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OUTPUT

Indicator	Level of access to public transport

Description

Proportion of the population without access to public transport, low level of access to public transport, medium level of access to public transport, high level of access to transport and very high level of access to transport.
This indicator describes how well the distribution and frequency of public transport covers the needs of the population and was calculated following the methodology proposed by the JRC.
This calculation took into account, on one hand, bus stops (urban and intercity) located less than a 5-minute walk (400 m along the street route) and on the other, the metro and the commuter train, which are combined into a single class. In this case, the accessibility distance defined by the JRC is a 10-minute walk (equivalent to 833m on the road network).
The classification of accessibility according to the proximity to public transport stops and the departure frequencies of each method of transport are shown in the table below:

Subway and commuter train

Bus: Frequency (departures/h)	High (>10)	Medium (4-10)	Low (<4)	No service
High (>10)	Very high	High	High	High
Medium (4-10)	High	Medium	Medium	Medium
Low (<4)	High	Medium	Low	Low
No service	High	Medium	Low	No access

The indicator was calculated for two scenarios, since the frequency of departures at the different stops is unknown, based on the description of the means of transport in the public transport plan.
Scenario 1: considering that all means of transport will have a high frequency of departures.

Scenario 2: considering that the frequency of train and metro departures, as well as BRT stops, will be high, with the rest of bus stops having an average frequency

Type	GIS	**Source**	Manual for the preparation of VLRs (JRC)

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OUTPUT

Data source

Madrid Nuevo Norte

Network, stops and departure frequencies of public transport in Madrid Nuevo Norte	**BIM**	YES

Combination of the following files into a single GIS layer:

- 1997 SPECIFIC MODIFICATION OF THE CITY PLAN in the Planning Areas: APE 08.03 “Prolongación de la Castellana” AND APE 05.27 “Colonia Campamento” for the Definition of the Determinations and Planning Parameters of the Urban Development Operation "Madrid Nuevo Norte". IV. ANNEXES. Annex 9. Mobility Strategy in the Sustainable mobility SMCP. Proposal developed in the SMCP (Population with potential access to the study area based on the estimated travel times, Urban Digital Insight)
- MNN_AD.GDB
- Red - Transportes_MPG_200211.

Street layout	**BIM**	NO

Combination of the following files into a single GIS layer:

- AreaMovimiento.GDB
- 1997 SPECIFIC MODIFICATION OF THE CITY PLAN in the Planning Areas: APE 08.03 “Prolongación de la Castellana” AND APE 05.27 “Colonia Campamento” for the Definition of the Determinations and Planning Parameters of the Urban Development Operation "MADRID NUEVO NORTE". V. DETAILED PLANNING DOCUMENTATION 4. Specific Urban Development Regulations

Comparison

Network, stops and frequencies of public transport in the Region of Madrid

- Metro network in GTFS (General Transit Feed Specification) format (2021) (https://datos.crtm.es/)
- Commuter Train Network in GTFS (General Transit Feed Specification) format (2021) (https://datos.crtm.es/)
- Network of Intercity Buses of the Region of Madrid in GTFS (General Transit Feed Specification) format (2021)(https://datos.crtm.es/)
- Madrid Urban Bus Network: EMT, in GTFS (General Transit Feed Specification) format (2021)(https://datos.crtm.es/)

Street layout

- Roadway: Travel axes. NOMECALLES. Official nomenclator and street map of the Region of Madrid (https://www.madrid.org/nomecalles/DescargaBDTCorte.icm)

Population: Location and number of inhabitants

- Population polygons: Urban Atlas 2018 (https://land.copernicus.eu/)

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OUTPUT

Calculation method

As mentioned before, the methodology proposed by the JRC was followed to calculate accessibility.
The data from Google Transit was used for the departure frequencies. In some cases, the stops had departure frequencies in minutes, so in those cases, the information was used directly. In cases where frequency data were not available, the frequency was approximated based on the bus, metro and commuter train stop times. After the data tables were prepared, they were associated with the stops using the Join attributes by field value tool (using the unique code of the stop as a join field). When the service area was calculated, the information associated with the stops was collected in the attributes table of the service areas.
After selecting the population polygons with access to the different stops (as specified in the section "Methodology for calculating accessibility indicators), the Select distance within tool was used to associate each polygon with the information contained in all of the service areas within the tolerance limit (25 m for Madrid, 50 m for Madrid Nuevo Norte) with the tool Join attributes by proximity.
This operation produced a layer with the information of the closest service areas associated with each polygon. Since the relevant information is that of the stop or station with the highest departure frequency that is accessible from the polygon, this information is summarised in a dynamic Excel table where the value of bus, metro and commuter train stop with the highest number of departures per hour is taken for each polygon (identified with a unique code).
After carrying out this operation, the transport access levels were classified according to the table in the previous section and the population polygons were reassociated using the Join attributes by field value tool.
During the activity of Madrid Nuevo Norte, the precision of the indicator may be improved with the actual population figures and locations, the detailed layout of the streets in Madrid Nuevo Norte and the actual locations of the bus stops and the actual departure frequencies of the different means of transport.

OUTCOME

Indicator	Unit	Source
Motorisation index	N	Region of Madrid (https://www.comunidad.madrid/gobierno/datos-abiertos)
Number of passengers on EMT	N	Strategy for localisation of the SDGs in the city of Madrid (https://www.madrid.es/portales/munimadrid/es/Inicio/El-Ayuntamiento/Cooperacion-y-Ciudadania-Global/Agenda-2030/Estrategia-de-localizacion-de-los-ODS-en-la-ciudad-de-Madrid/?vgnextfmt=default&vgnextoid=b7b75cd724a38710VgnVCM1000001d4a900aRCRD&vgnextchannel=5347a62071048710VgnVCM1000001d4a900aRCRD)
Number of passengers on Metro and Commuter Train	N	