analysis option B2**

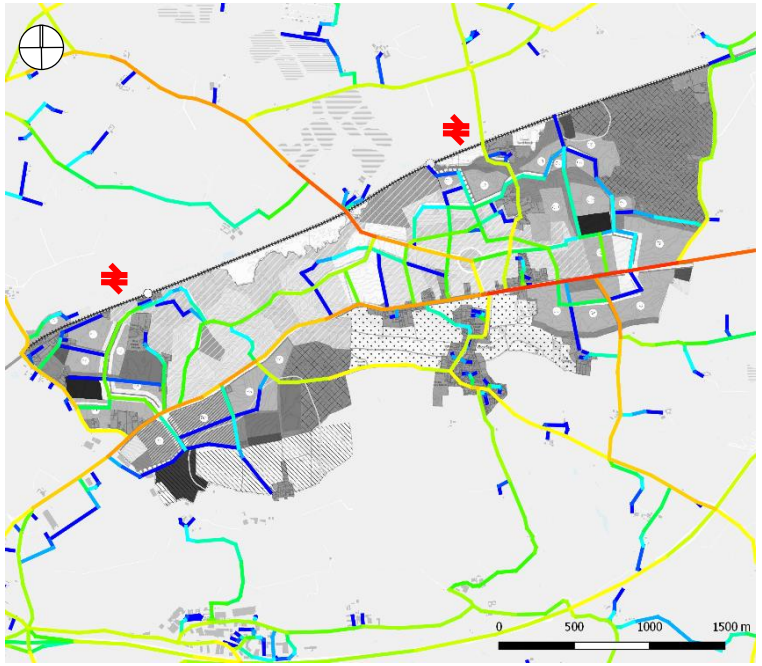
**Spatial changes**

- Links with no change
- Removed links
- New links

**Spatial accessibility**

high

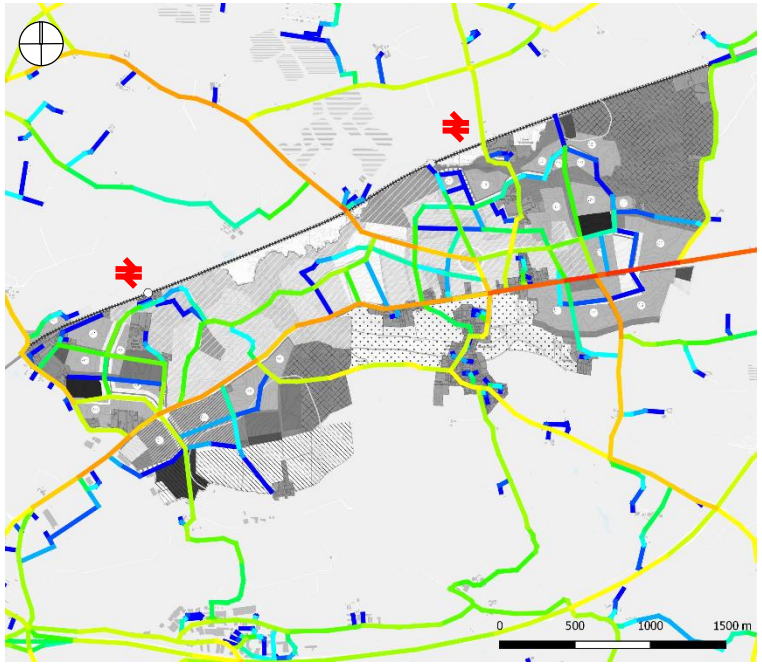
low




**Savills masterplan analysis**

NACH5,000m

# Option B3


**Savills masterplan analysis option B3**

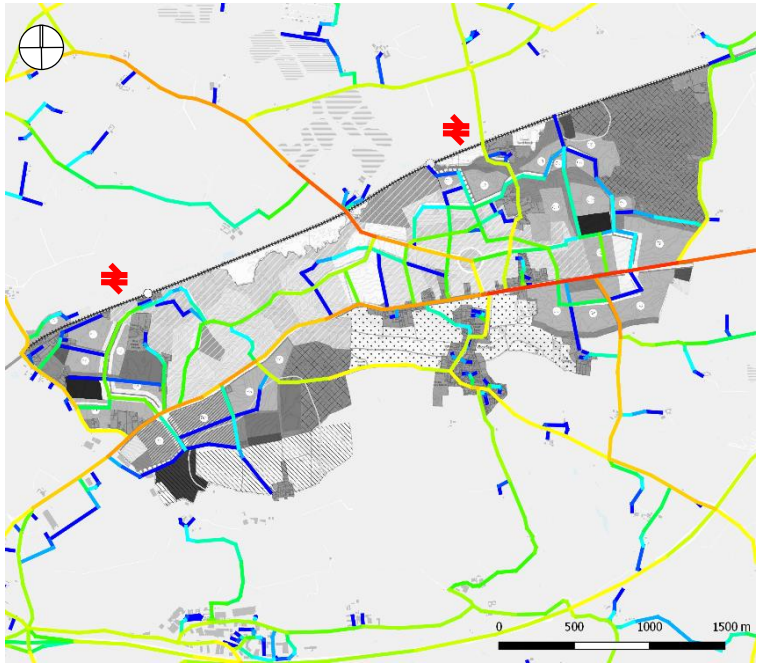
**Spatial changes**

- Links with no change
- Removed links
- New links

**Spatial accessibility**

high

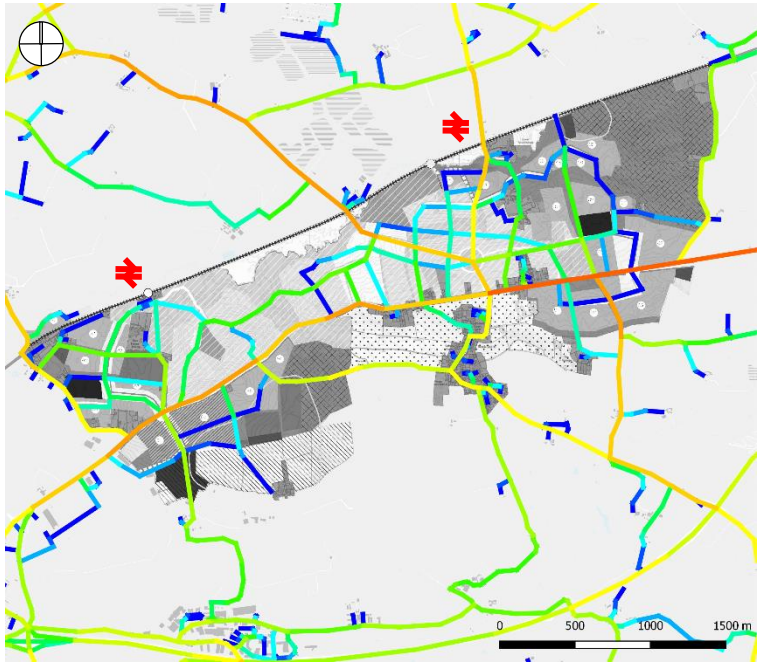
low




**Savills masterplan analysis**

NACH5,000m

# Option B4


**Savills masterplan analysis option B4**

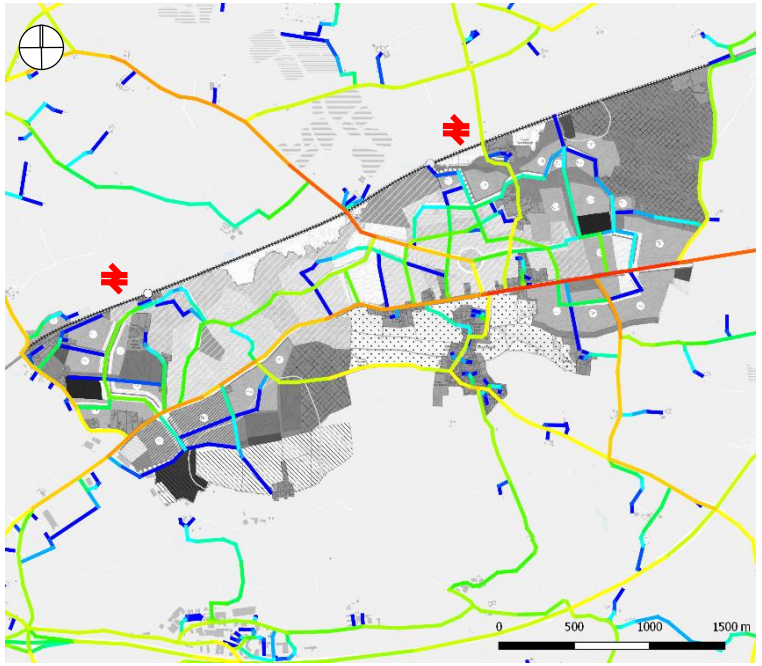
**Spatial changes**

- Links with no change
- Removed links
- New links

**Spatial accessibility**

high

low




**Savills masterplan analysis**

NACH5,000m

# Savills masterplan recommendations Option A2

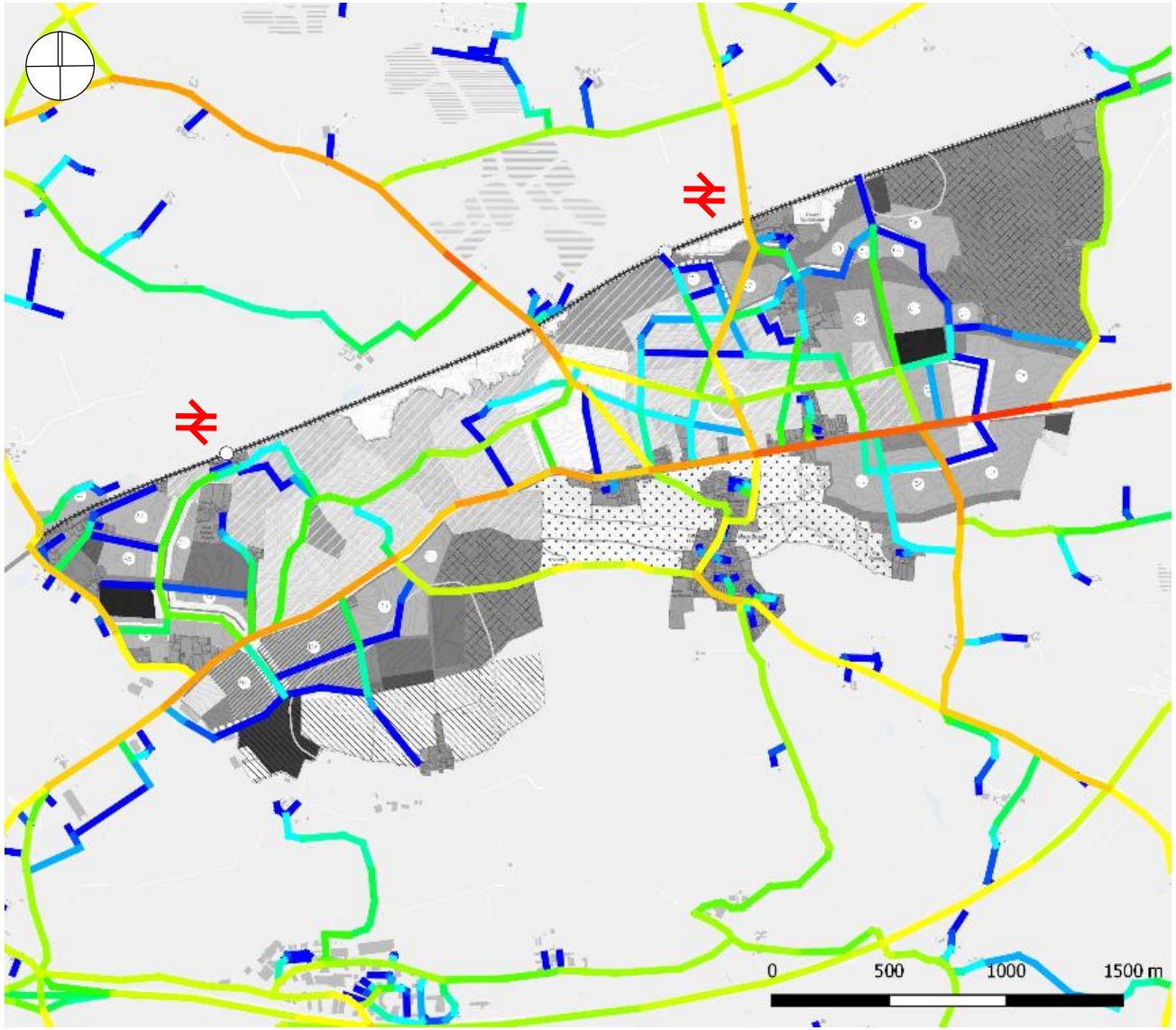
**Option A2**

1. Extend the north-south connection to meet Rockbeare as continuously as possible. The high accessibility of this route and of London Road can support multi-directional movement, which is required for a town centre to work.
2. Adapt the proposed grid to create more regularly shaped blocks
3. Create a direct link between the proposed station and the main ‘spine’ of London Road and the local spine of Tillhouse Road.
4. Change staggered junctions across London Road to make direct continuous links.


**Spatial changes**

- Links with small or no change
- Removed links
- New links

# Recommendations Option A2 Spatial Accessibility



# Savills masterplan recommendations Option B4

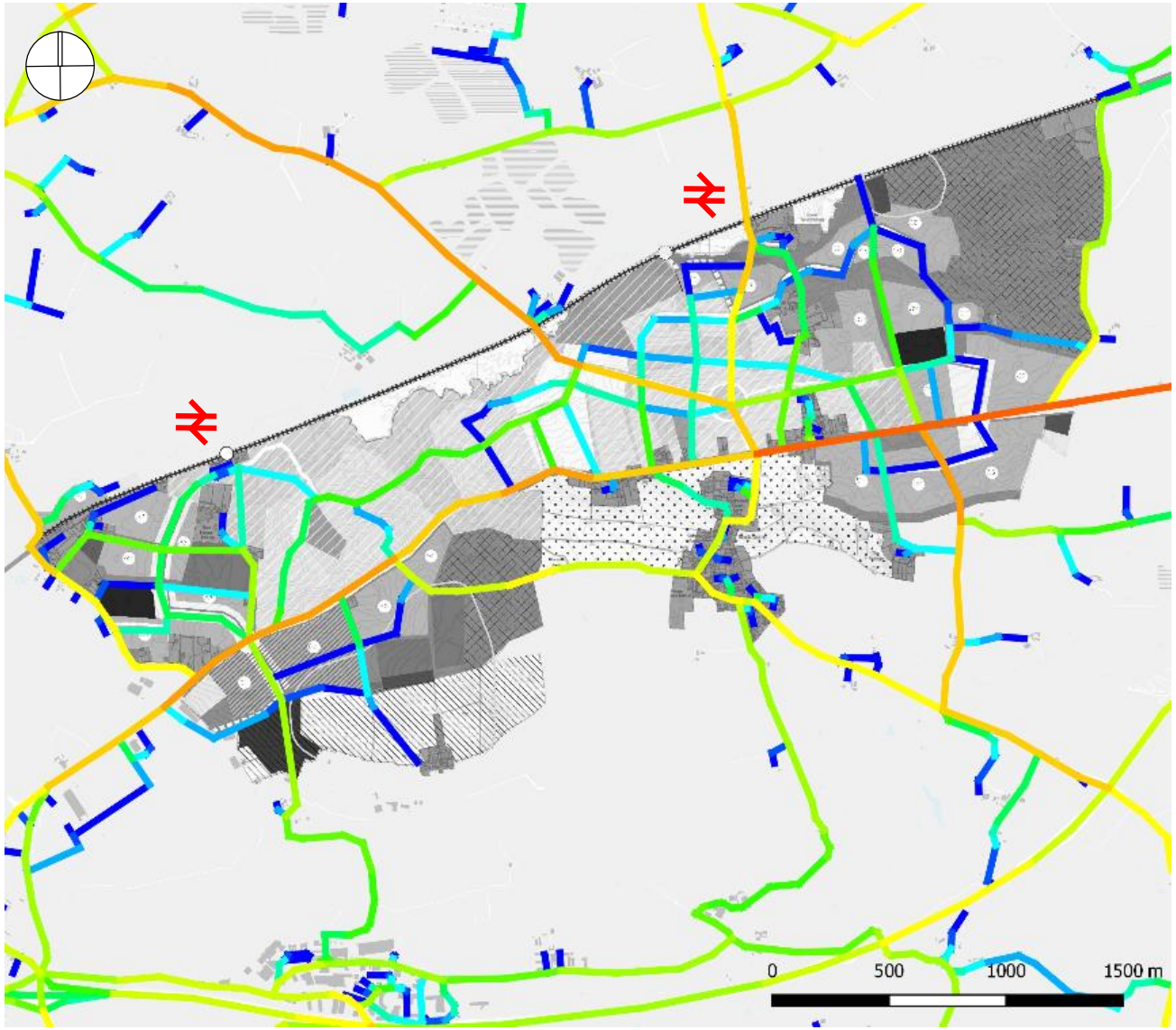
**Option B4**

1. Propose a diagonal north-south link that connects with Tillhouse Road and thus the local centres. This route, together with London Road, can be main axes for the development of the town centre. In this case the town centre should be slightly relocated towards the east. The relocation of the town centre is further supported by the grid intensification (shown yellow).
2. Create a direct link between the new proposed station and the town centre
3. Change the staggered junction to make a direct continuous link across London Road.
4. Direct link between the station and the main local route of Younghayes Road and the local centre to the west.
5. Intensifying the grid at the location of the existing local centre
6. Extend existing connection of Gribble Lane to the local centre.

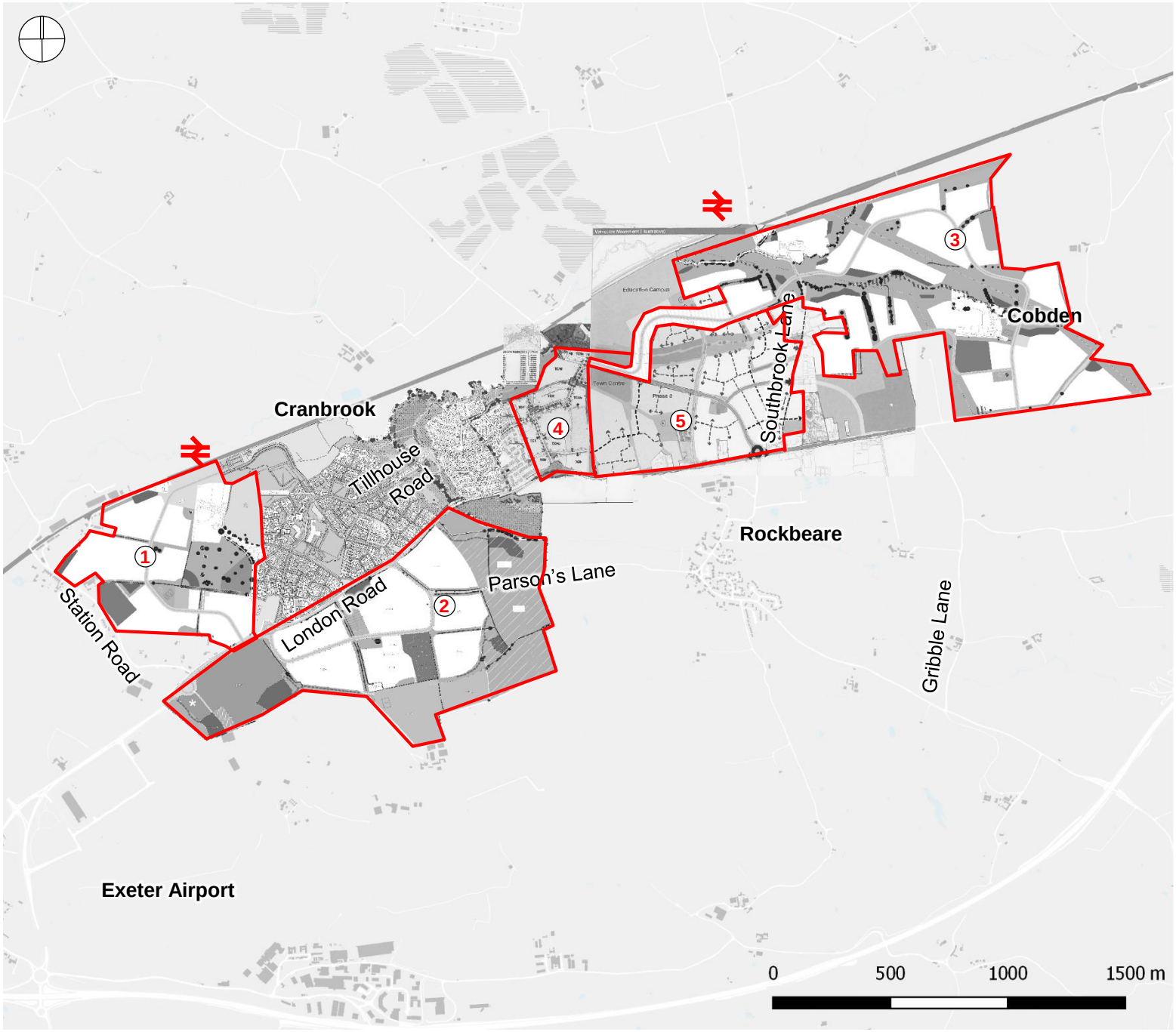

**Spatial changes**

- Links with small or no change
- Removed links
- New links

# Savills masterplan recommendations Option B4 Spatial Accessibility

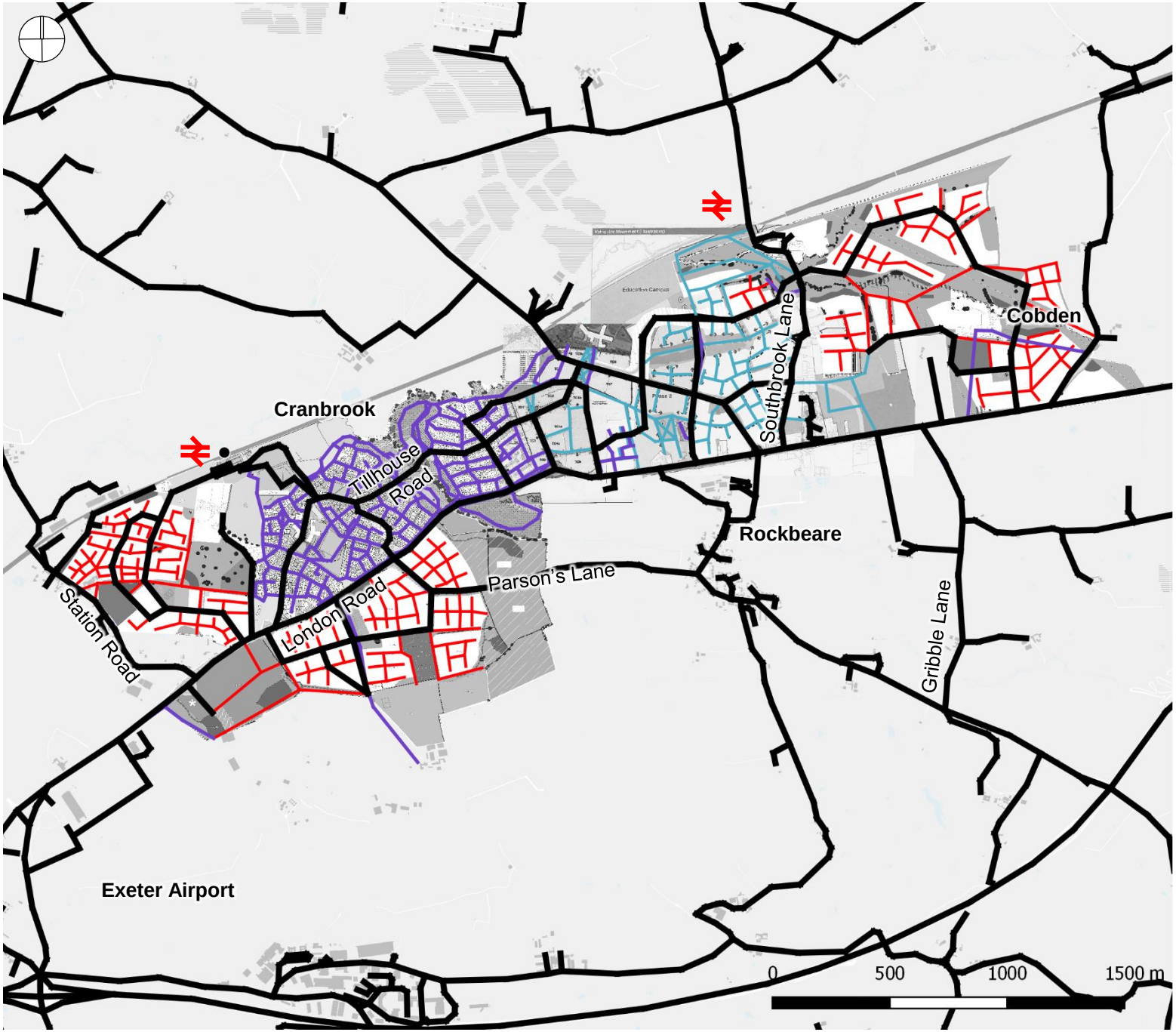


# NCP masterplan analysis NCP expansion areas, Phase 3-4 and Town Centre




1. NCP expansion areas with south – WCN053 - PAW - 002 - A - Parameters plan 20141219
2. NCP expansion areas with south – WCN054-DFP-001- Emerging DFP 20170510-A2+
3. NCP expansion areas with south – WCN053 - PAE - 002 - A - Parameters plan 20141218
4. Town Centre movement
5. NCP Outline area Phase 4 scans - P4 GI plan with roads indicated, P4 pedestrian and cycle movement, P4 vehicle movement

# NCP masterplan analysis Methodology



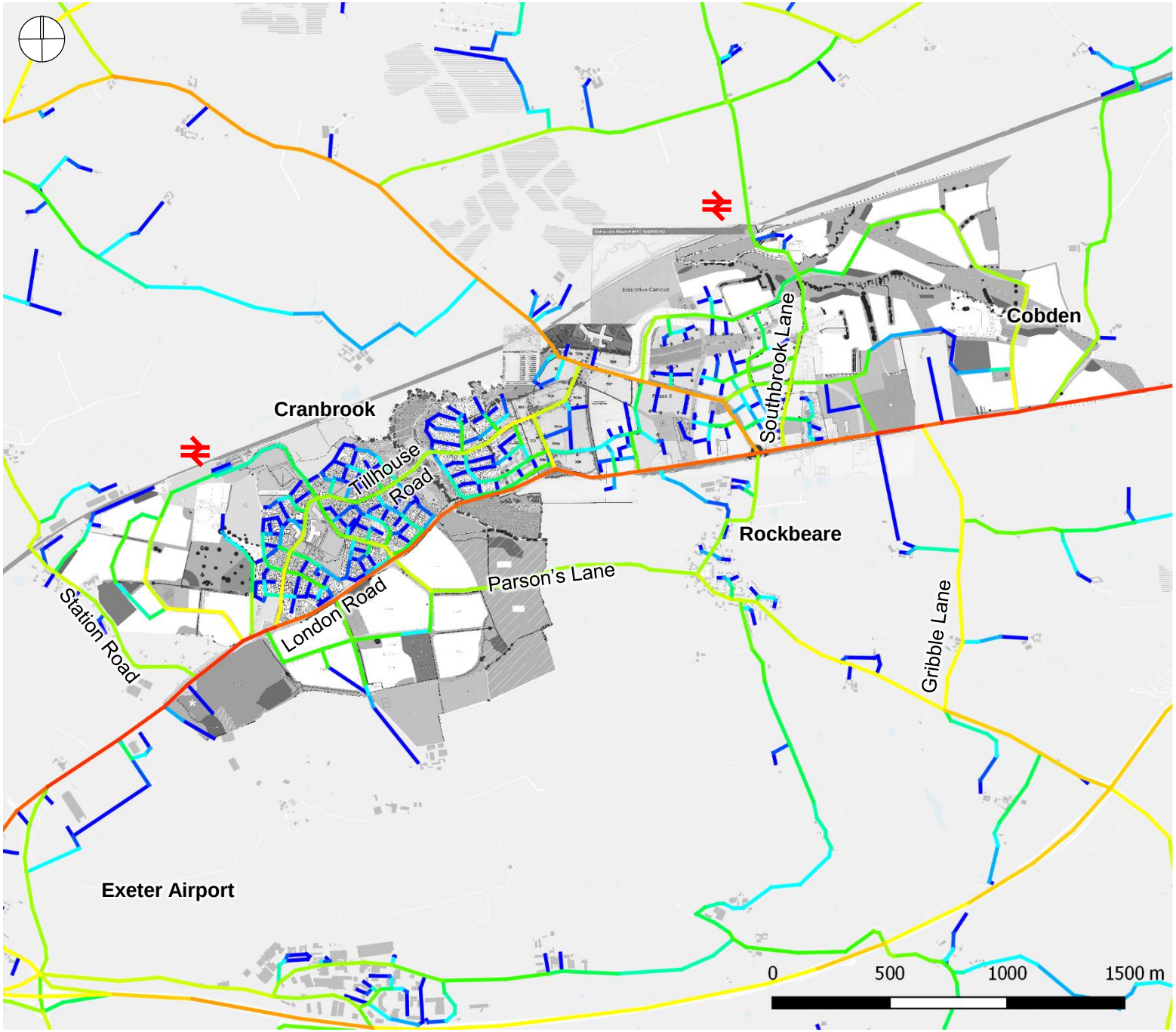

The NCP expansion areas proposes a primary route network without details for the secondary network.

The methodology has been adapted to work with available data. Using the existing model as a base to test options in would not provide an accurate analysis, as results would be skewed towards the areas with a more detailed street network.

Therefore to test the NCP masterplan for both regional and local hierarchies an assumed secondary network was added to the NCP expansion areas.

- Primary routes (future existing and proposed NCP masterplan)
- Future existing proposed secondary routes
- Phase 3-4 & Town Centre proposed secondary routes
- NCP expansion areas assumed secondary network

# NCP masterplan analysis Regional spatial accessibility




- Typically 90% of retail land uses is located along the top 10% of the most spatially accessible streets.
- The town centre land uses are not located at these highly accessible locations in the masterplan.

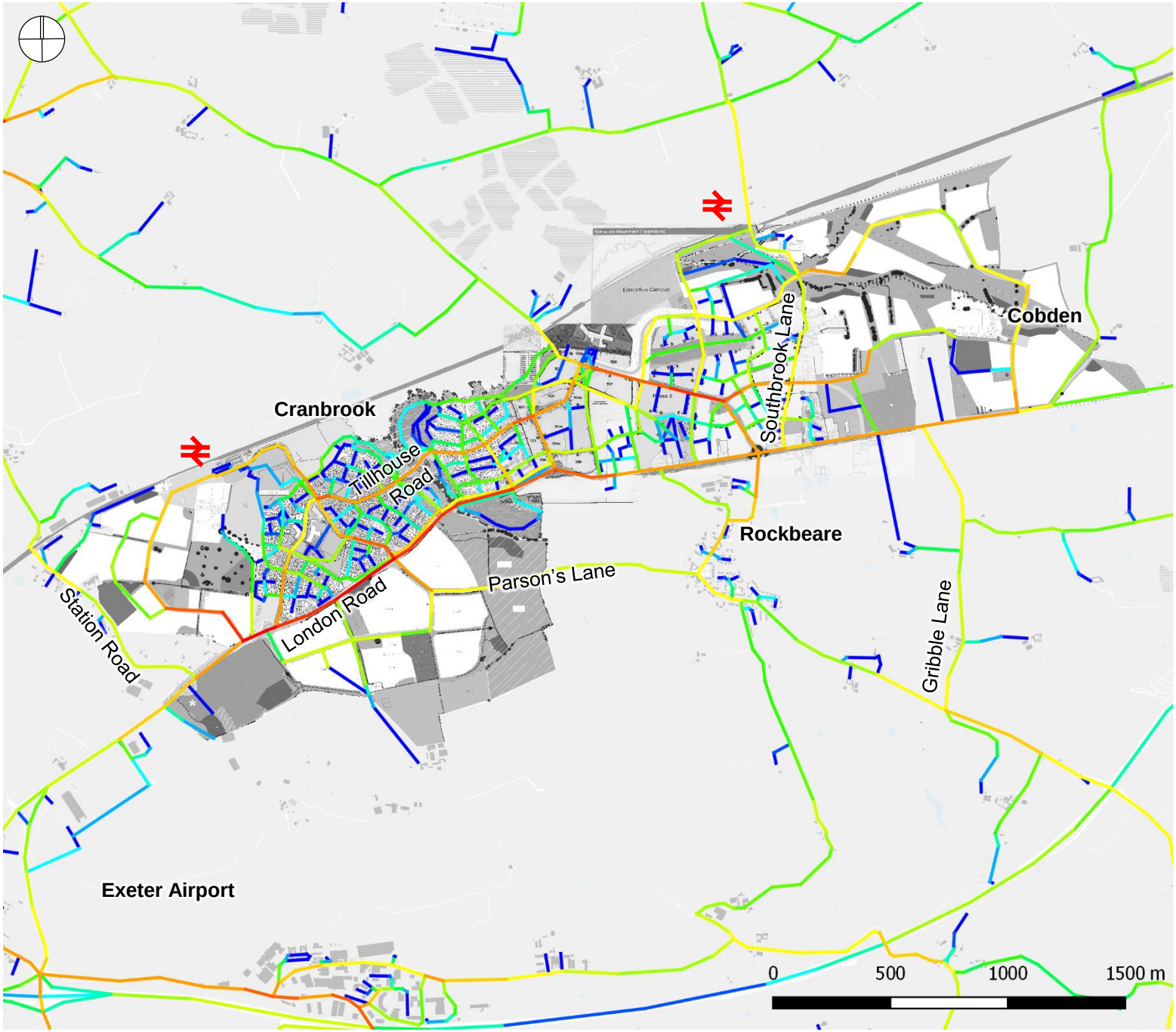
Town centre

**Spatial accessibility**

high

low

# NCP masterplan analysis Local spatial accessibility




- Indirect connections between the expansion areas, the station and the town centre.

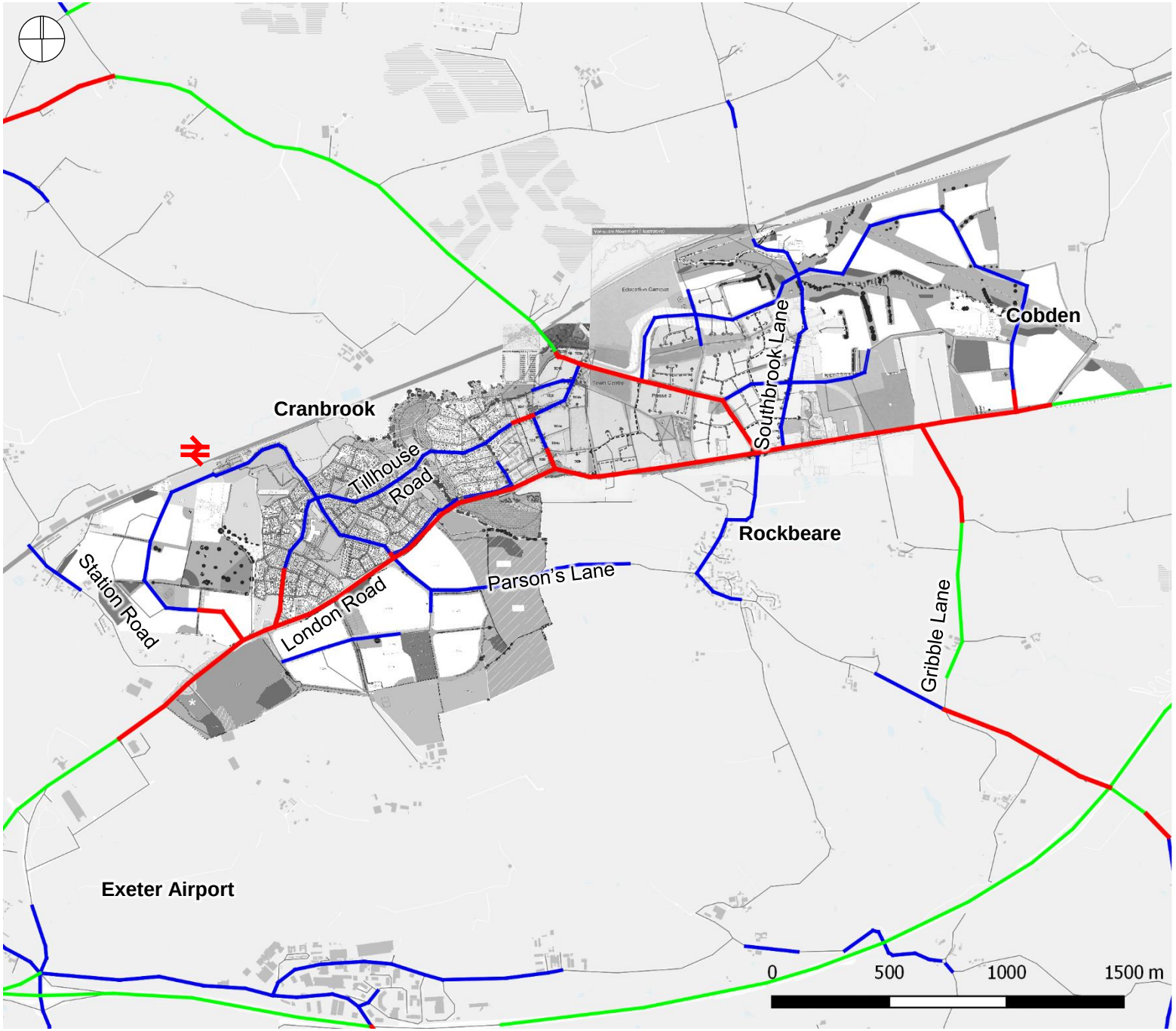
**Spatial accessibility**

high

low

NACH2,000m

# NCP masterplan analysis Multi-scale spatial accessibility



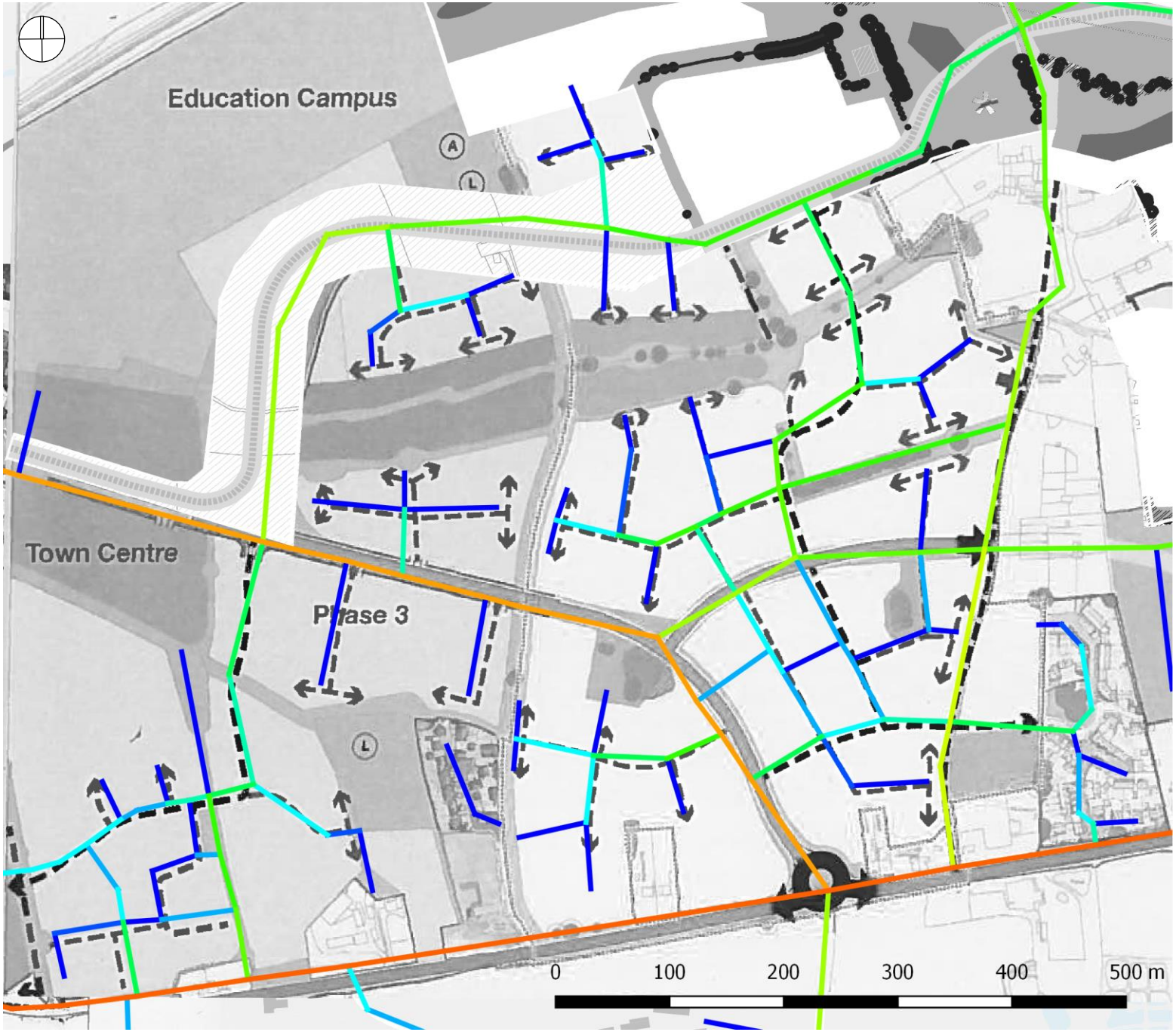

NACh10km > 1.2 , NACh2,000m > 1.2

- The diagonal route and the London Road have high multi-scale accessibility. However, they are by-passing the designated town centre.

**Primary route**

- Regional and local
- Regional
- Local

# Masterplan analysis Regional spatial accessibility Phase 3-4




- The highly accessible diagonal route through Phase 3 can support active land uses at ground level as well as intense levels of other land uses including residential.

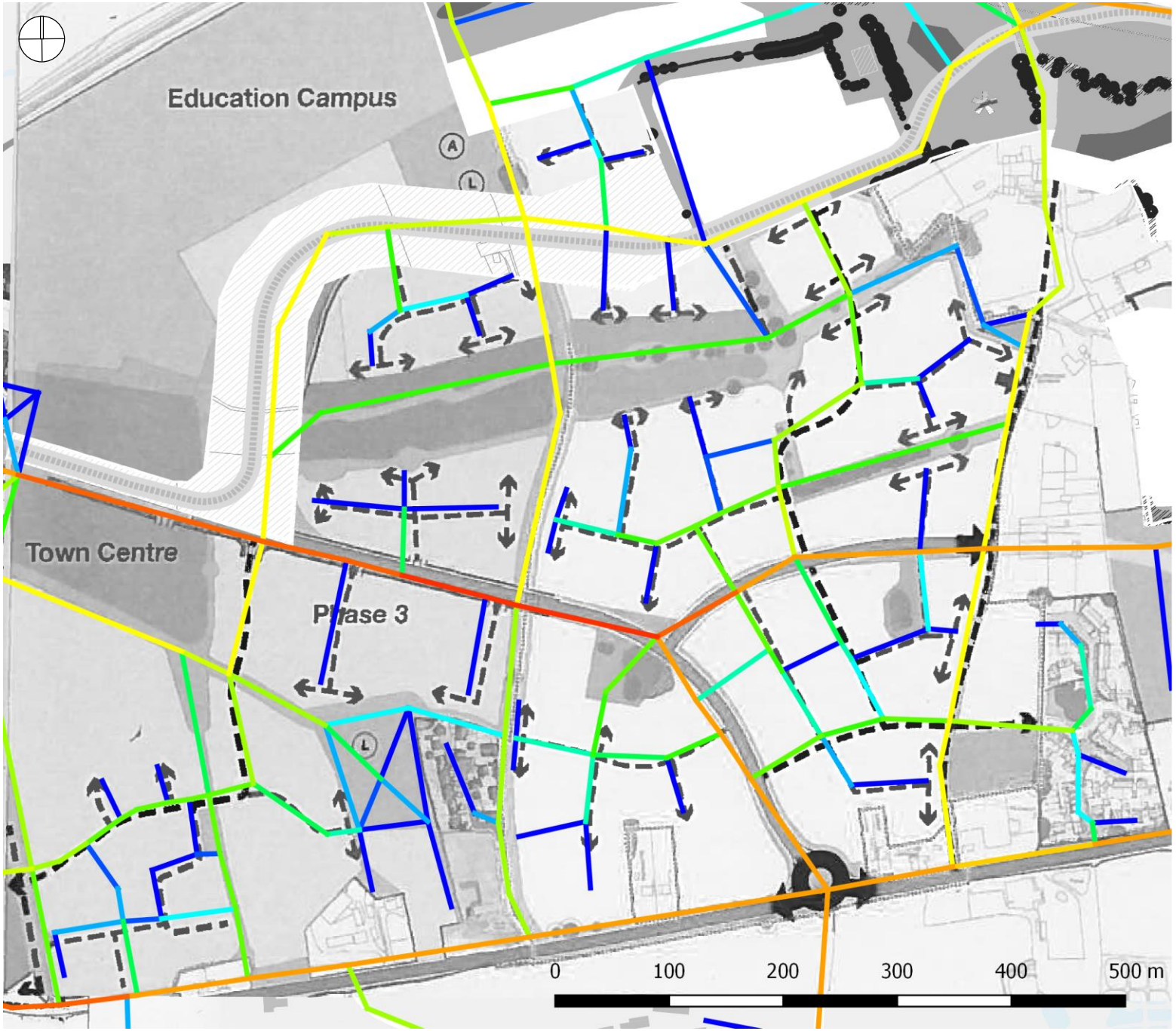
**Spatial accessibility**

high

low

NACh10k

# Masterplan analysis Local spatial accessibility Phase 3-4



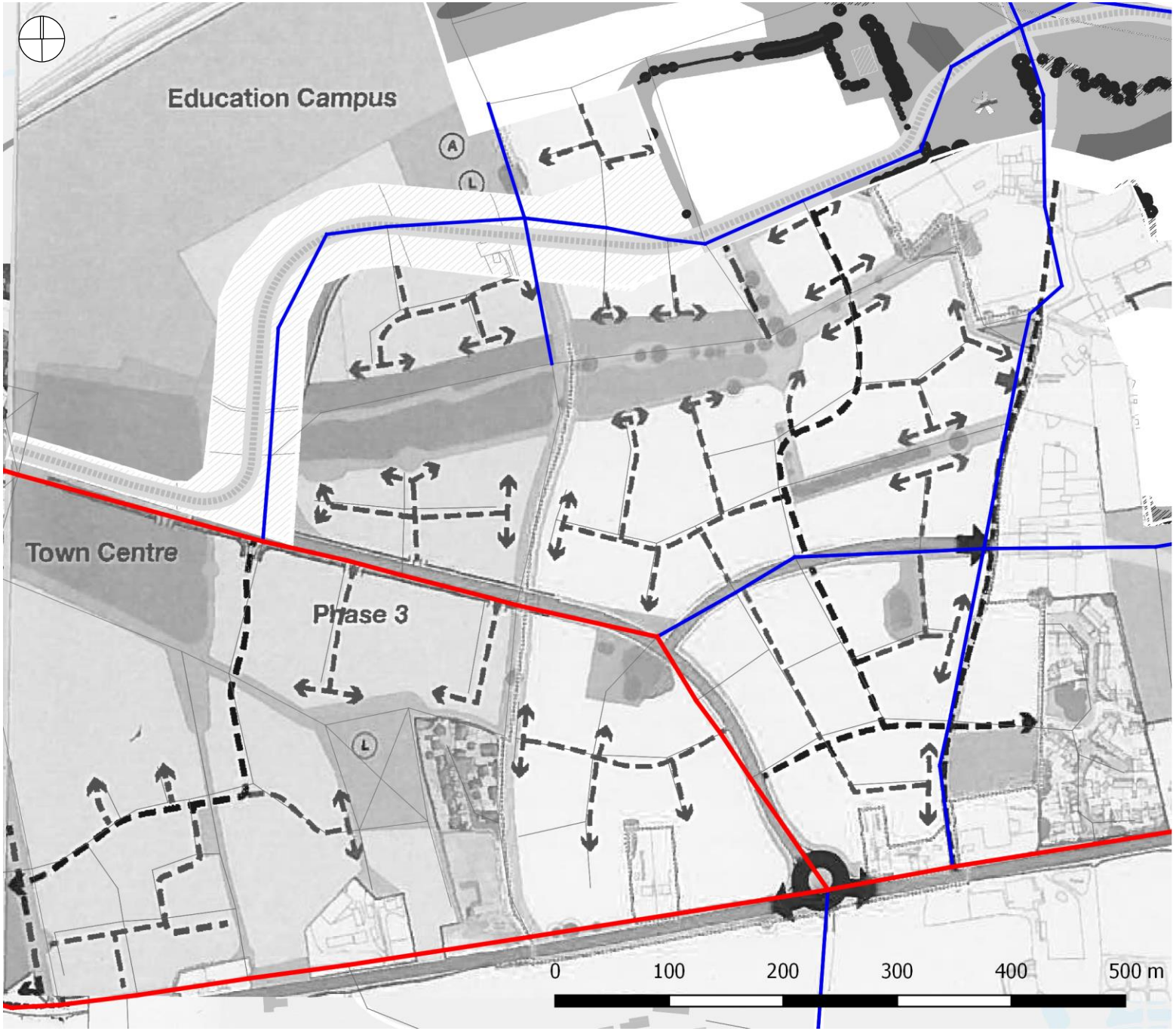

- The secondary route network is fragmented and has a high number of dead-ends.
- There are very few connections between the different parts of Phase 3-4.
- Limited connectivity between Phase 3-4 and the town centre.

**Spatial accessibility**

high

low

# Masterplan analysis Multi-scale spatial accessibility Phase 3-4



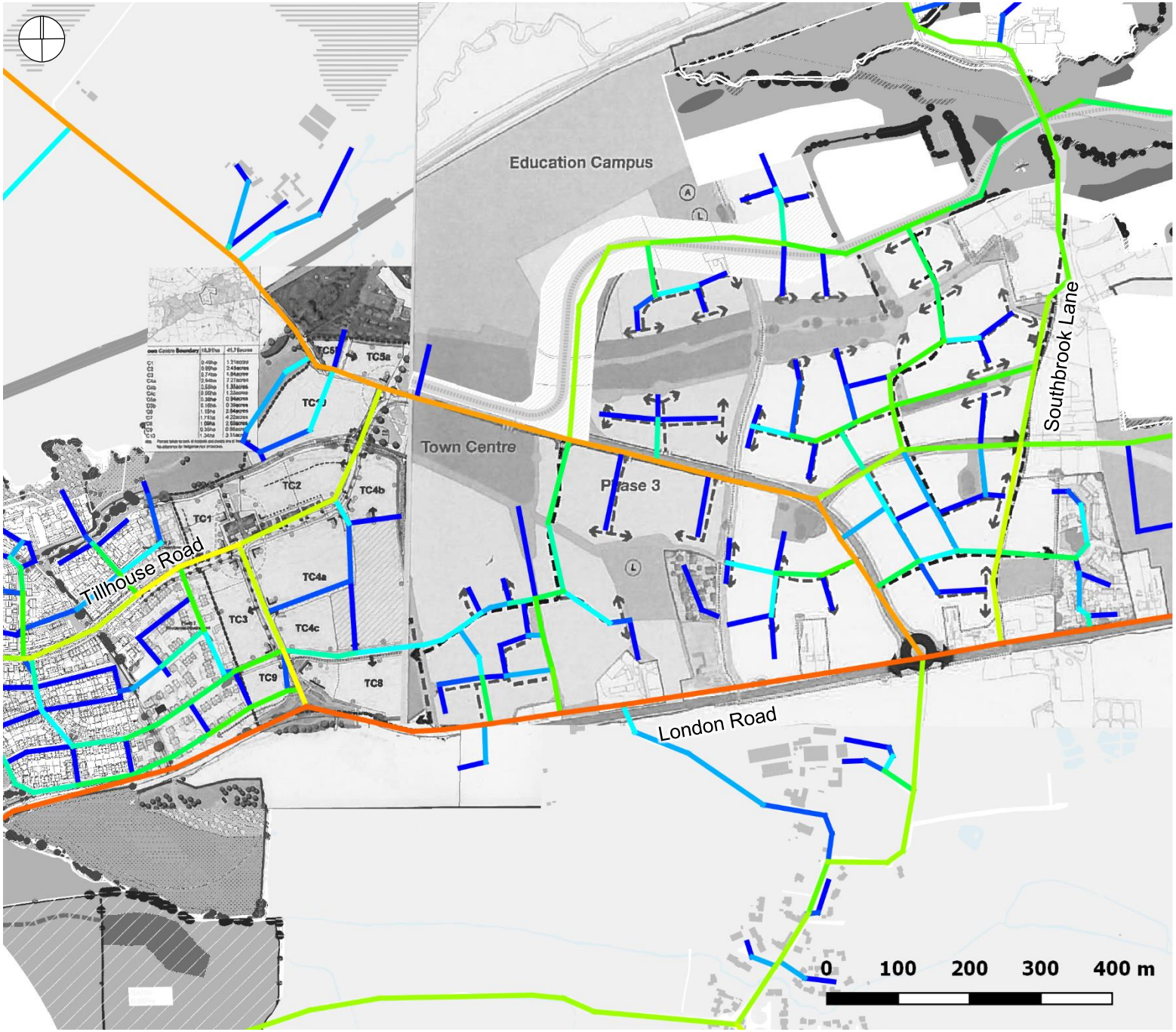

- The multi-scale analysis highlights the importance of the diagonal route in both regional and local scales of movement.
- It also highlights the lack of a strong and continuous local scale network.

**Primary route**

- Regional and local
- Regional
- Local

NACh10km > 1.2 , NACh2,000m > 1.2

# Masterplan analysis Regional spatial accessibility Town Centre




- The highly accessible London Road and diagonal route currently by-pass the designated town centre.

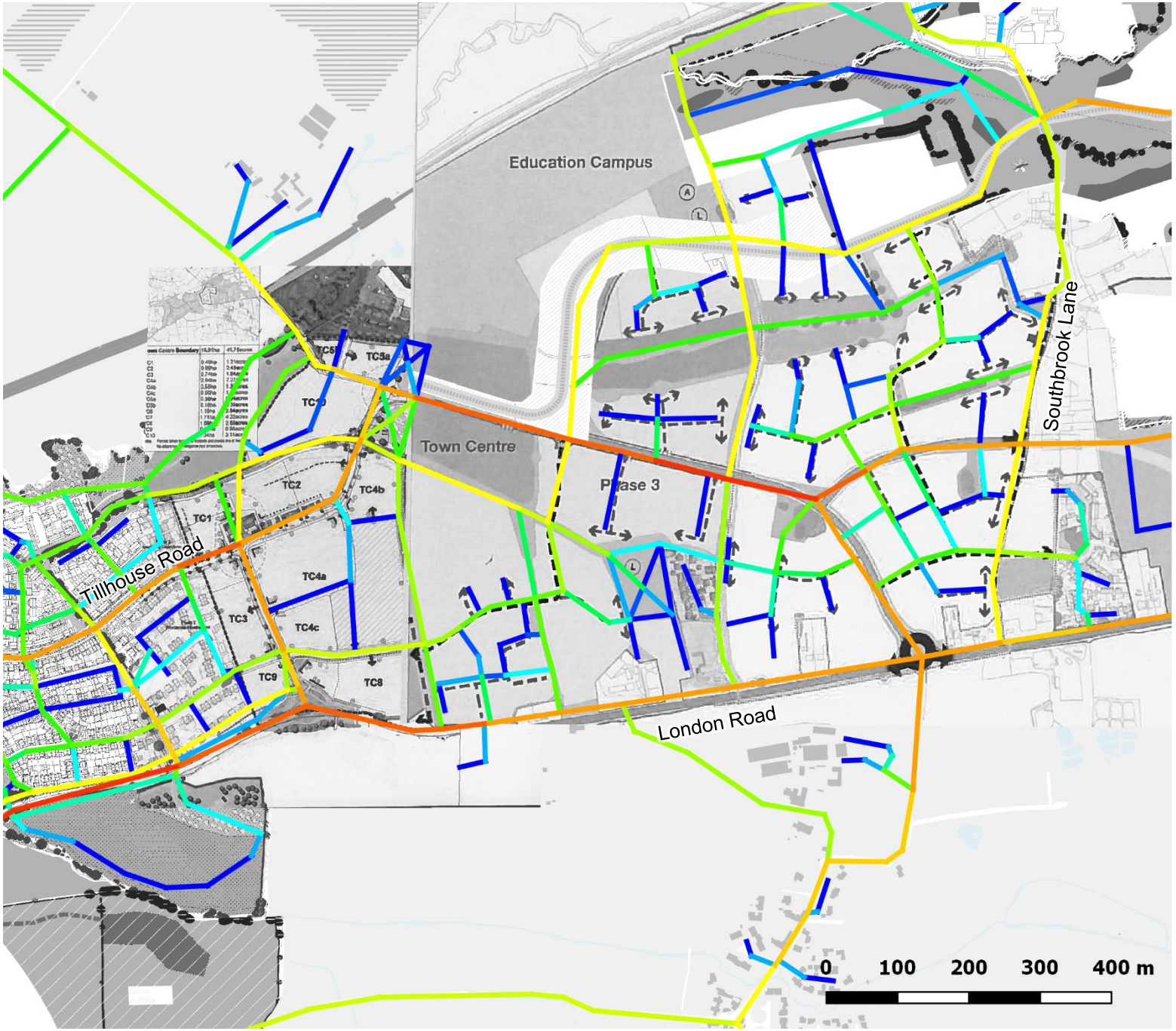
**Spatial accessibility**

high

low

NACh10k

# Masterplan analysis Local spatial accessibility Town Centre




NACh2,000m

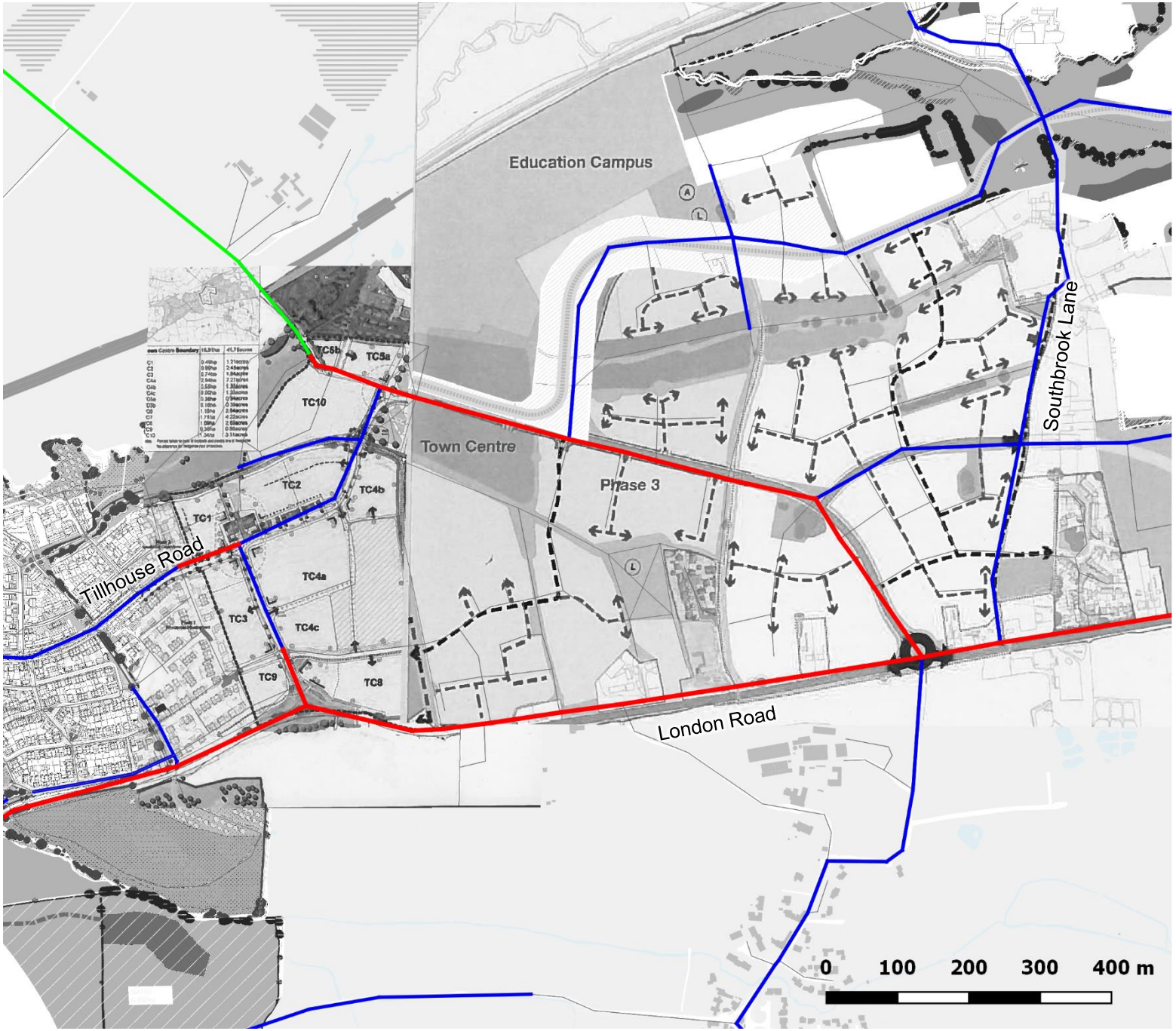
- Good local accessibility levels along the routes through the designated town centre.
- Limited connectivity between the town centre and the development area to the east.
- No direct connection between the town centre and the station.

**Spatial accessibility**

high

low

# Masterplan analysis Multi-scale spatial accessibility Town Centre



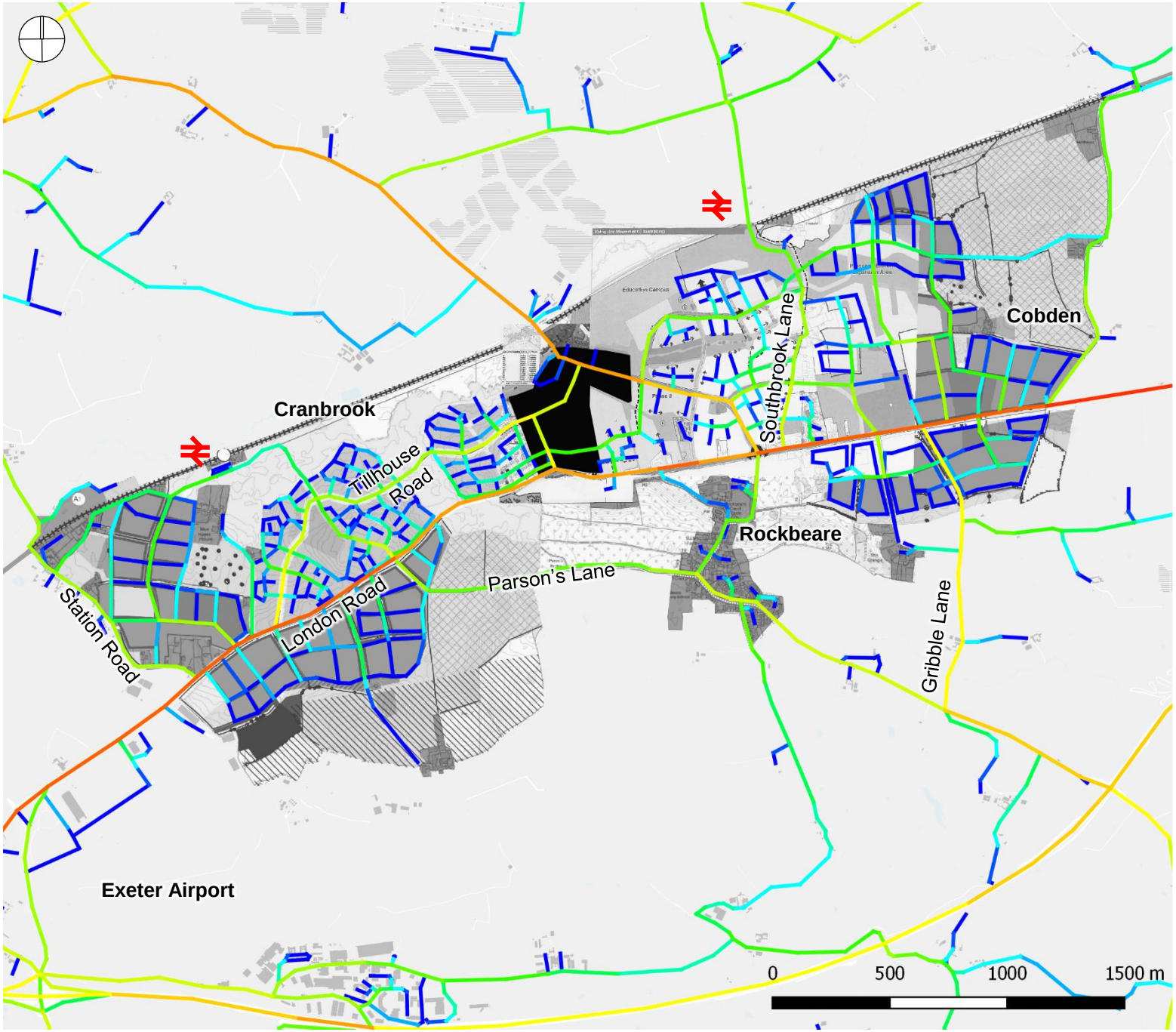

NACh10km > 1.2 , NACh2,000m > 1.2

- The town centre land uses are not located along the most highly accessible locations.
- Retail should be located along the highly accessible diagonal route.
- Other town centre land uses, for example the youth and children's centres, the library, and the health and well-being centre, can be located along the locally accessible routes of the designated town centre.

**Primary route**

- Regional and local
- Regional
- Local

# Refined Savills masterplan Regional spatial accessibility



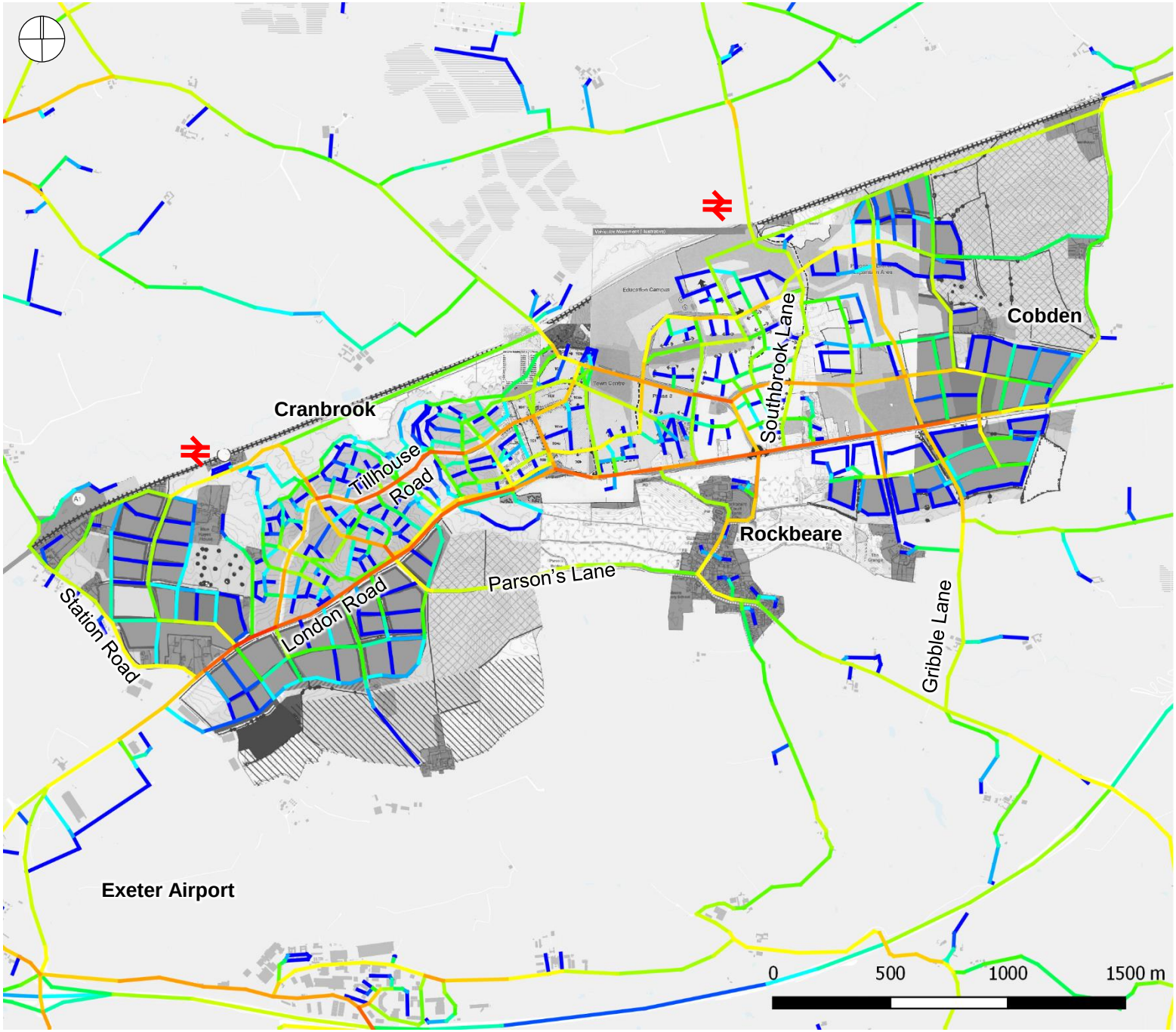

Town centre

**Spatial accessibility**

high

low

# Refined Savills masterplan Local spatial accessibility



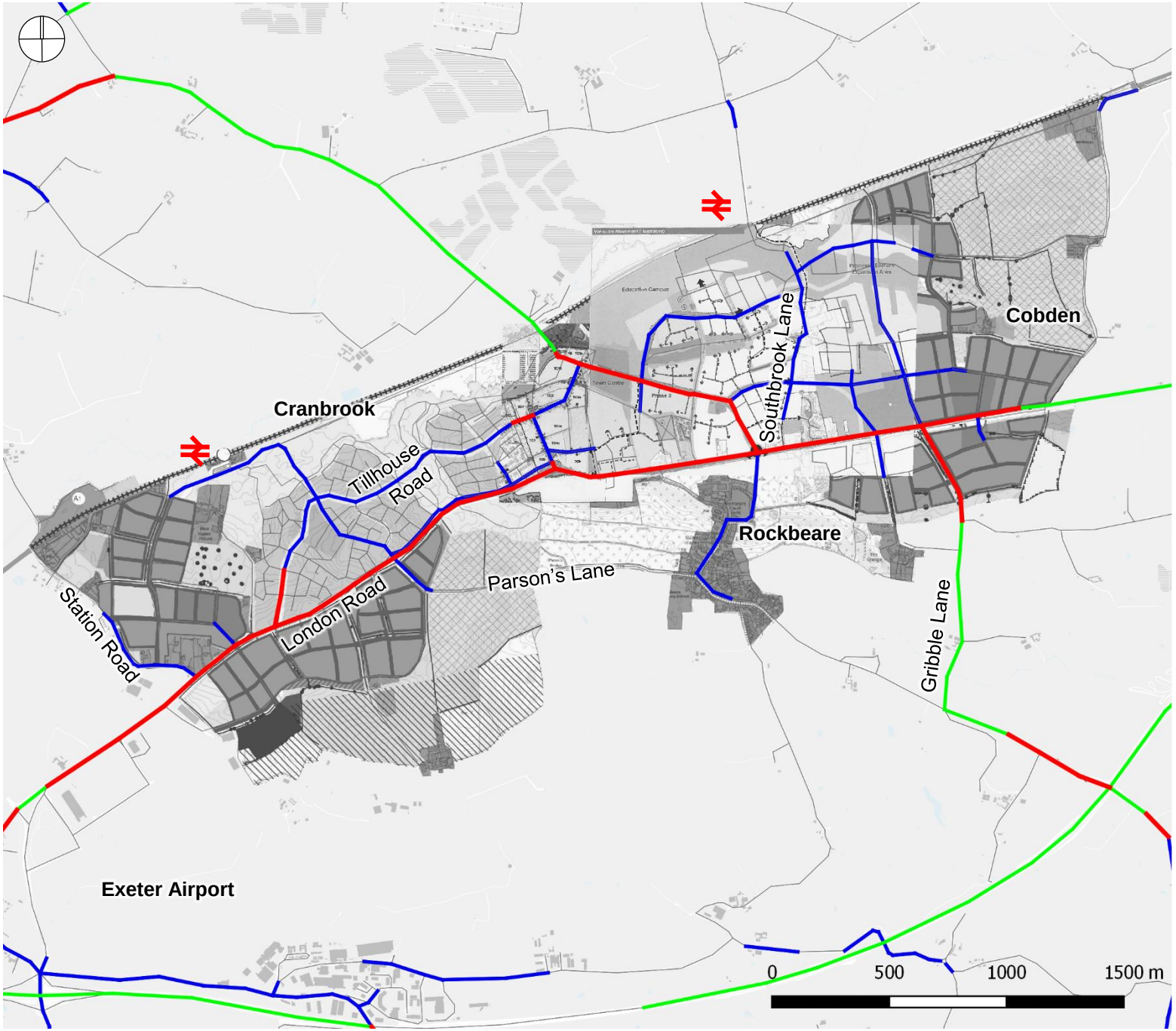

NACH2,000m

**Spatial accessibility**

high

low

# Refined Savills masterplan Multi-scale spatial accessibility




NACh10km > 1.2 , NACh2,000m > 1.2

The refined Savills masterplan creates a more legible grid-like internal route structure in the expansion areas.

In particular, the extension of Gribble Lane to the north creates a strong north-south axis, which, along with London Road, can support a local centre in this area (1).

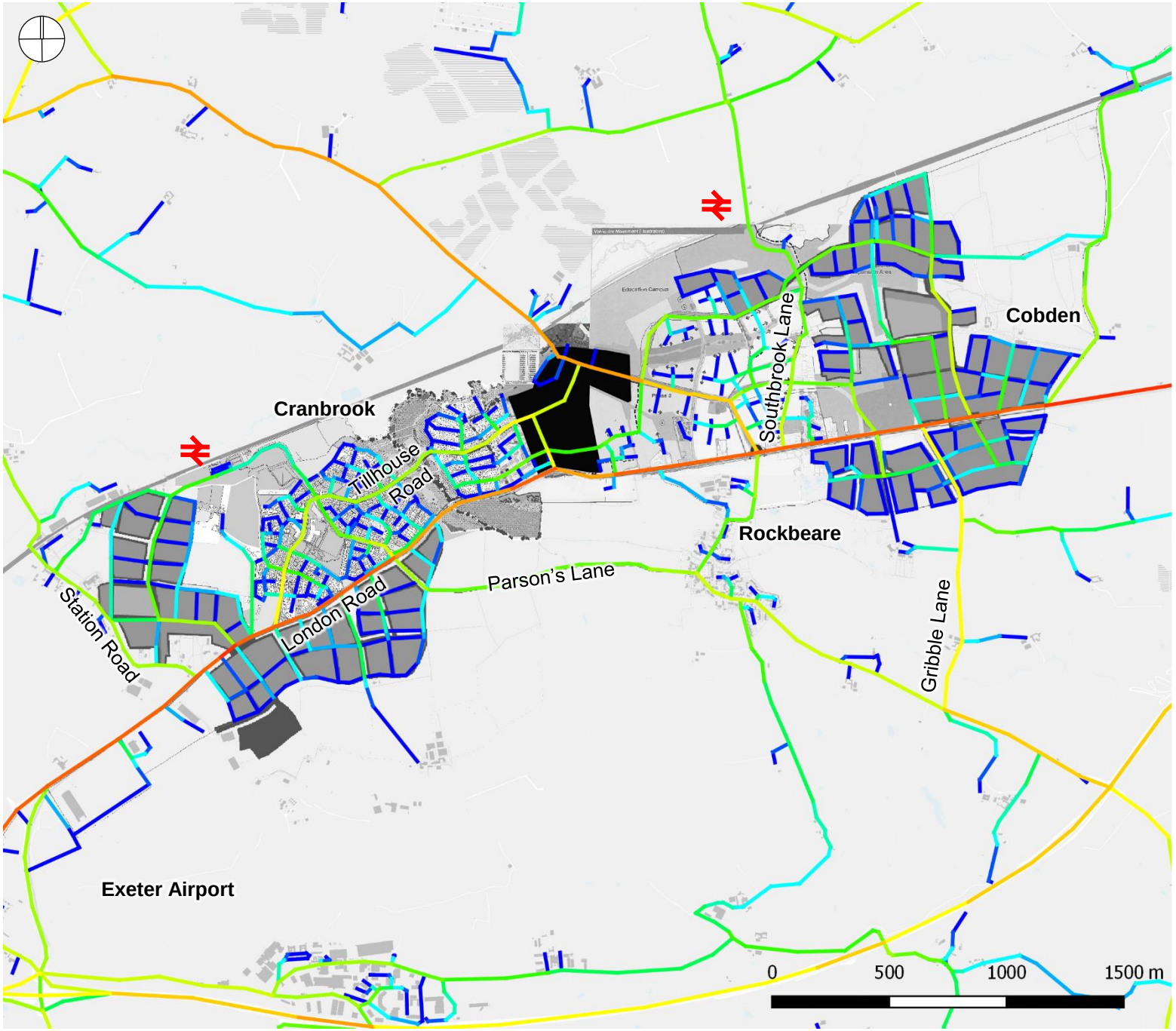
This north-south route is supported by a strong local east-west connection linking it to the diagonal route (2). However, this does not extend further to the west through Phase 3.

Despite the rational internal structure in the western expansion area, the lack of connections to the existing route structure of Cranbrook limits its connectivity and segregates it.

**Primary route**

- Regional and local
- Regional
- Local

# Savills masterplan revised Regional spatial accessibility



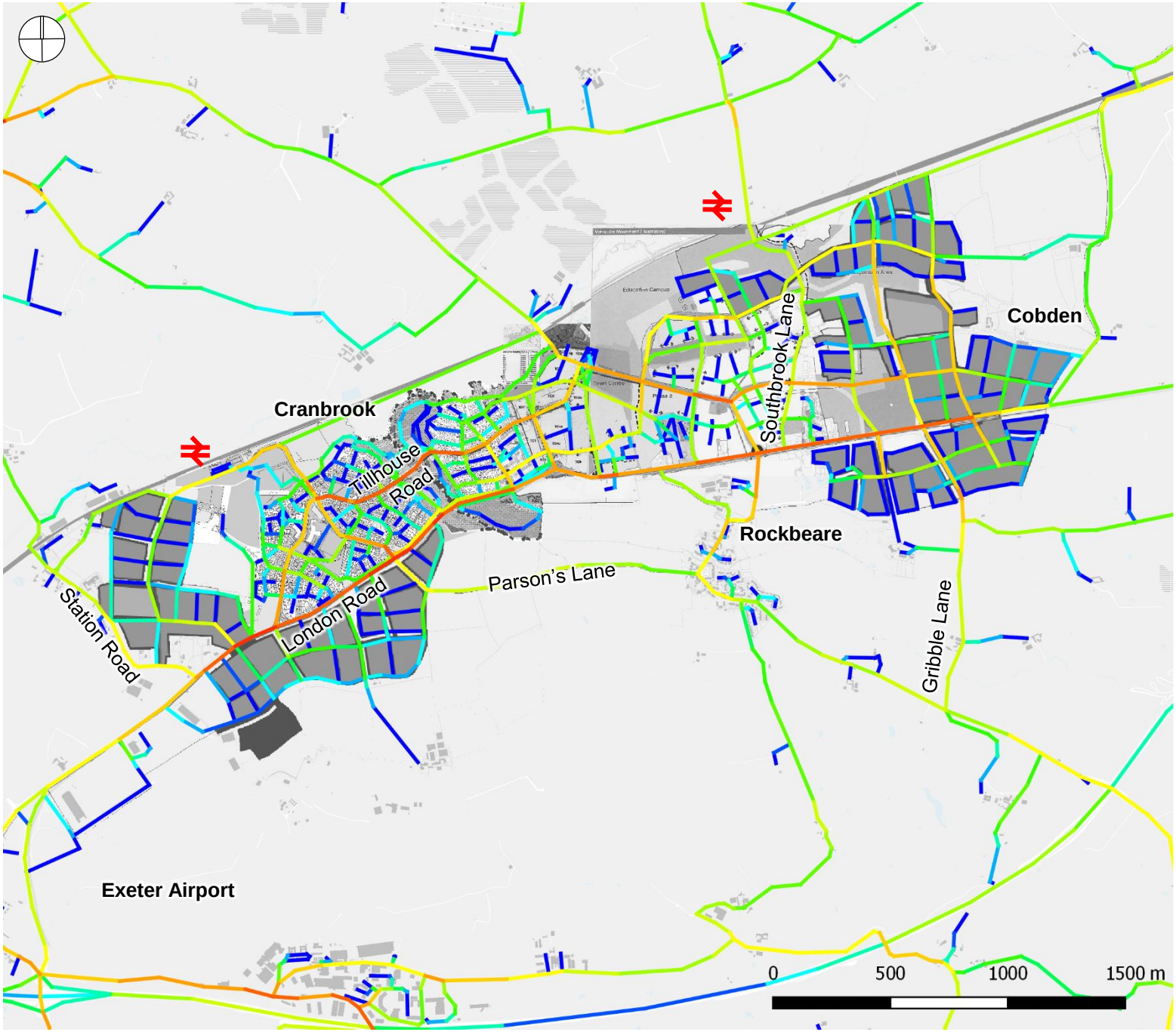

Town centre

**Spatial accessibility**

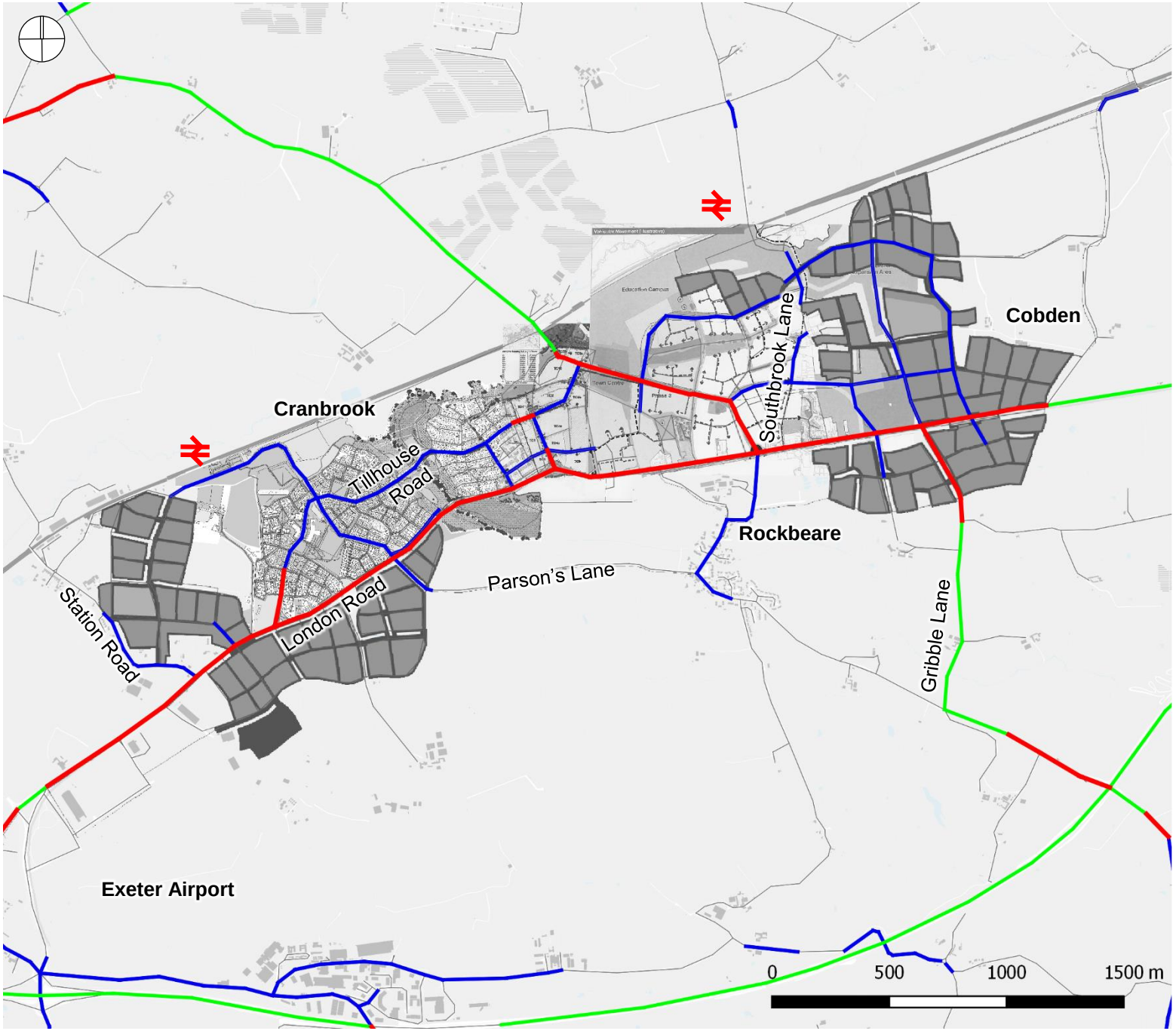
high

low

# Savills masterplan revised Local spatial accessibility



# Savills masterplan revised Multi-scale spatial accessibility

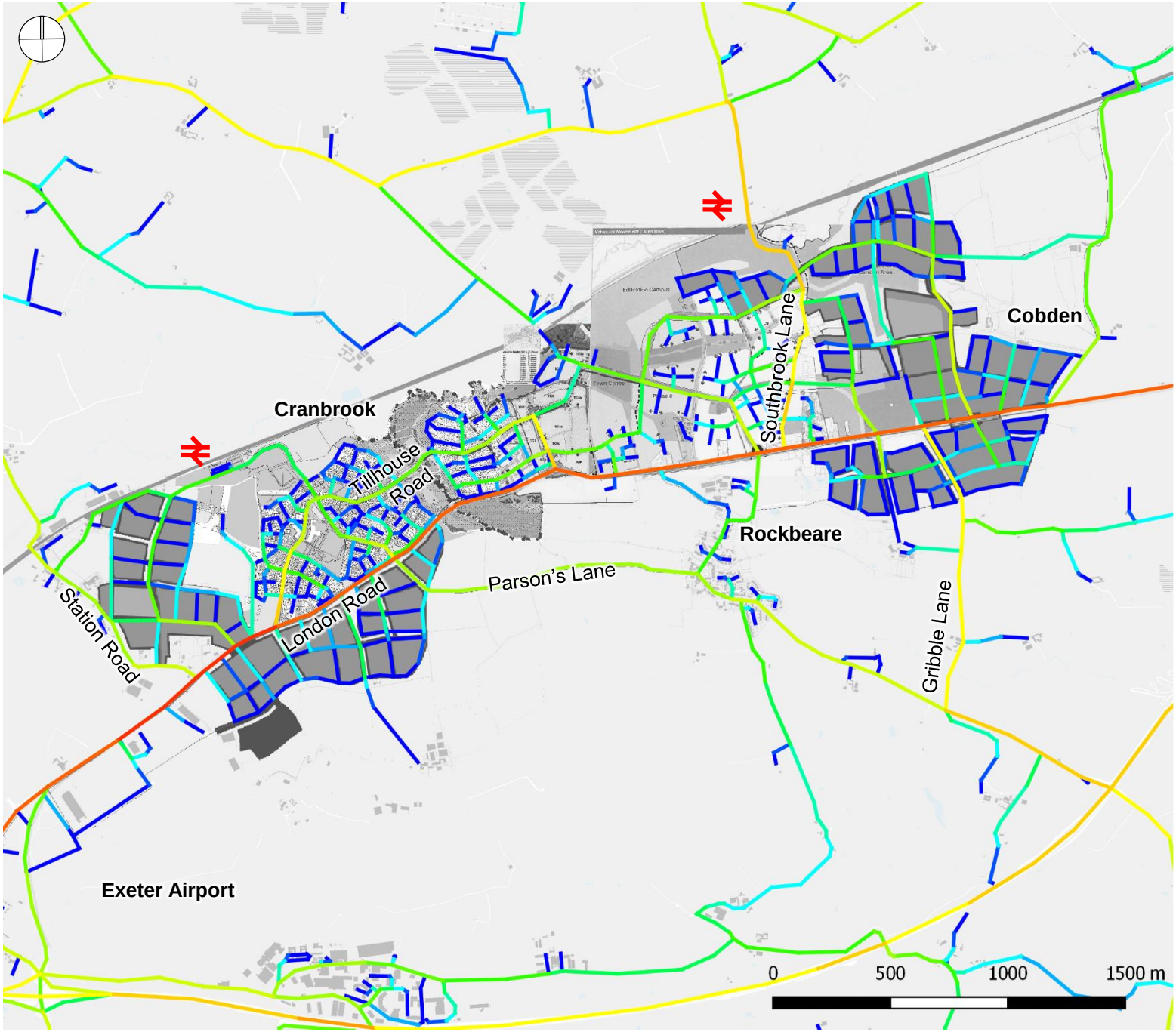



NACh10km > 1.2 , NACh2,000m > 1.2

**Primary route**

- Regional and local
- Regional
- Local

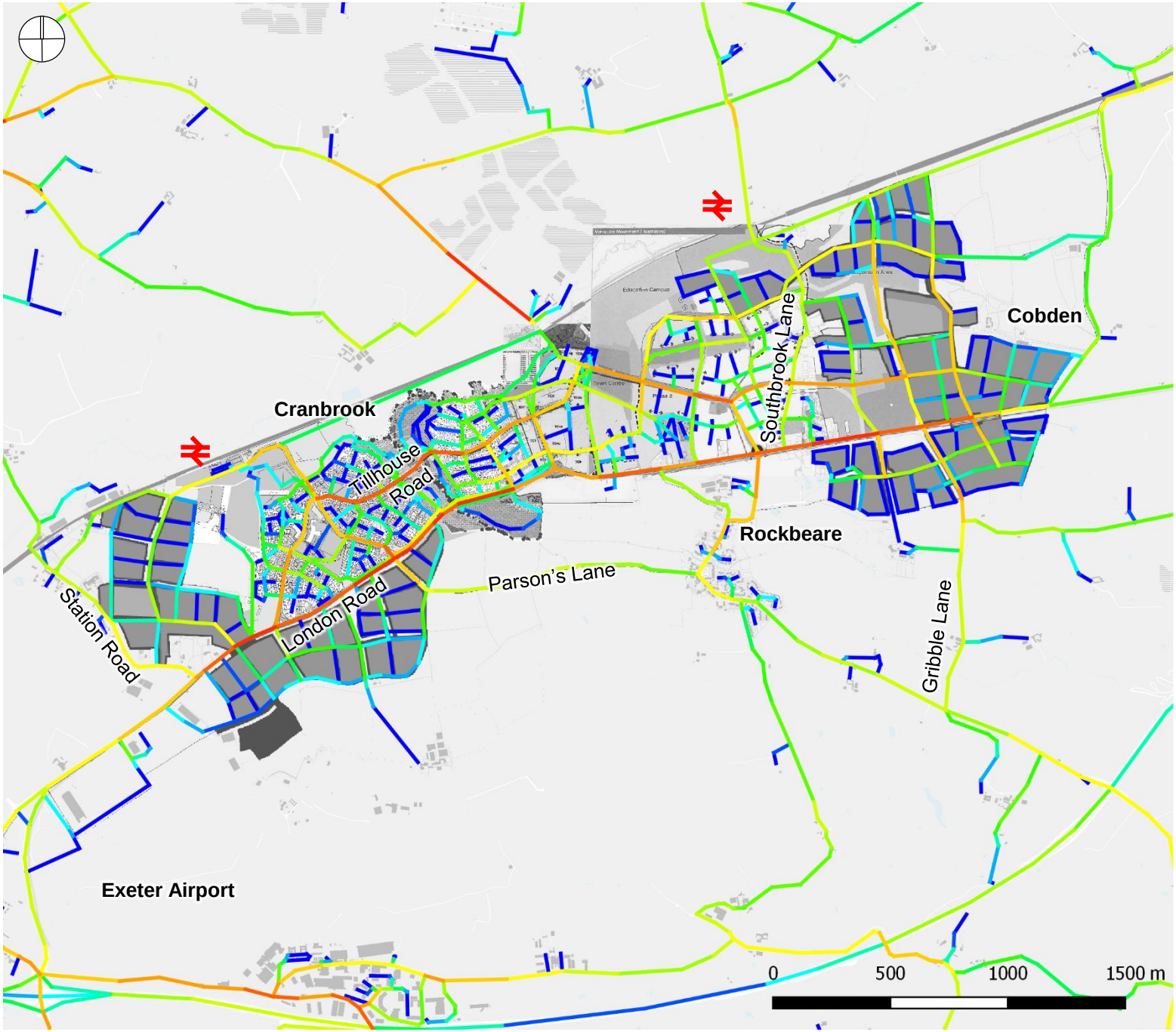
# Savills masterplan revised - Crannaford crossing closed off Regional spatial accessibility




Spatial accessibility
high
low

NACH2,000m

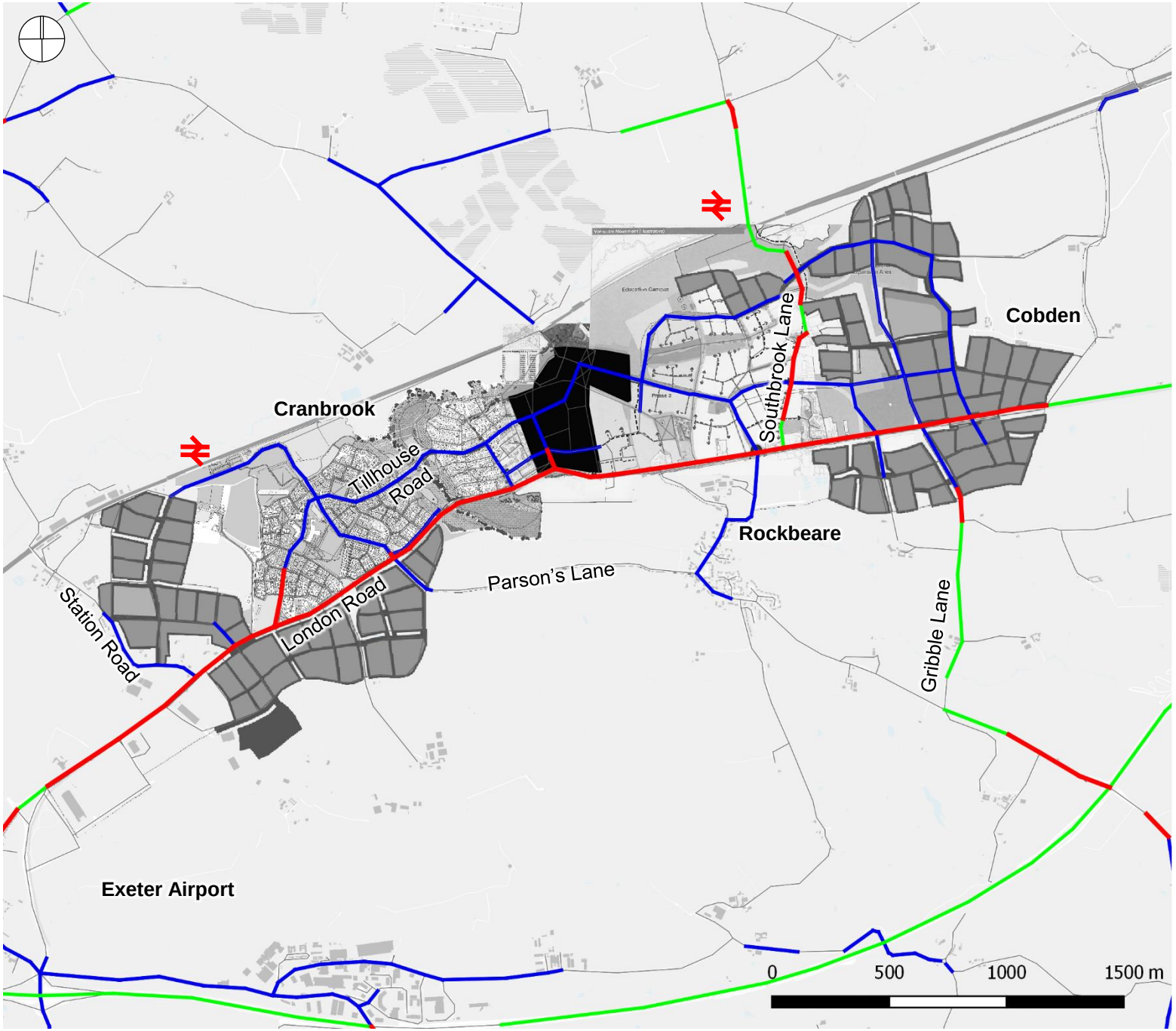
# Savills masterplan revised - Crannaford crossing closed off Local spatial accessibility




Spatial accessibility
high
low

NACH2,000m

# Savills masterplan revised - Crannaford crossing closed off Multi-scale spatial accessibility




Closing off the Crannaford crossing significantly reduces spatial accessibility along the diagonal, which becomes important only at the local scale. This reduces the potential of the diagonal to support footfall dependent town centre uses.

Southbrook Lane becomes part of the multi-scale network of streets that can support town centre development. However its location is further away from the development to the west.

Town centre

Railway station

**Primary route**

Regional and local

Regional

Local

NACh10km > 1.2 , NACh2,000m > 1.2