



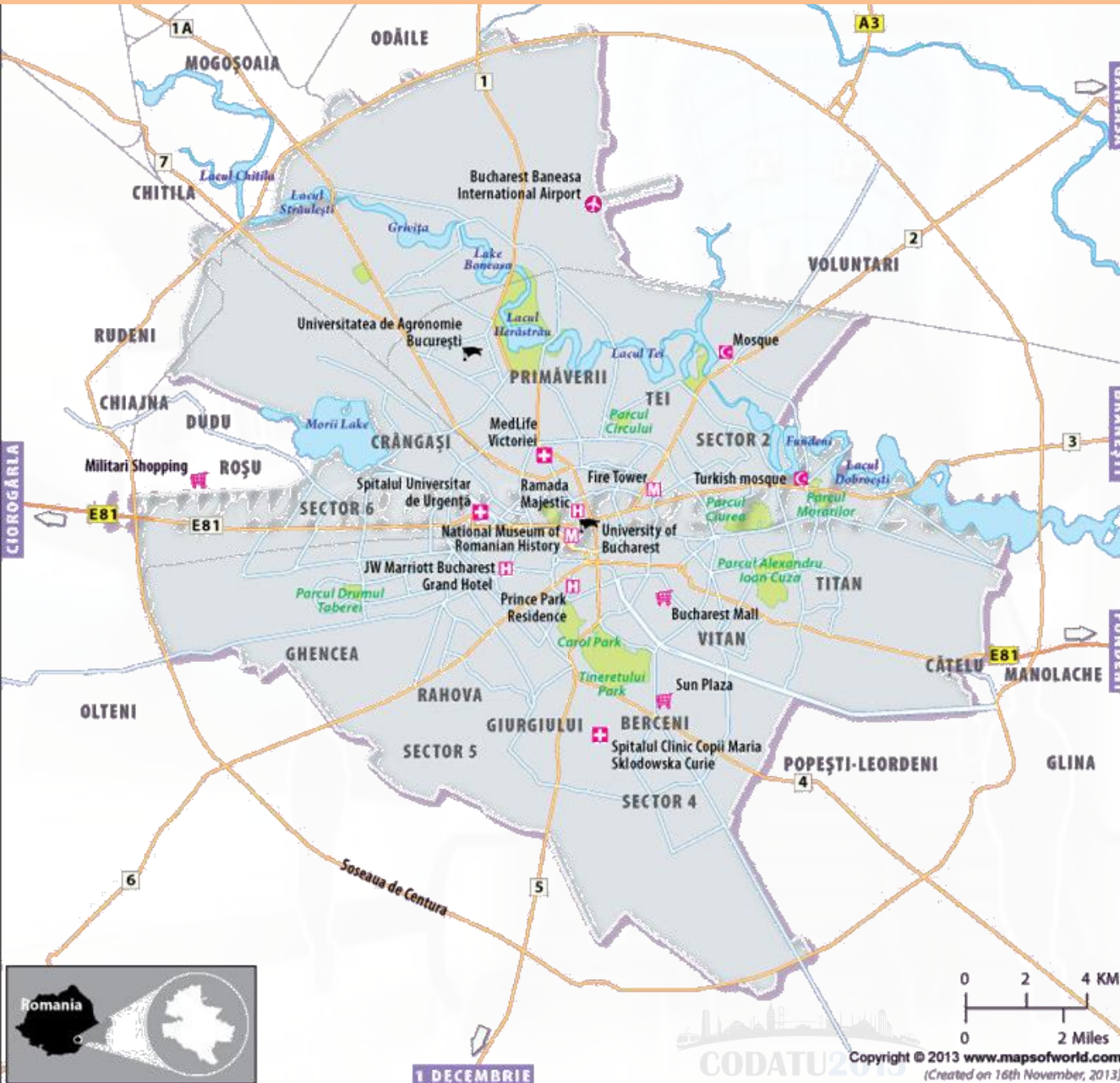
EVALUATION OF THE PERFORMANCE OF URBAN PUBLIC TRANSPORT CONNECTIVITY BACKGROUND OF THE CONNECTIVITY ISSUES IN BUCHAREST PUBLIC TRANSPORT MAIN STOPS



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Bucharest city



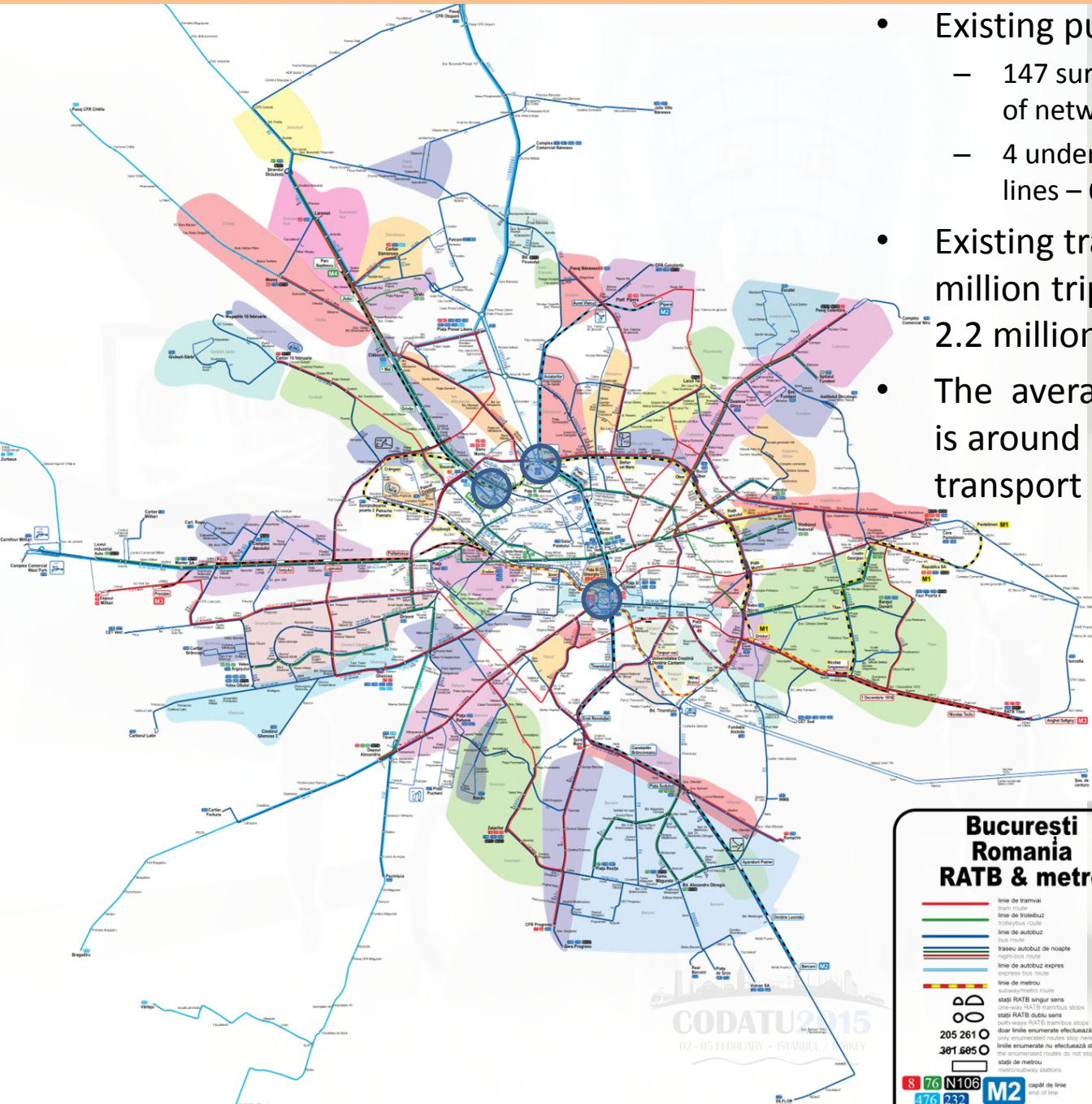
Capital city of Romania
 Urban area : 228 km²
 Population : 1,883,425
 Demographic density:
 8,260/km²



- National Highway
- Railway
- Shopping Center
- Airport
- Hospital
- Hotel
- Tourist Place
- Other Road
- State Highway
- Educational Inst.
- Museum
- Vegetation
- Waterbody
- Mosque

Urban public transport system

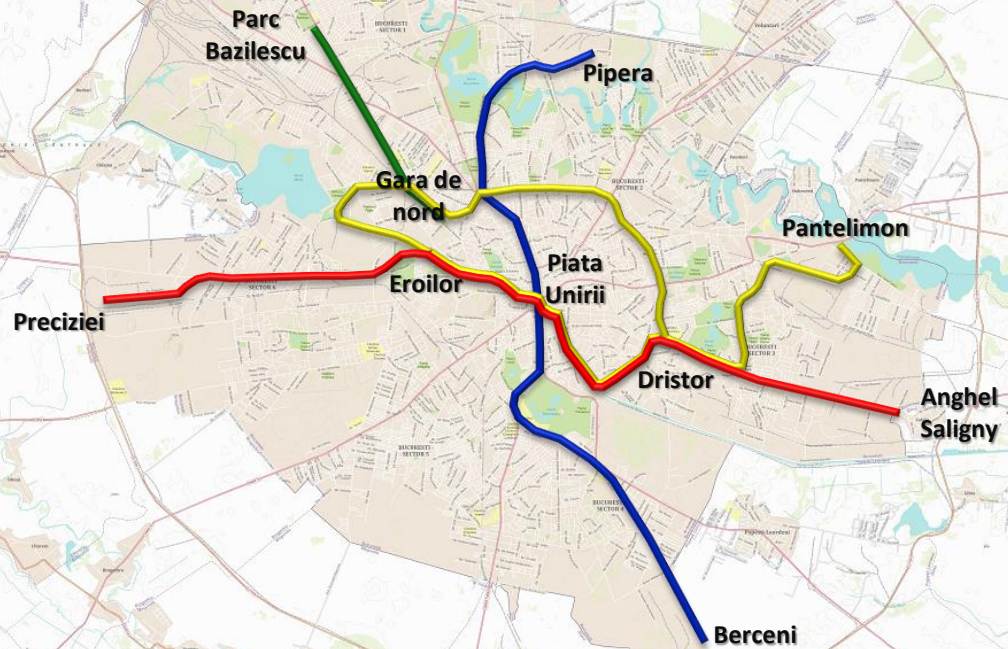
- Existing public transport network:
 - 147 surface public transport lines – 370 km of network
 - 4 underground public transport (metro) lines – 62.25 km of network
- Existing transport demand: around 3.8 million trips/day, from which around 2.2 million public transport trips/day
- The average metro transport demand is around 20% of the entire public transport demand



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New connection stop in the public transport system - Design

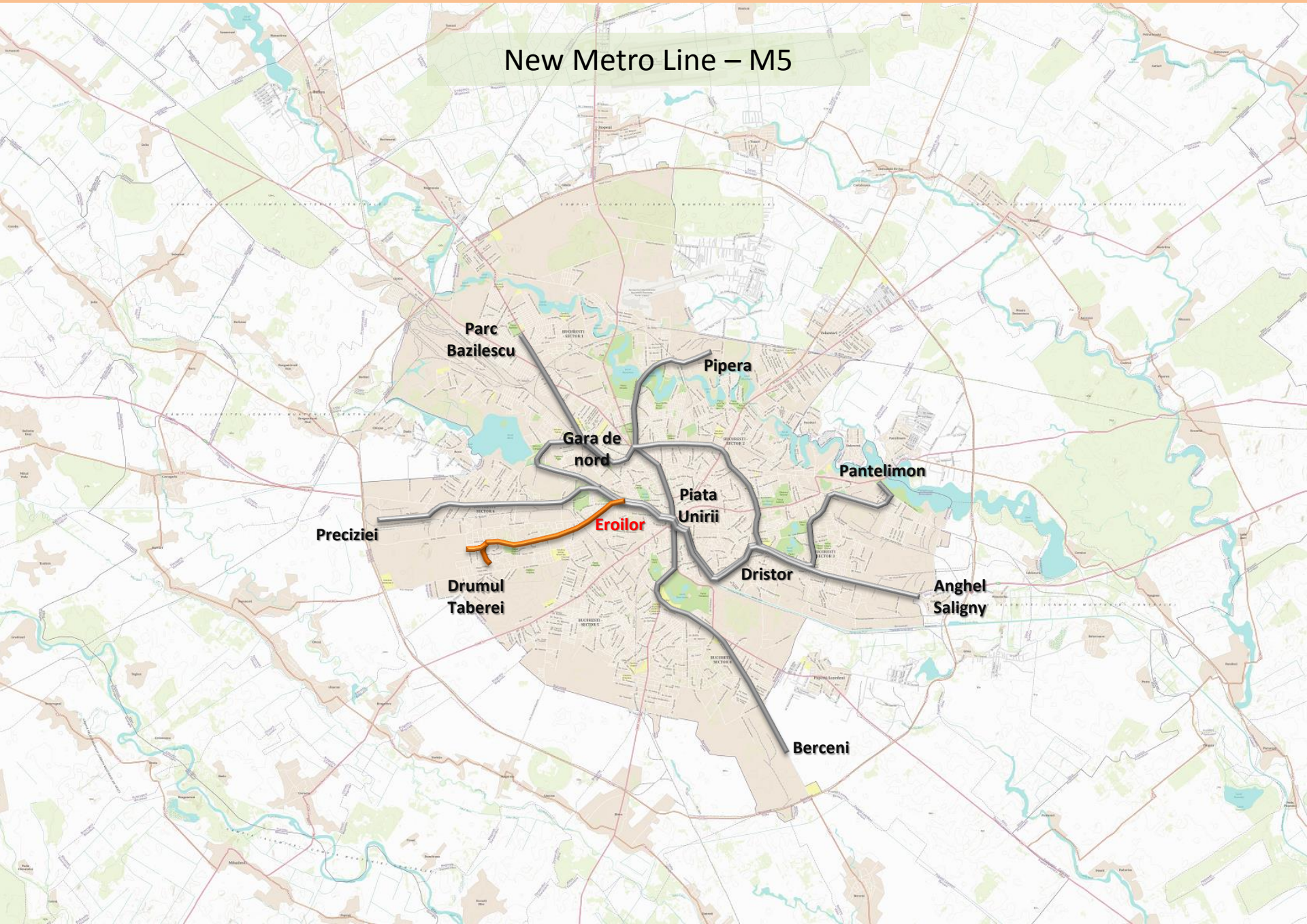
Existing metro network



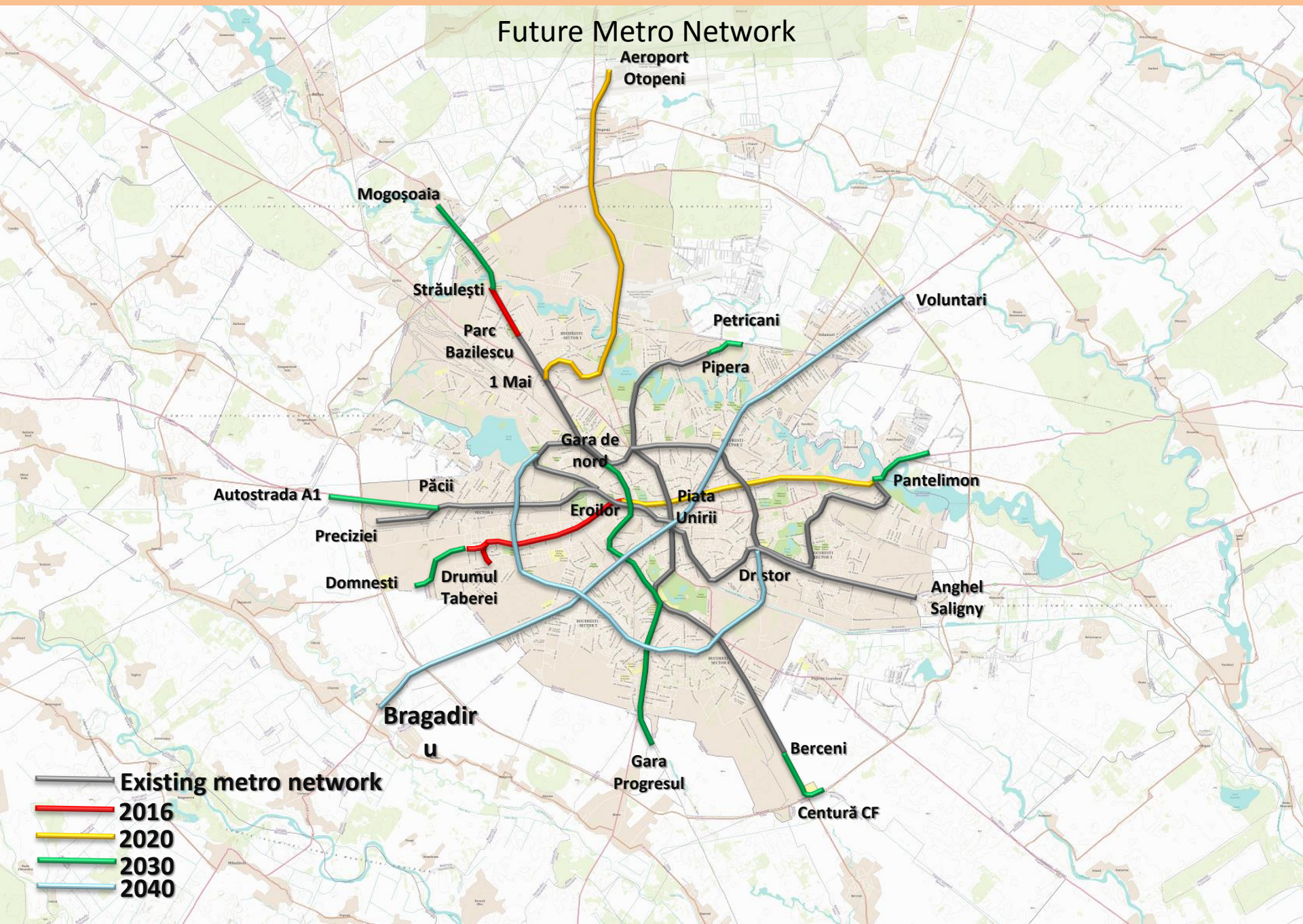
- M1** Pantelimon-Dristor
- M2** Pipera-Berceni
- M3** Preciziei-Anghel Saligny
- M4** Gara de nord-Parc Bazilescu

New connection stop in the public transport system - Design

New Metro Line – M5





New connection stop in the public transport system - Design



Eroilor public transport node scheme

Existing stop points and metro accesses



-  Metro Access
-  Bus/Trolleybus station

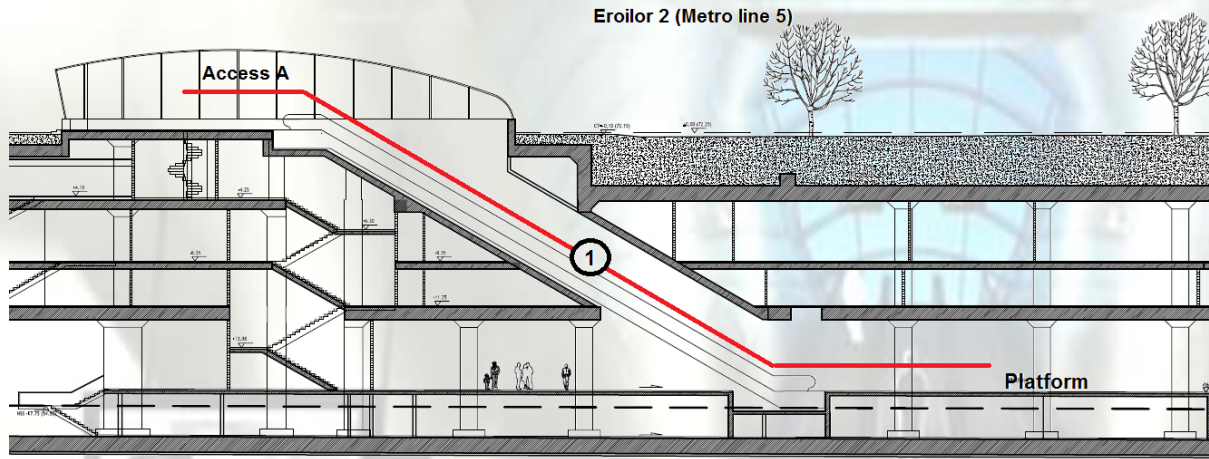
-5 bus stops
-4 access to the
under ground
transport

Eroilor public transport node scheme

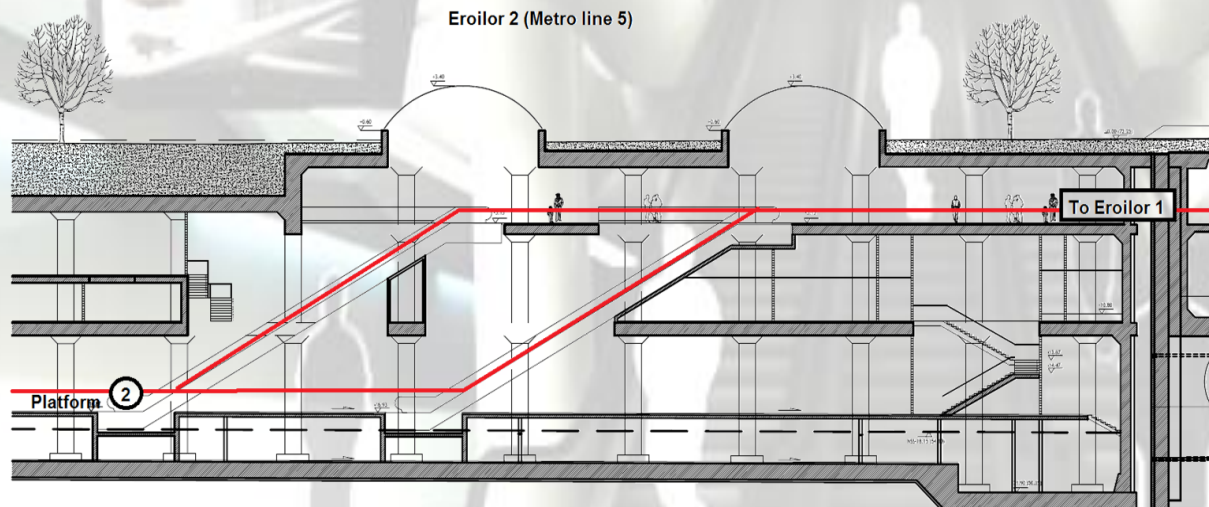
New metro configuration



Pedestrian routes in the new metro station

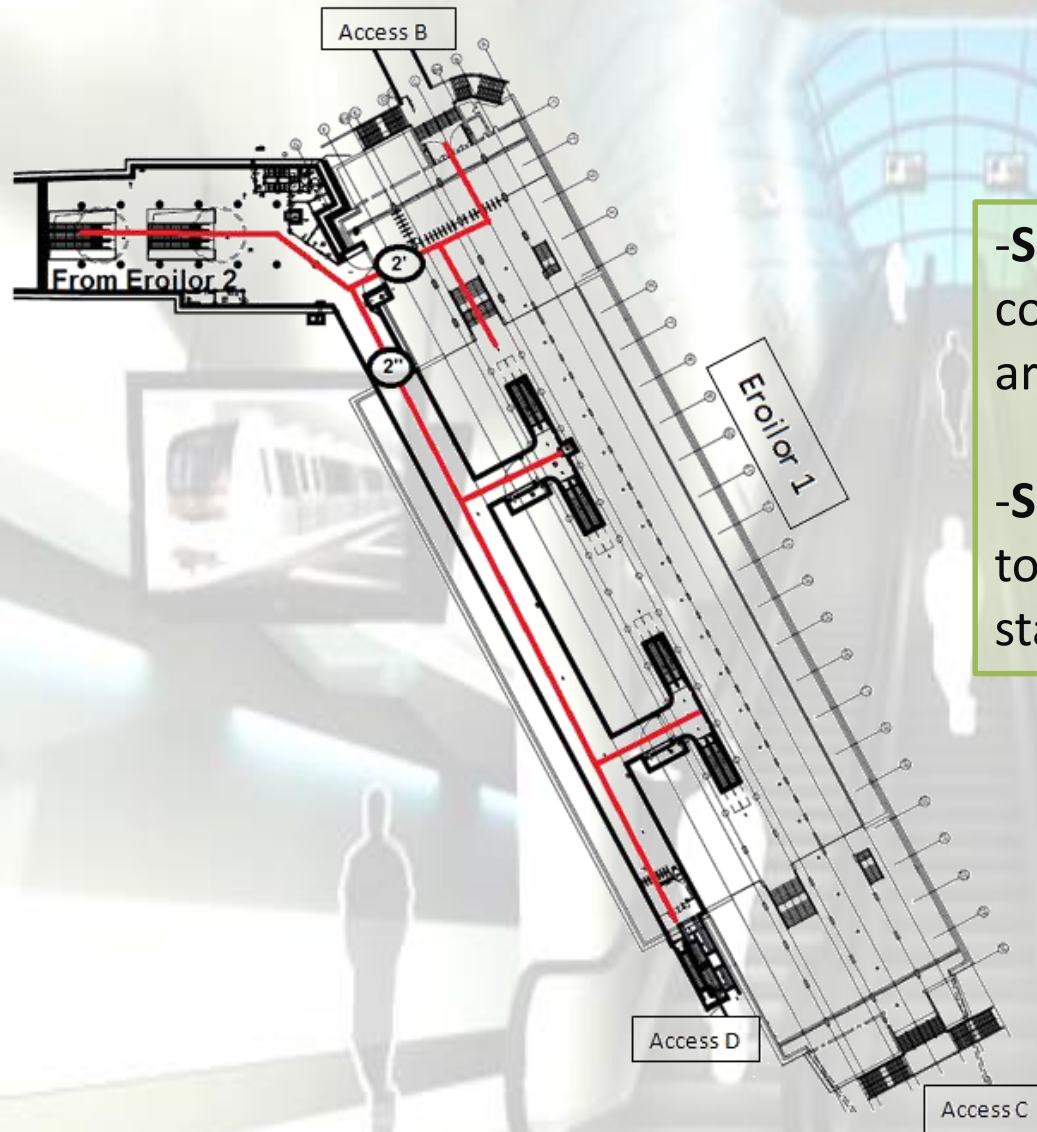


The **first route (1)** – between the platform and ends at the gate line of the access



The **second route (2)** – between the platform and the old station.
2 subroutes – one for transfer and 1 for exit/entrance

Pedestrian routes in the passageway between metro stations



- Subroute 2'** – leads to the transfer corridor to the existing Eroilor station areas
- Subroute 2''** – leads to the other directly to the new designed access of the new station

Capacity assessment methodology

Level of service	Description (for queuing areas, walkways and stairways)
A	Free circulation.
B	Uni-directional flows and free circulation. Reverse and cross-flows with only minor conflicts.
C	Slightly restricted circulation due to difficulty in passing others. Reverse and cross-flows with difficulty.
D	Restricted circulation for most pedestrians. Significant difficulty for reverse and cross-flows.
E	Restricted circulation for all pedestrians. Intermittent stoppages and serious difficulties for reverse and cross-flows.
F	Complete breakdown in traffic flow with many stoppages.

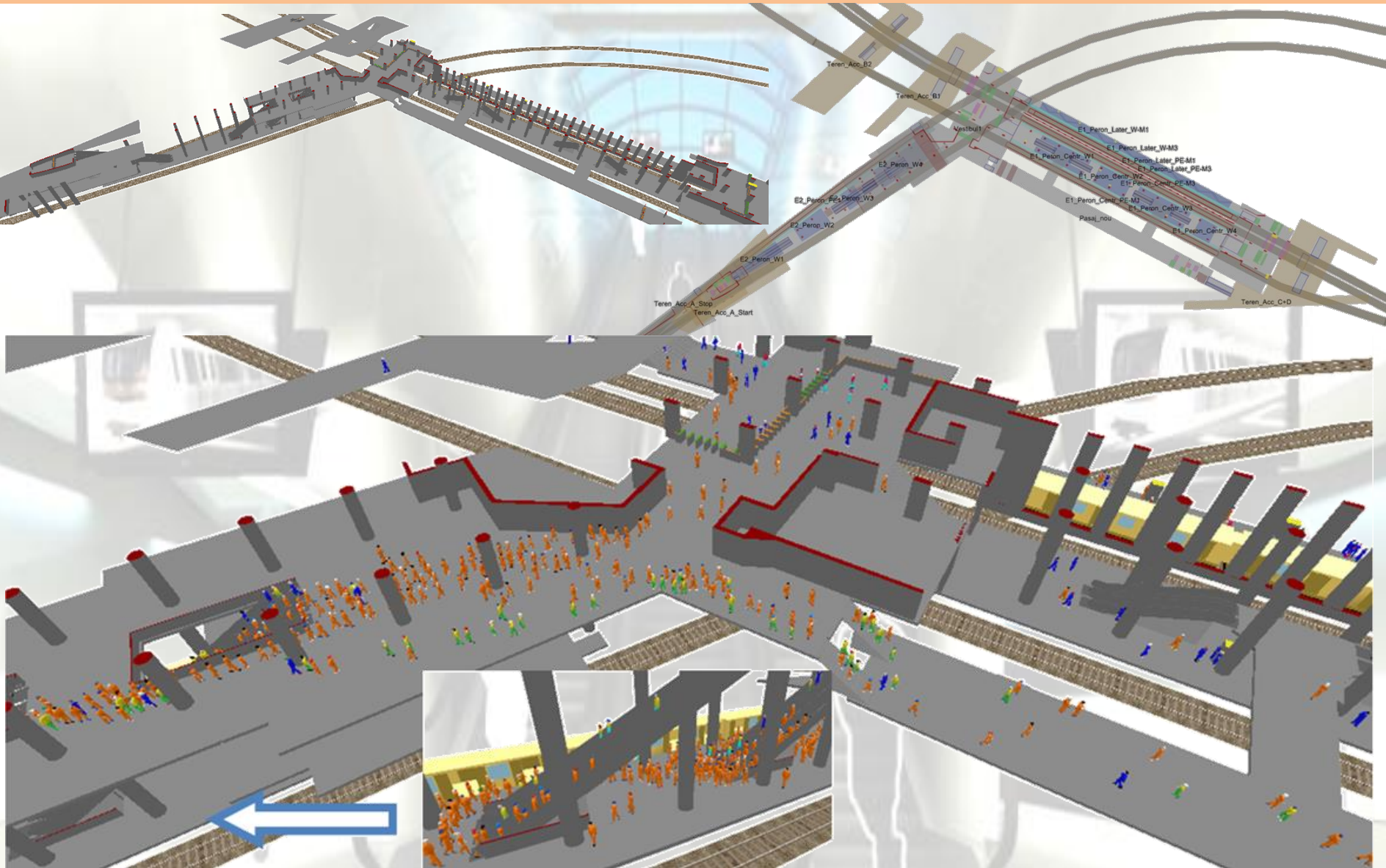
- Main design elements:

- Platforms
- Escalators
- Stairs
- Passageways/corridors
- Gate lines

- Unit capacity for each design element:

- 0.5 sq m/person for platform (LOS D)
- 100 passengers/min for escalators
- 28 passengers/min/meter width (LOS C) for the two-way stairways
- 40 passengers/min/meter width (LOS C) for the two-way passageway
- 25 passengers/min/gate for the gate line

Pedestrian movement evaluation



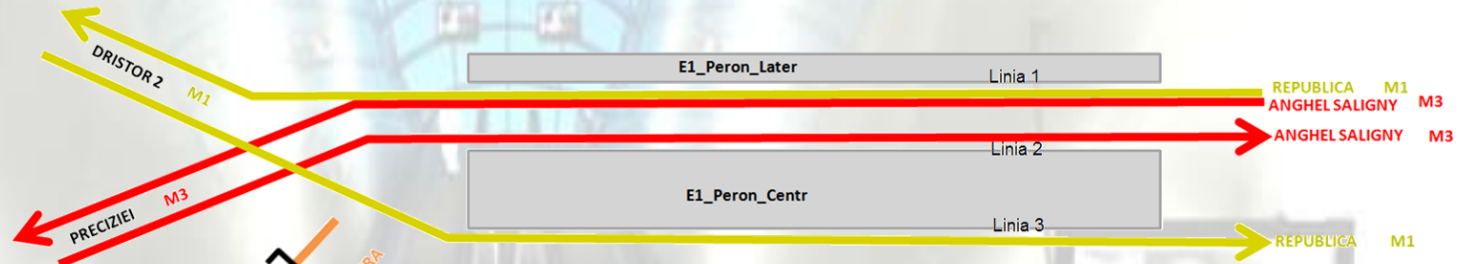
Pedestrian movement evaluation

Passengers flows between station elements

From	To	E1_Peron_Later_PE-M1	E1_Peron_Later_PE-M3	E1_Peron_Later_W-M1	E1_Peron_Later_W-M3	E1_Peron_Centr_PE-M1	E1_Peron_Centr_PE-M3	E1_Peron_Centr_W1	E1_Peron_Centr_W2	E1_Peron_Centr_W3	E1_Peron_Centr_W4	E2_Peron_PE	E2_Peron_W1	E2_Peron_W2	E2_Peron_W3	E2_Peron_W4	Teren_Acc_A_Start	Teren_Acc_A_Stop	Teren_Acc_C+D	Teren_Acc_B1	Teren_Acc_B2	
E1_Peron_Later_PE-M1	1420				254								156	130	78	156			162	243	243	
E1_Peron_Later_PE-M3	836			65									12	10	6	12			183	274	274	
E1_Peron_Later_W-M1																						
E1_Peron_Later_W-M3																						
E1_Peron_Centr_PE-M1	802				19								140	116	70	140			79	119	119	
E1_Peron_Centr_PE-M3	1012			63									195	162	97	195			75	112	112	
E1_Peron_Centr_W1																						
E1_Peron_Centr_W2																						
E1_Peron_Centr_W3																						
E1_Peron_Centr_W4																						
E2_Peron_PE	2626			457	45			242	544	242	181								229	229	229	229
E2_Peron_W1																						
E2_Peron_W2																						
E2_Peron_W3																						
E2_Peron_W4																						
Teren_Acc_A_Start	147												71	47	29							
Teren_Acc_A_Stop																						
Teren_Acc_C+D	736			115	95								47	37	44	20						
Teren_Acc_B1	1031			173	142			284	284				37	40	44	27						
Teren_Acc_B2	1031			173	142			284	284				37	40	44	27						

Pedestrian movement evaluation

Train circulation and headway



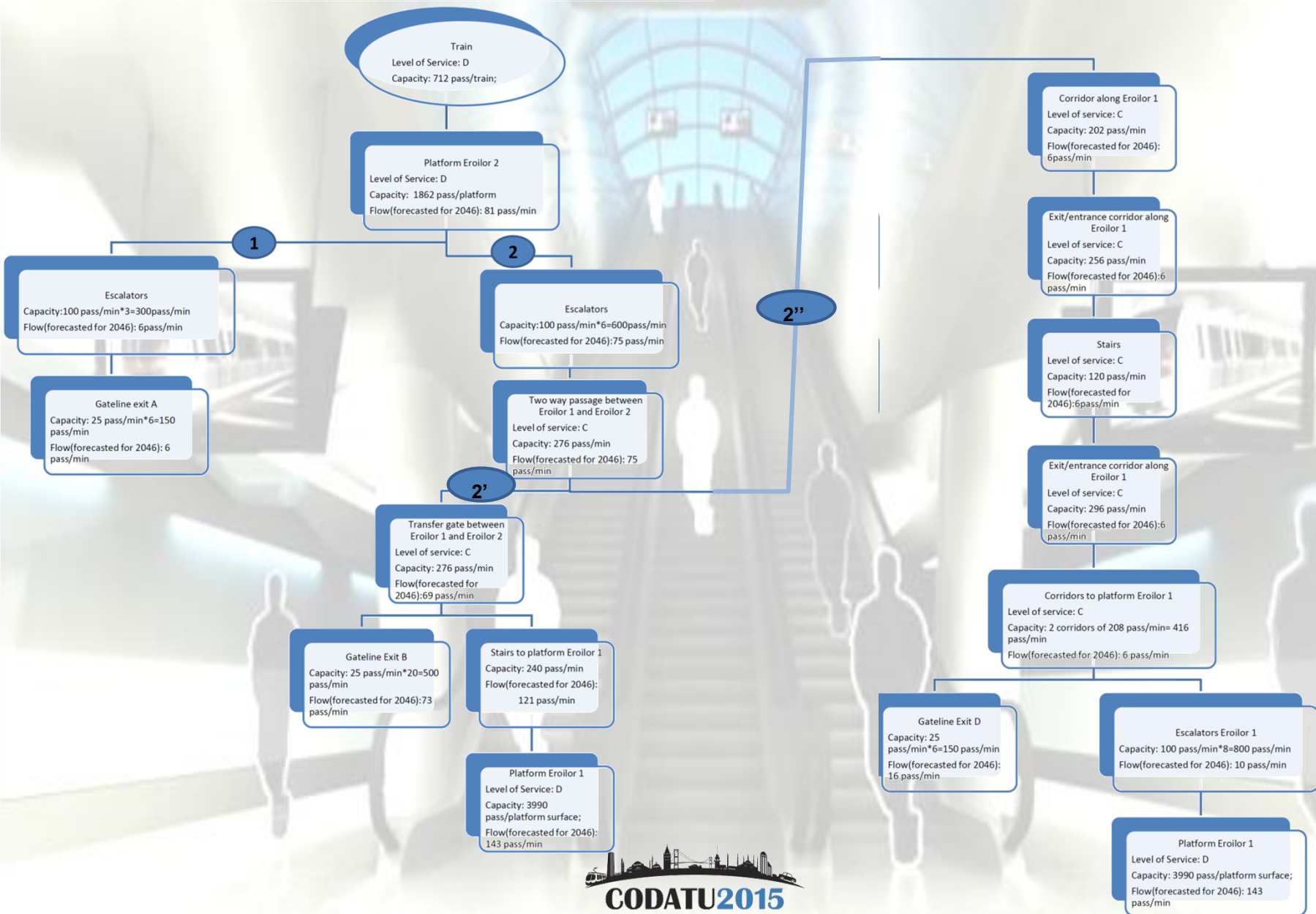
Old Station Platforms

New Station Platform

Timetable

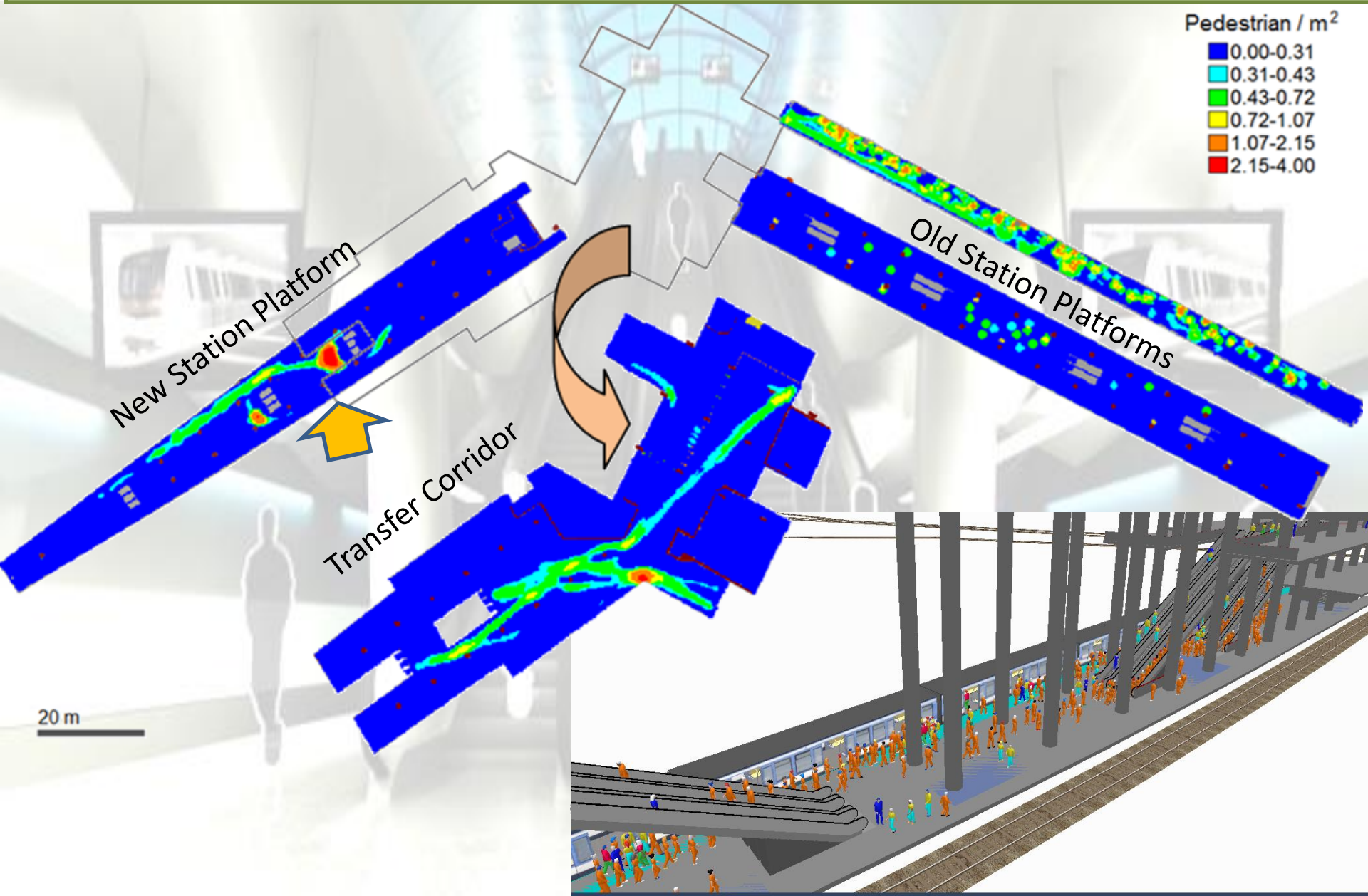
Linia	0	5	10	15	20	25	30									
E2-Linia2		2		8		14		20		26						
E1-Linia1		3		7		11		15		19		23		27		
E1-Linia2	1			9				13		17		21		25		
E1-Linia3				5				10		15		20		25		29

Capacity assessment scheme



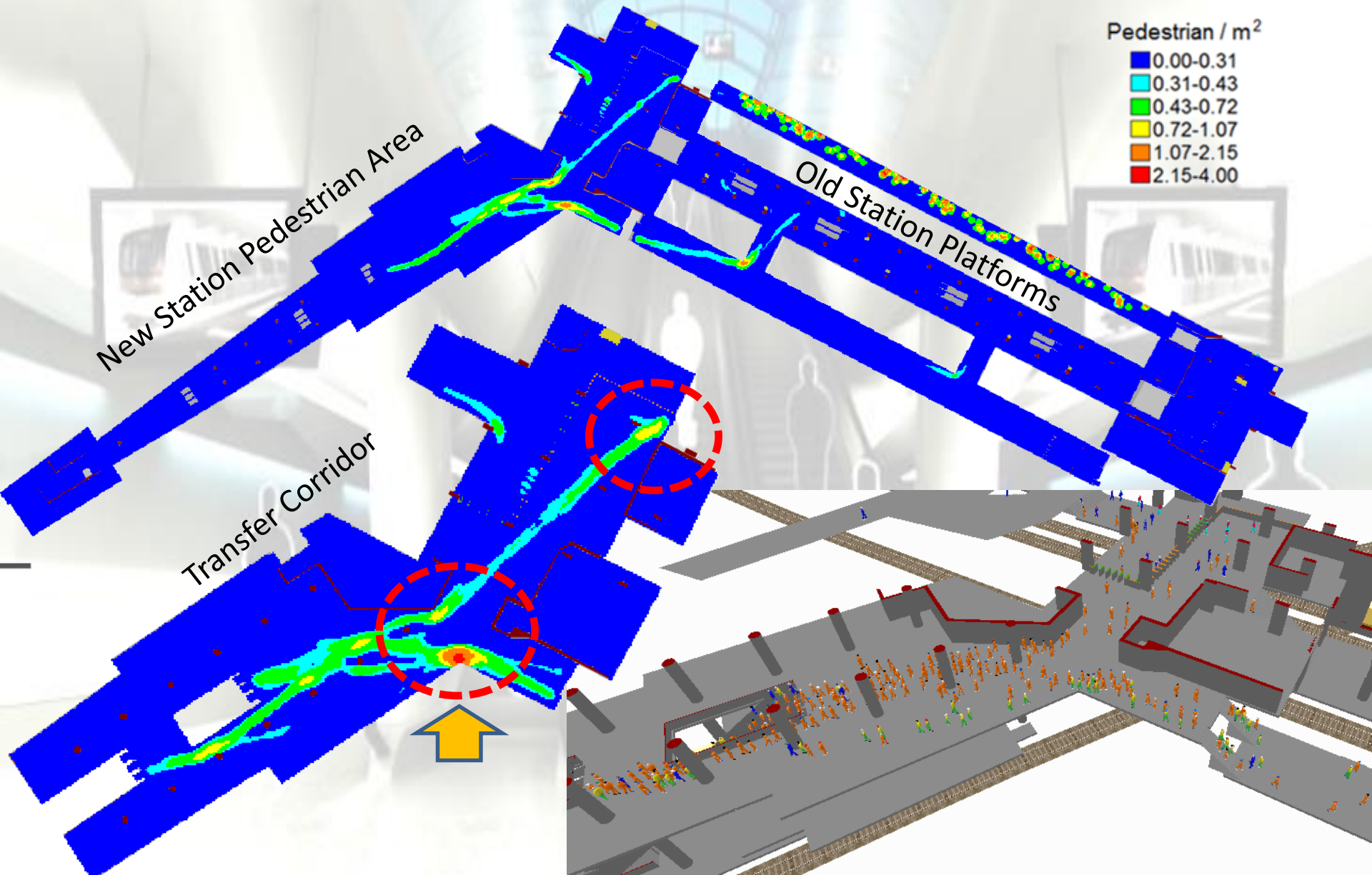
Pedestrian movement simulation

Eroilor metro stop overall pedestrian densities



Pedestrian movement simulation

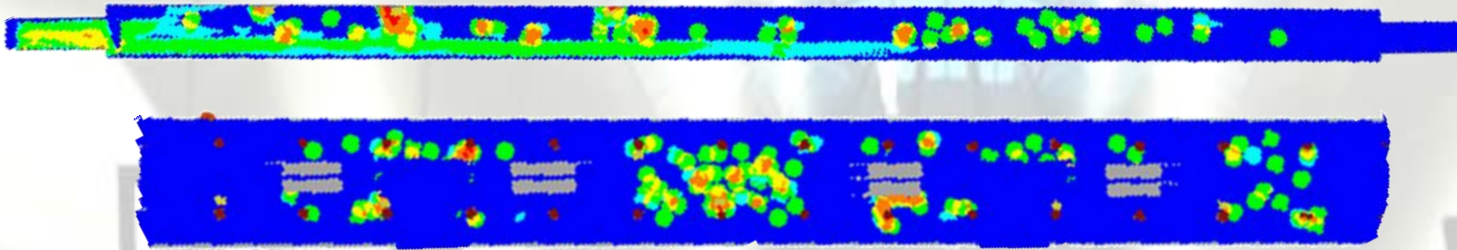
Eroilor metro stop pedestrian densities – transfer corridor



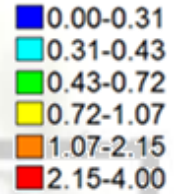
Pedestrian movement simulation

Eroilor metro stop pedestrian densities – existing platform (old station)

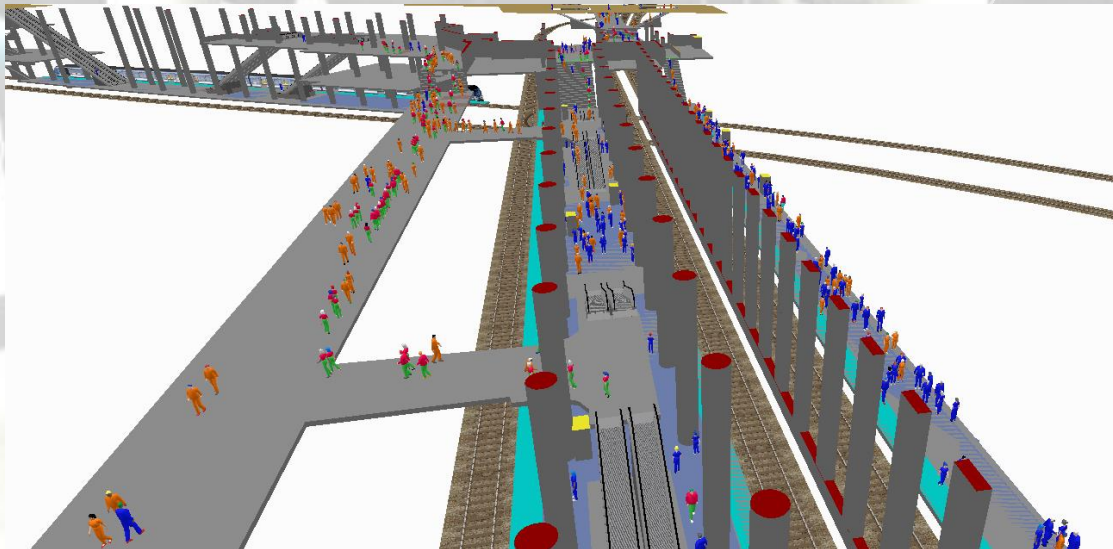
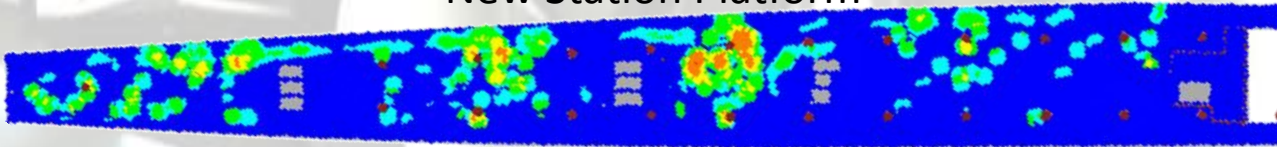
Old Station Platforms



Pedestrian / m²



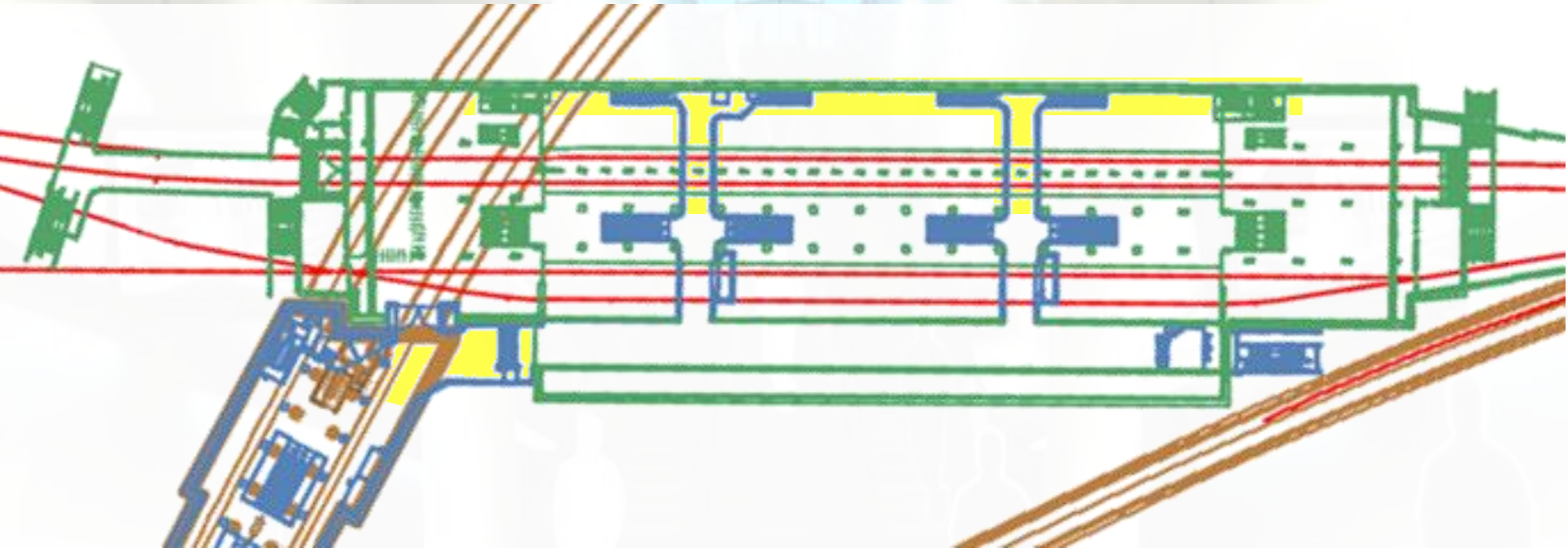
New Station Platform



Conclusions

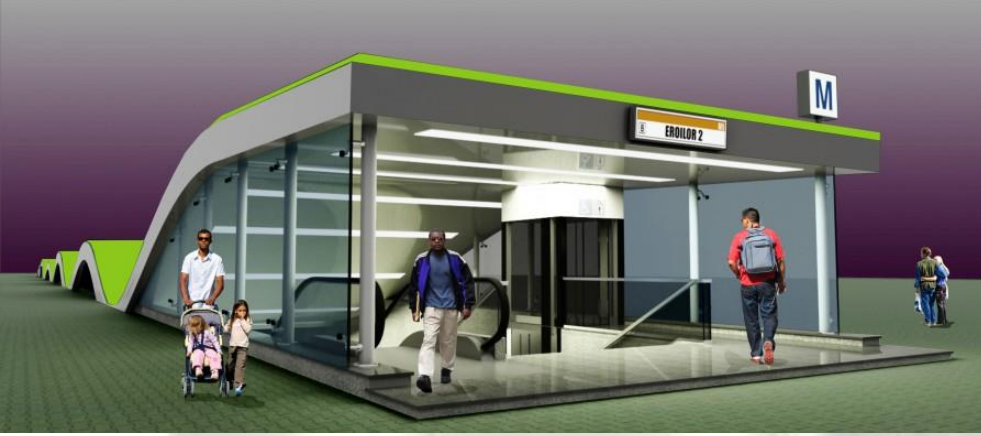
Capacity assessment and station simulation helped in:

- identifying the design issues and correct them in design phase
- providing safe spaces for passengers and free circulation in the transfer areas



Next step

- Designing a better connectivity with the surface transport
- Correlating the surface public transport to the underground public transport



THANK YOU
JE VOUS REMERCIE
TEŞEKKÜR EDERİM

