**Identifying potential transport modes**

Once there is a good understanding of what a transport service needs to provide, attention can turn to looking at which transport modes can best deliver those needs.

For example it is not necessarily the case that the best use of a former rail line is to re-open it as mainline rail.

The key steps in the process of defining potential modes and deciding between them are set out below

**Step 1 – decide on necessary compatibilities**

You should be starting this process with a good understanding of some key elements of the outcome specification. This will allow you to decide on the capacity and frequency of services, what the desired journey times are, whether services are captive to your proposed route or need to run through onto other networks, whether capacity to carry freight is required.

Whether or not the route needs to carry freight will be an important factor in deciding which types of passenger transport may be suitable. If freight carrying is required then it is likely that for through service compatibility that a mainline railway solution will be the most suitable.

Where mainline freight compatibility is not required then a wider range of transport system types can be considered.

If there is a need for the new route to offer interchange or through running for mainline services this also affects decisions; through running for mainline will almost certainly require a mainline railway approach to signalling and infrastructure.

The decisions on these points need to be supported with evidence to justify the choices.

Light rail options can have some lower costs than mainline railway infrastructure and vehicles, but may come with more limited operational capability.

**Step 2 – considering the compatible modes**

Table A on the next page is an example of the various types of transport that might be considered, with some selected parameters shown for each to help illustrate the high level criteria that might be useful in deciding which modes are likely to be able to provide the transport need.

It is very likely that at this stage there will be more than one mode of transport capable of delivering the service capability.

The distinction between passenger transport modes is not always specific; a tram, a tram-train, and a LRT vehicle might all be almost identical and only differentiated by how they are used and some technical details. There is a continuum of transport modes that means more than one mode will normally be able to deliver an operational need. The diagram below is intended to indicate this overlap in capabilities.

**Number of people**

**Distance moved**

**Bus**

**Tram**

**Metro**

**Commuter rail**

**High-speed rail**

**Coach**

**Bike**

**Walk**

NB The axes in this diagram, box sizes and degrees of overlap are intended to be illustrative of the concept of overlapping capability and not to be taken as absolutes.

This stage should focus on the technical capabilities of the various transport modes. You will probably need specialist advice on the capability of the various modes at this stage.

**Table A**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Compatible with Freight | Optimum passenger vehicle speed for target journey time from Strategic Case | Typical station interval | Optimum train capacity per journey from Strategic Case | Accessibility: i.e. level boarding | Example Systems | Generic Transport System |
| No | < 25 mph | 200m | 6 max | Unassisted | Heathrow Pods, Birmingham Air rail link | Personal Rapid Transit |
| No | <62 mph | 500m to 15km |  | Unassisted | Very Light Rail (Stourbridge Revolution VLR) | Light Rail |
| No | <62 mph | 500 to 1500m |  | Unassisted | Tramway (Edinburgh/Blackpool/Manchester) |
| Yes\* | <62 mph | 500 to 4km |  | Unassisted | Tram Train (Sheffield) |
| No | <62 mph? | 500 to 1500m |  | Unassisted | Light Metro (DLR) | Metro |
| Possible\* | <62 mph | 500 to 1500m |  | Unassisted | Metro (T&W) |
| Possible\* | <62 mph | 500 to 4km |  | Unassisted | Heavy Metro (TfL) |
| Yes | <90 mph | 1 to 4km  | 100 to 1000 | Assisted | Heavy Rail Inner Suburban (Merseyrail, London Suburban Network) | Heavy Rail |
| Yes | <90 mph | 10 to 20km  | 100 to 1000 | Assisted | Heavy Rail Outer Suburban (Merseyrail, London Suburban Network) |
| Yes | <110 mph | 20km to 50km |  | Assisted | Heavy Rail Cross Country/Inter City (Leeds - Manchester) |
| Yes | <100 mph | 15km to 25km |  | Assisted | Heavy Rail Rural (Borders Railway, Norwich - Great Yarmouth) |
| Yes | <125 mph | Location dependent |  | Assisted | Heavy Rail with Freight (Settle - Carlisle) |
| Yes | <100 mph (Freight only) | N/A |  | Assisted | Heavy Rail Freight only (Tilbury Line TBC) |
| Yes | >110 mph and <125/140mph | 50 to 100 miles | 250 to 1000 | Assisted | National High Speed (London - Manchester, London - Exeter) |
| Yes\* | >125/140 mph | 50 to 200 miles | 500 to 1000 | Assisted | HS1 |

\* Axle load dependent

The [Transport Mode Finder](https://bvraildev.wpengine.com/transport-mode-finder/) on the BVR website is intended to give an interactive representation of this chart.

**Step 3 – consider commercial and legal aspects**

After narrowing down the types of transport modes that might deliver the service need there needs to be some more specific thinking on the practicality of using the various modes.

This includes for example deciding whether there are existing vehicle fleets that could be used to provide the service, if there are obvious operators who could take on the operation of the service, and the equivalent for the infrastructure including stations.

Where there are existing companies or equivalent then this might simplify the development of the proposals. Where no existing vehicles, operators or infrastructure managers are identified this is not necessarily a blocker to the proposals but indicates that timescales for development might be longer and that additional advice would be needed on setting up the operational aspects of the project.

Other commercial issues should be considered, for example if a light rail system is created which serves to extend mainline services, passenger through ticketing to be offered, what might happen in times of disruption?

You should also take advice on whether there are any legal constraints on the type of transport mode you have selected, or whether different legal routes might be needed to gain authorisation to construct and operate the route dependent on the mode.

**Step 4 – choosing a mode of transport**

Once the previous steps have been taken, to set out an objective set of performance requirements, narrow down the types of transport mode that can deliver these, and look at the deliverability of each mode, then a case can be built for which transport mode is likely to best deliver the project objectives. The case should also take into account other relevant factors – whether that is integration, technical risk appetite, future-proofing etc.

It is advised that the decision is made through a panel independent of the project development. The panel should have wide representation including those with construction, operational and maintenance experience, along with key external stakeholders, and potential funders. For projects likely to involve an existing infrastructure manager they should be included.