

# Modelling in the West of England



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# What are transport models?

Transport models are digitised, mathematical representations of the transport system. Transport models are used to evaluate existing conditions and to determine future effects and needs. They can represent different modes of transport and show the user the conditions for a defined base year or forecast conditions in future years and at different time periods, such as peak periods.

## Benefits

- Demonstrating how the transport system is used
- Helping to forecast the consequences of different transport and land use policies
- Supporting transport investment decision-making

West of England Combined Authority has developed the West of England Regional Transport Model (WERTM).

WERTM has been developed in line with the DfT's Transport Analysis Guidance.

# Types of transport models

## Strategic transport models

- Cover large areas such as regions, local authorities, cities and towns
- Include all the main transport routes such as motorways, main roads, bus and rail routes
- Generally used to test large transport schemes or area-wide policies
- WERTM is an example of a strategic transport model

## Local transport models

- Cover specific areas, usually including detailed road junction layouts
- Local models are typically used operational assessment such as testing new junctions layouts, or new traffic signals and timings

# Types of transport models

## Highway model

- Used to represent trips/journeys that use the highway network within a particular area
- The highway network may include strategic routes including motorways and A-roads and other roads including B-roads and local roads
- Highway models include car, light goods vehicle and heavy goods vehicle movements
- Car journeys may be categorised by journey purpose such as commuting, business, education, leisure

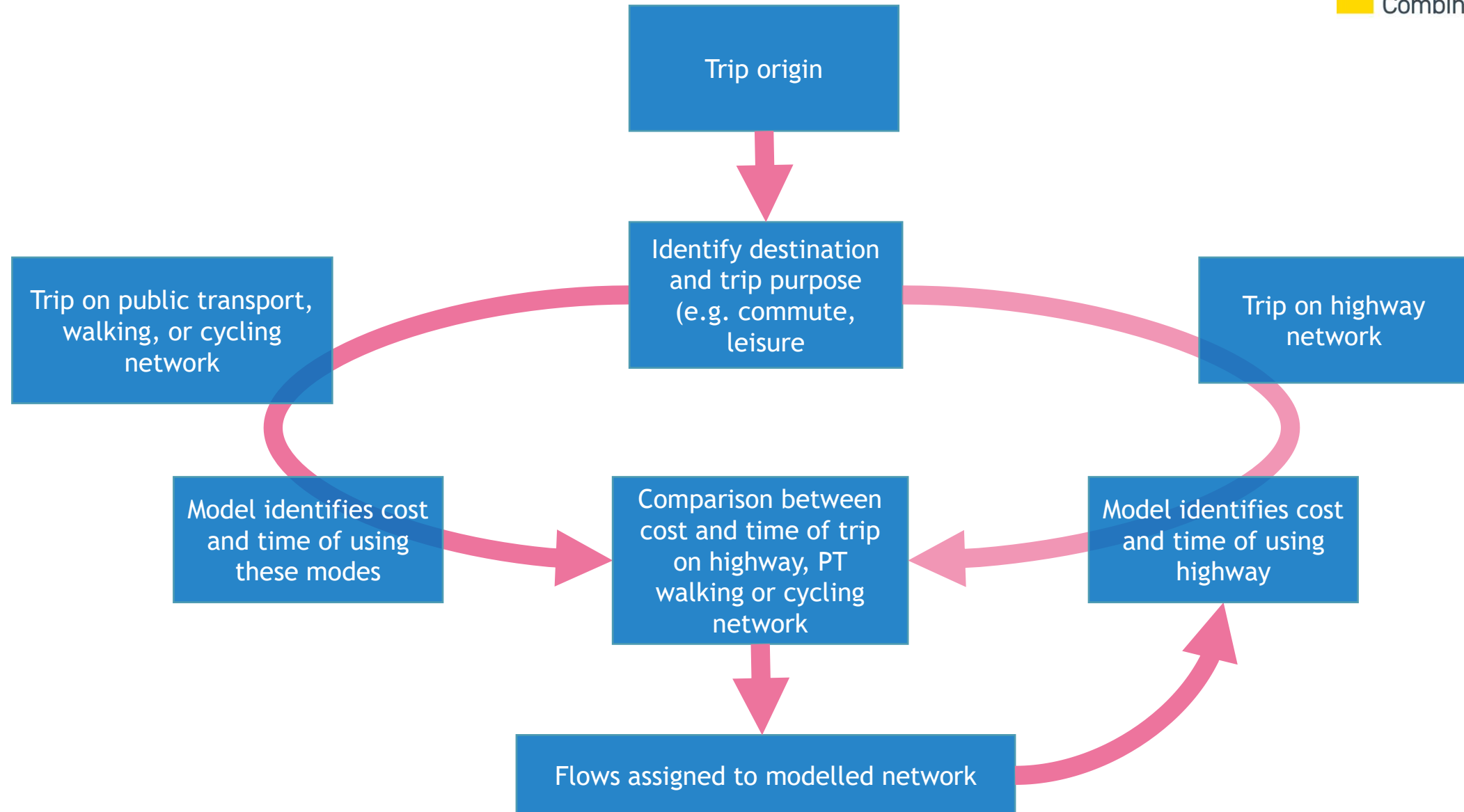
## Public transport model

- Represents journeys that use the rail and bus networks, often down to the level of individual bus journeys and rail services
- Walking and cycling are often also included as ways of accessing the public transport network

## Demand model

- Demand models represent the trips that take place across all modes of transport
- A demand model will assign a trip based on cost/time analysis to a particular mode of transport between the start and end of that trip
- It allows the transport model user to test options that affect both the public transport and highway networks
- For example, a new rail station will increase demand for rail while at the same time reducing demand on the highway network.

# How do transport models work?



# Primary baseline data

Transport models are developed using a significant amount of data. Primary data has been collated by the Combined Authority for the development of WERTM

**Link counts** - data collected on roads and on rail and bus routes to identify the number of vehicles or passengers using each section of the transport system. Two specific link count methods on roads are:

- **Automatic Traffic Counts (ATC)** - undertaken using rubber tubes across the road that count the number of vehicles (and vehicle axles) that pass over them. There are normally for 24 hours a day over a 1 or 2 week period.
- **Manual Classified Count (MCC)** - typically collected from camera footage, recording the vehicles passing and later counted by a person or specialist software. This data is often collected for a 12-hour period and provides a detailed breakdown of the number of each vehicle type such as car, bus, heavy goods vehicle (HGV) etc.

**Face-to-face interviews** - used to obtain a sample of individual journey information, detailing start and end locations, purpose of the journey, how the journey is made, ticket types used and frequency of journey.

*We were unable to include any interviews as part of the development of WERTM due to the pandemic.*

**Boarding and alighting counts** - counts of the number of people using public transport such as rail or bus. They are collected at stations or bus stops and represent the number of people using the services

# Secondary baseline data

Secondary baseline data is available from external sources that have been used for model development

**Mobile phone data (MPOD)** - anonymised information on the start and end points of journeys made, collated by mobile phone network operators based on communications between individual phones and cell towers.

**In-vehicle journey time data** - this is generally gathered from on-board GPS devices and is used to determine the average speeds of vehicles at different times of day on each road within the modelled region.

**MOIRA data** - rail station and route usage statistics based on ticket sales.

**WebTRIS** - traffic flow data covering the Strategic Road Network at all times of the day

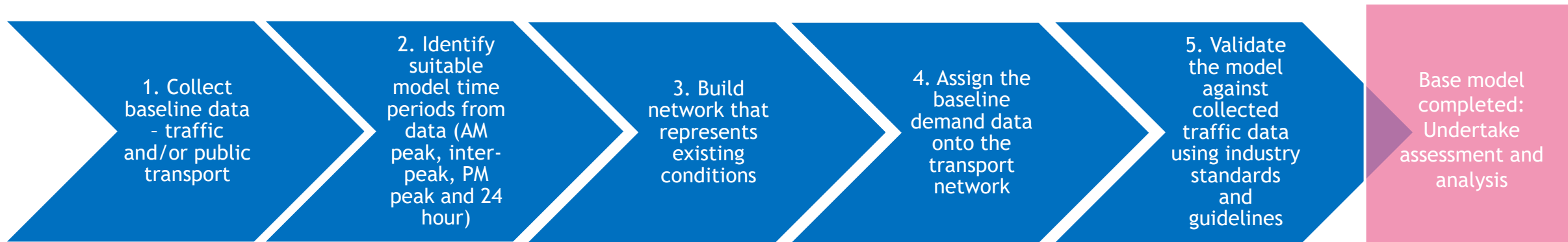
**Local Authority data** - includes traffic counts, traffic signal timings and car park occupancy data

**Census** - provides supplementary information for England and Wales, including the mode of transport used for journeys to work.



# Building a transport model

## Base Year



# Building a transport model

## Future years

1. Base year model - validated and calibrated model that represents the existing conditions
2. Develop an uncertainty log which identifies all possible developments and transport scheme within the modelled area and the likelihood of the scheme or development being completed
3. Based on the level of development, and any key schemes proposed along the network, identify forecast years - this is done in consultation with key stakeholders including the Combined Authority and Unitary Authorities
4. Using the uncertainty log identify the locations and size of all likely developments within the model for each forecast year - stakeholders are part of this identification process
5. Apply increase in demand based on type of development at key locations and apply general growth based on the National Trip End Model

# West of England Regional Transport Model

## WERTM covers

- Bath and Northeast Somerset
- Bristol
- South Gloucestershire
- North Somerset

## And includes:

- A Highway model (SATURN)
- A Public transport model also containing walking and cycling (VISUM)
- Variable demand model (VISUM)

A base year of 2019 has been developed as well as future years of 2029 and 2042.



# Purpose of WERTM

Improve consistency and quality of the evidence base for transport decision making throughout the West of England

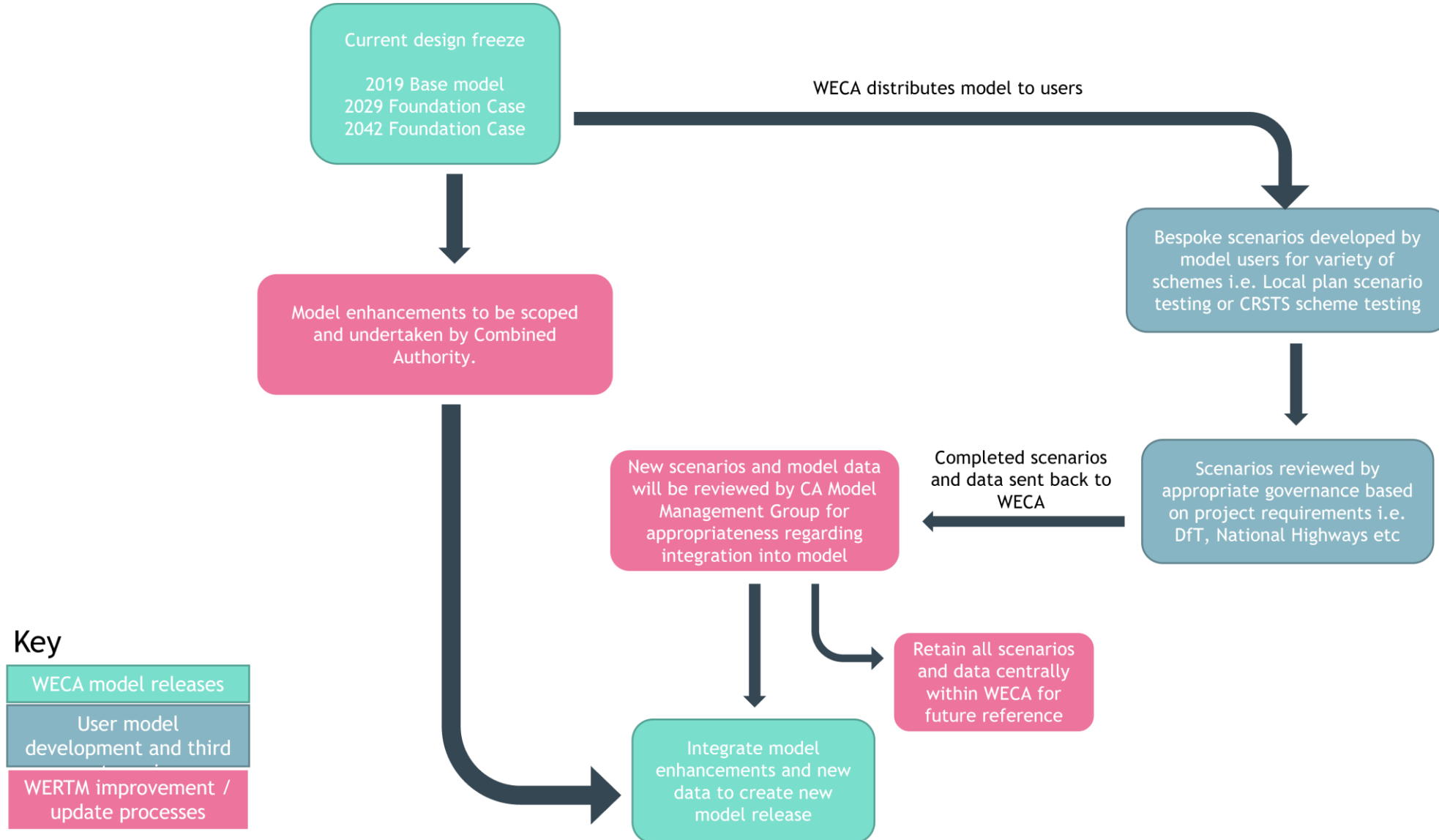
Provide the highest standard of tools available to assess current and future transport policies and projects

Reduce the need to commission ad-hoc or scheme specific strategic models and provide a robust and consistent modelling framework for the region

## Potential uses

- Assessing cumulative impact of development
- Database of detailed trip-making information
- Supporting scheme development and statutory processes
- Supporting decision making and major policy interventions
  
- Future 4 West
- CRSTS
- Local Plans
- Joint Local Transport Plan 5

# WERTM use and update process



# Model outputs

- Traffic flows
- Traffic speeds
- Highway delays
- Bus and rail passenger numbers
- Mode to/from rail station or bus stop (e.g. walk, cycle, car)
- Mode share
- Trip length
- Traffic and passenger flow comparison (between scenarios)
- Speed and delay comparisons
- Journey time analysis



# Glossary

**Transport system:** Any form of transport (rail, car, bus etc) that allows people to move between different locations.

**Modes of transport:** Form of transport used such as rail, bus, car etc.

**Base year:** The year during which all baseline data was collected and the year to which the model is validated.

**Peak periods:** The busiest times on the transport system such as morning (AM) or afternoon (PM) peaks.

**Strategic transport models:** Transport models that represent larger areas, such as entire regions or cities, including the main road and public transport networks.

**Network:** The representation of the highway or public transport network that is used in the model, also known as the transport ‘supply’.

**Demand:** Journeys/trips that people want to make on the transport network.

**Uncertainty Log:** A log of future developments within a study area including residential, employment, highway and public transport.

**Origin:** Starting location of a journey/trip.

**Destination:** End location of a journey/trip.

**Trip(s):** Describes the journeys made between two locations.

**Baseline data:** Any data which has been collected to help develop the model base year.

**Multi-modal:** Representing different modes of transport, rail, bus, car etc.

**Evidence base:** The essential data and information needed to justify a decision on a current or future transport project.

**TAG:** The Department for Transport’s Transport Analysis Guidance (TAG) provides advice on how to conduct an appraisal that meets the requirements of the DfT. Projects or studies that require government approval are expected to make use of this guidance in a manner appropriate for that project or study. For projects or studies that do not require government approval, TAG should serve as a best practice guide.

# Contact us

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