Solution n.1

Mean of transportation: urban buses
Goal: Specifications towards more accessible public transport app

1.1   Make public transport app usable by visually impaired people as all other users do, making it fully accessible (VoiceOver service of the smartphones has to fully interact with all the functions of the app)

1.2   Make public transport app able to inform users (real time) about possible delays and accessibility of the bus (presence of the ramp on board)

1.5   Insert in public transport app a function able to create an accessible itinerary (using buses that have a ramp on board allowing wheelchair users to board and disembark from the bus)

1.6   Insert in public transport app a function that allows passengers to buy and validate the ticket on board directly from the app - even without using the validating machine of the bus.
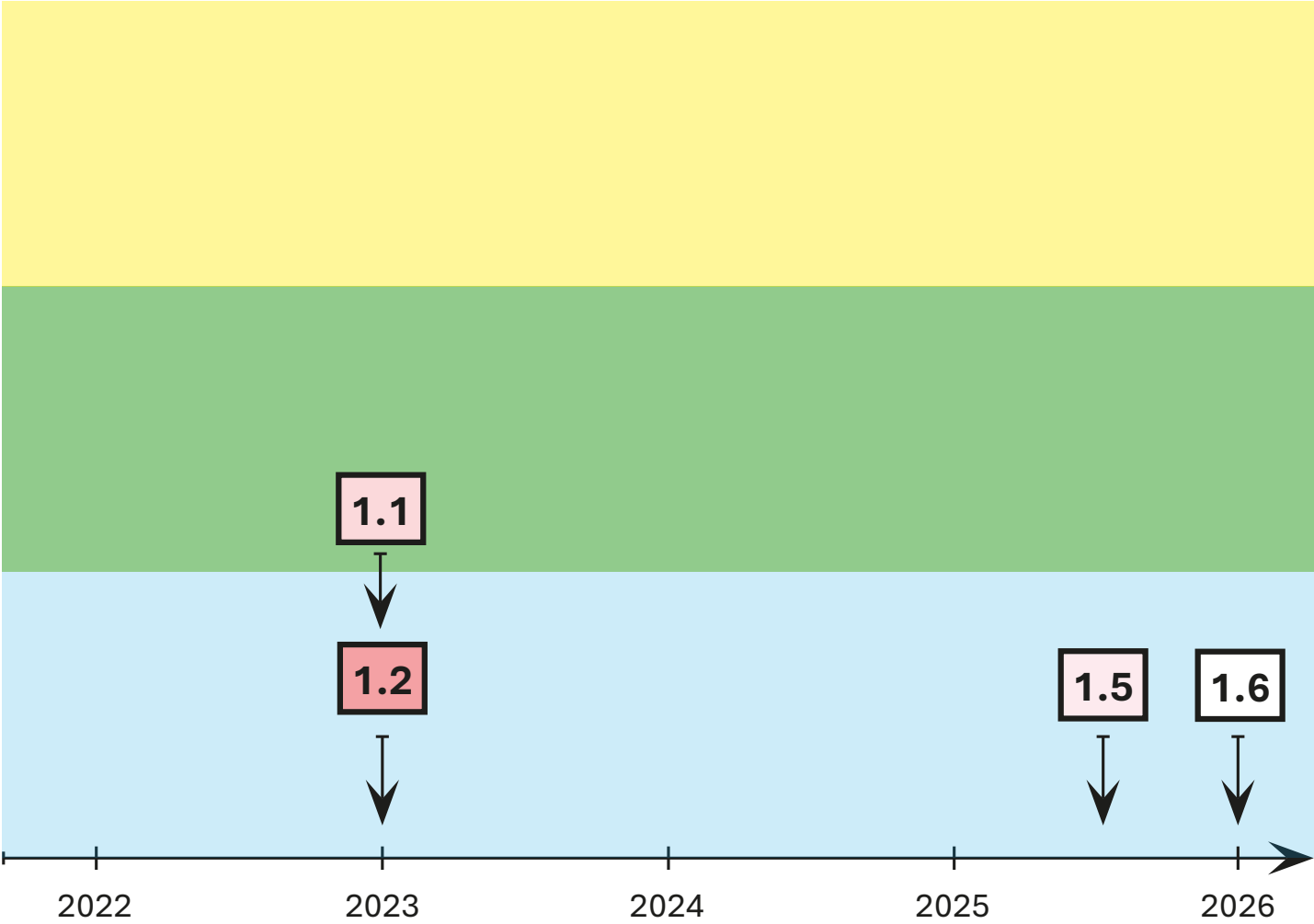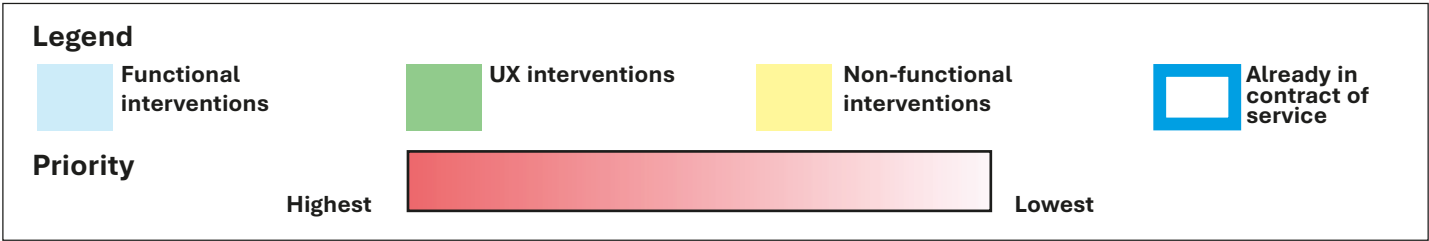
Solution n.1

Legend

Functional interventions

UX interventions

Non-functional interventions

Already in contract of service

Priority

Highest — Lowest

1.1

1.2

1.5

1.6

2022   2023   2024   2025   2026

Solution n.2

Mean of transportation: urban buses
Goal: Recommendations for enhanced bus stops

2.1   Make the bus stops identification names unique (e.g. adding a geographic landmark or the bus direction)

2.2   Spread additional information that can be accessible by visually impaired people - possibily through the public transport app and on the bus - about the non-standard location of the bus stops (e.g. some stops are located on the traffic diveder rather than on the sidewalk like all the others) and real time information about roadworks that force the bus stop to be moved

2.3   Make the bus stop location standard, so they can be more easily found by visually impaired people (e.g. making them more quickly recognizable)

2.4   Post at bus stop information plaques (in English as well) indicating that timesheets (and in the future accessibility info as well) can be read also on the public transport app. Pair a QR code that links to the digital timesheets

2.5   Standardize the height of the bus stop platform so wheelchair users can avoid danger or difficulties when boarding / unboarding from the bus

2.6   Provide a system (even digital - through the public transportation app) that allows to book the bus stop, so that passengers with disability waiting for the bus may notify the drivers about their intention to board the bus

The images above show two distinct stops, located in streets perpendicular to each other, about 150m apart and not visible from each other, with the same name.

The image shown above shows the presence, on different sides of the road, and in a third position behind it (located in a parking lot), of three bus stops with the same name (Piazzale Atleti Azzurri).

Solution n. 2

Legend

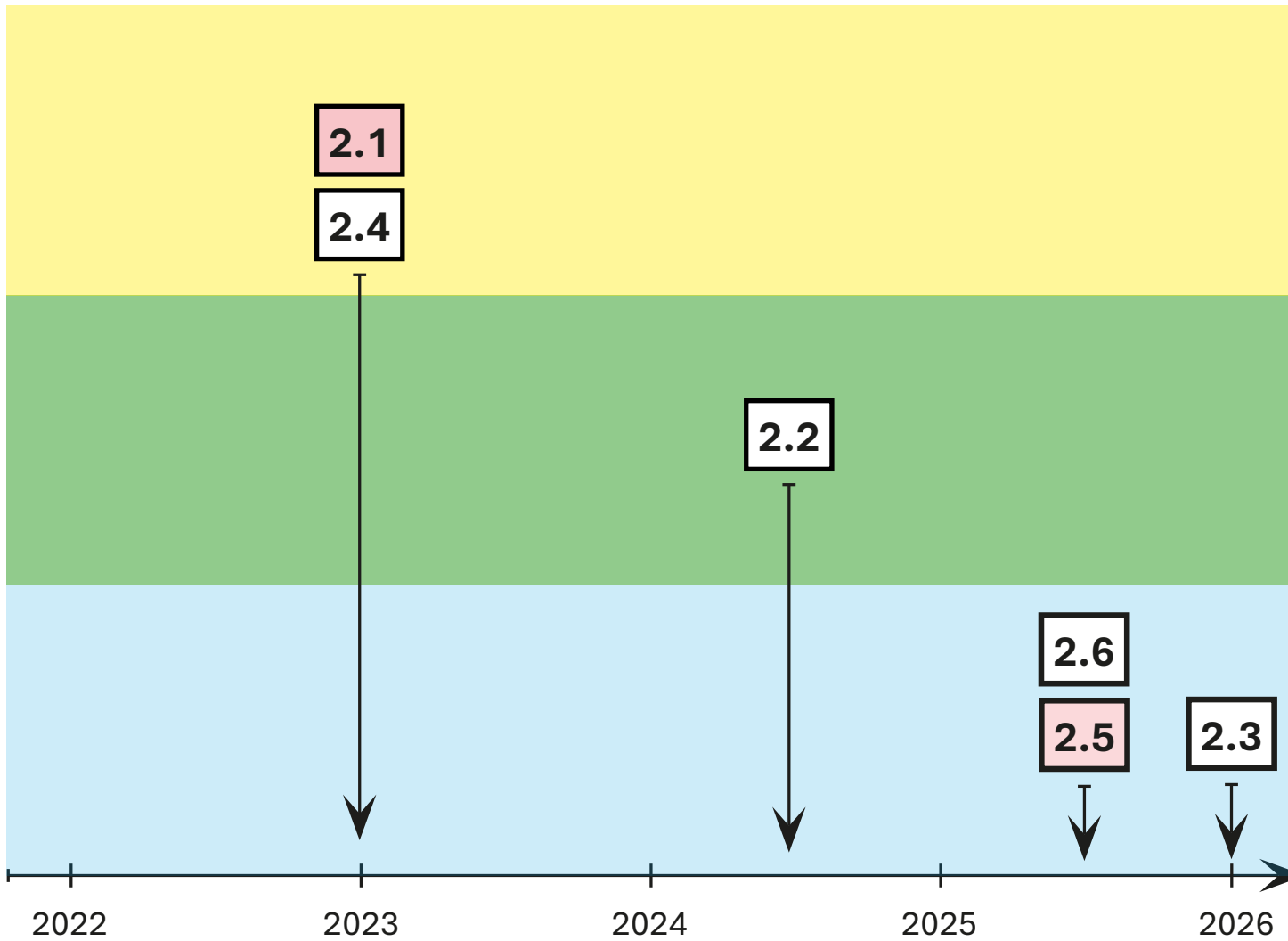Functional interventions   UX interventions   Non-functional interventions   Already in contract of service

Priority

Highest   Lowest

2.1

2.4

2.2

2.6

2.5

2.3

2022   2023   2024   2025   2026

Solution n.3

Mean of transportation: urban buses
Goal: Recommendations for fully-accessible buses

3.2   EXISTING BUSES - Equip future buses with tactile floors so that visually impaired passengers can be informed about the location of onboard services (validating machine, exit, etc.)

3.3   EXISTING BUSES - Translate information written on onboard validating machines in Braille; create digital solutions that allow visually impaired passengers to get accessible info about validating procedures (also making fully accessible the whole purchase and validating process

3.4   EXISTING BUSES - Modify the contactless bus ticket purchasing machine so it can communicate with a vocal assistant what appears on the screen and/or make a confirmation sound that the user put the bank card in the right position and the transaction was successful

3.5   EXISTING BUSES - Make the onboard voice assistant (the one that reads the name of the following stop) always working, set at the right volume over the whole lenght of the bus; set the voice assistant so it repeats the bus stop name when the bus is stopping, so the information can be well heard by all the passengers (when stopping, noises of the moving bus are minimal and the voice assistant can be better heard)

3.6   EXISTING BUSES - Limit the number and frequence of voice messages played onboard the buses: there are too many and they often are redundant (e.g. "beware of the pickpockets"; "wear a facemask"), furthermore they limit other messages that help visually impaired passengers to be oriented

3.7   EXISTING BUSES - Make the onboard voice assistant that reads the number of the bus line when the bus is stopping always working; it is particularly useful for visually impaired people waiting at the bus stop specially when multiple buses stop at the same time

3.8   Reshape the space reserved for wheelchair users, considering the actual dimensions of wheelchair and a potential increase of wheelchair users when the public transportation will be fully accessible

3.9   Reshape the handles positioned in the space reserved for wheelchair users, mounting them over 90cm from the floor (some handles are mounted at a lower height and can obstacle the movements of wheelchairs, furthermore they are not useful at that height)
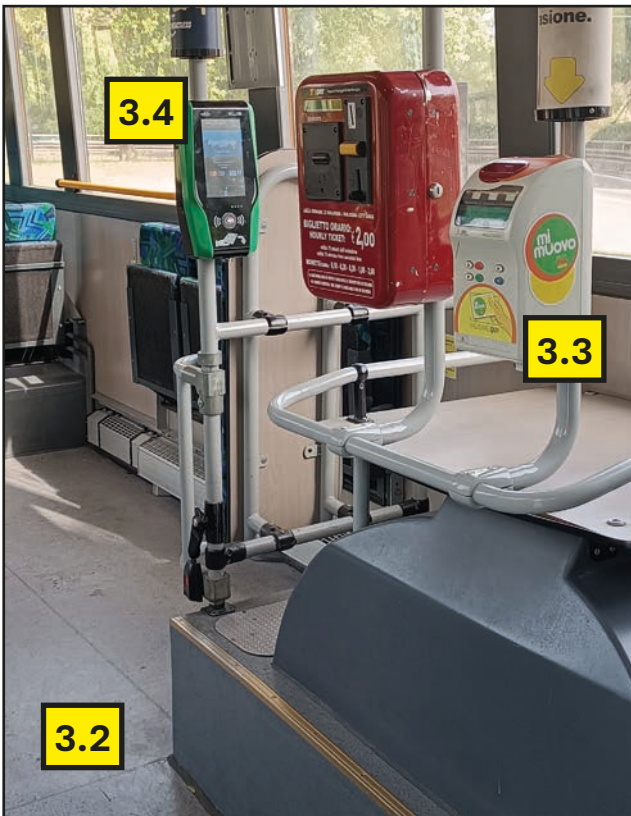
3.10 Make handles and safety belts for wheelchair users present in all buses; improve the quality and efficiency of the ineffective ones so safety onboard can be always guaranteed for all passengers

3.11 Protect more efficiently the space reserved for wheelchair users, possibly mounting handles that can be moved in order to better protect them from the interaction with other passengers onboard

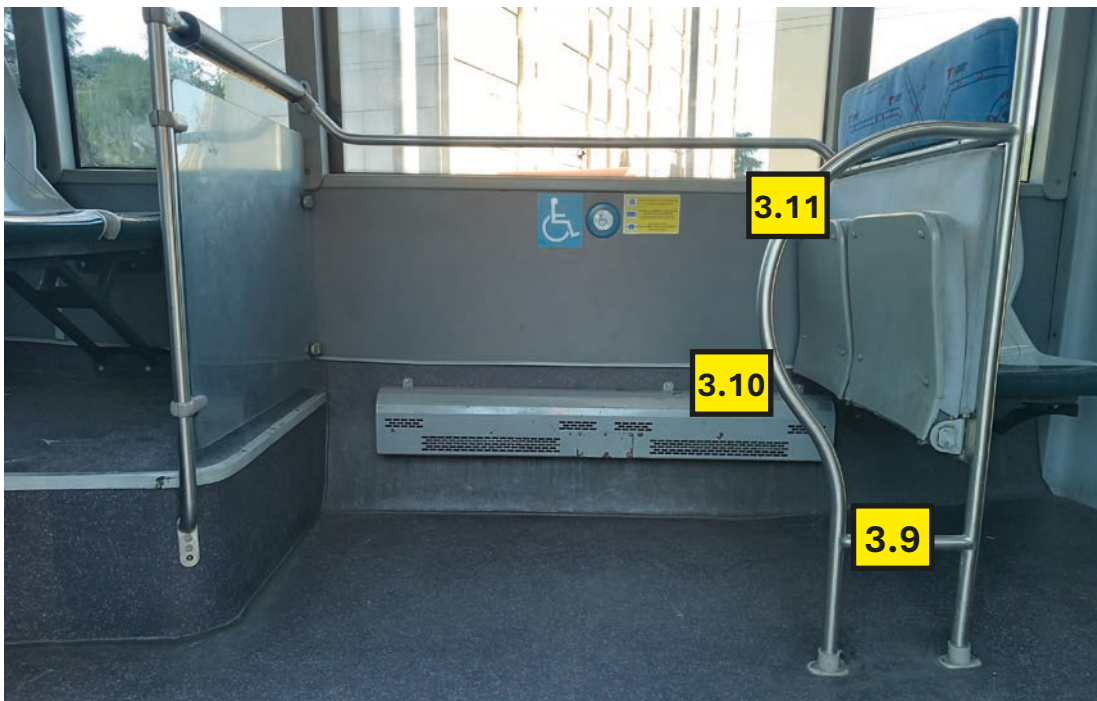3.12 EXISTING BUSES - Make the push button reserved for wheelchair users always working

3.14   Make the button panel that is at disposal of wheelchair users able to communicate to the driver and to give a feedback to the wheelchair users when the request for the bus to stop is sent and received by the driver

3.16   Mount a digital screen on all buses that informs the passengers about the name of the following stop, and include also an information panel that repeat as a written message what said by the voice assistant onboard (function useful also for people with hearing impairments)

3.17   Standardize the location of the ticket issuing and validating machines onboard the bus, locating them side by side on all buses and close to the seat reserved for wheelchair users (in a position lower than the current one)

3.19   Guarantee a minimum number of accessible buses running every day so a certain percentage of accessible bus rides canna be guarnteed (bus with onboard ramp)
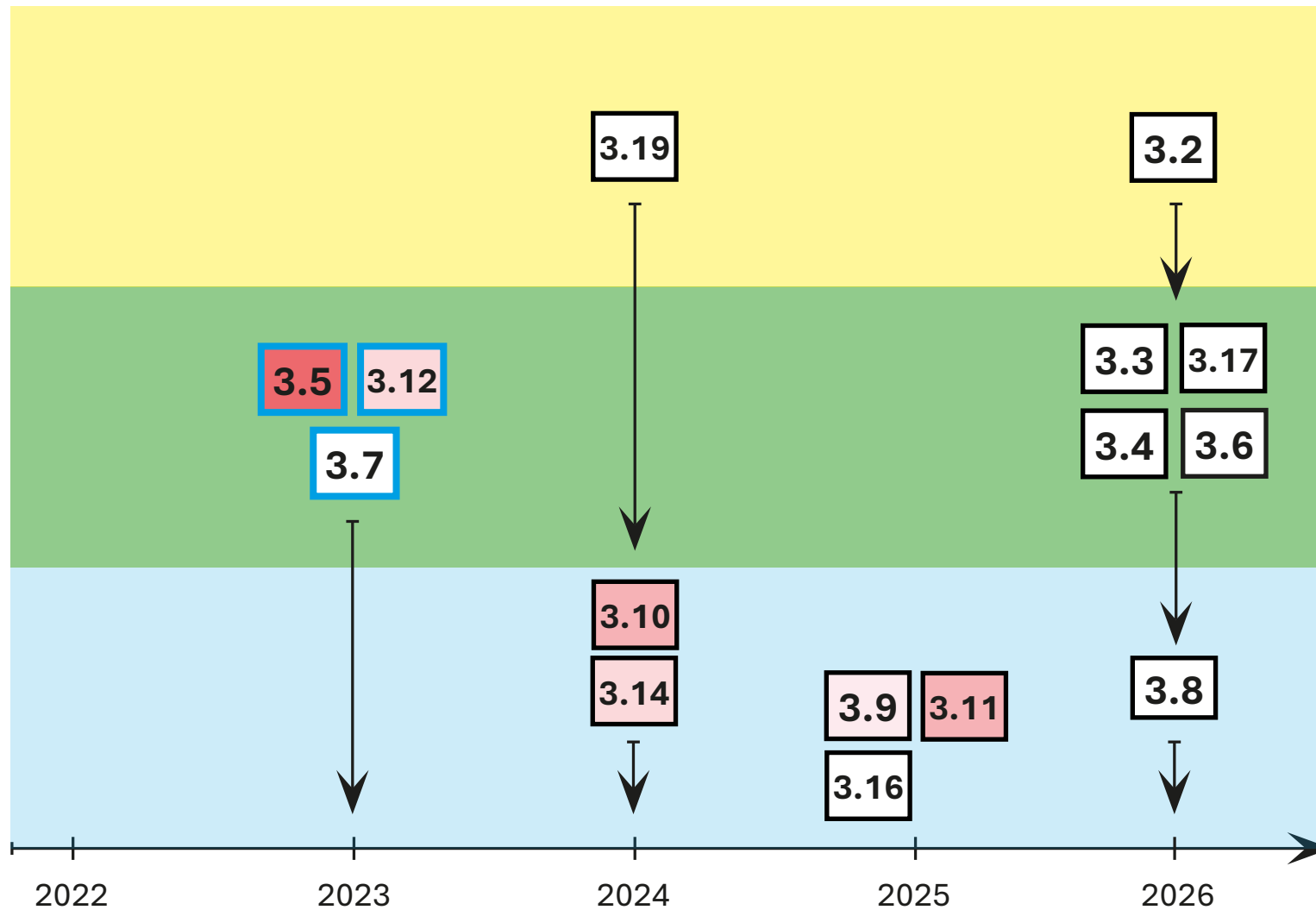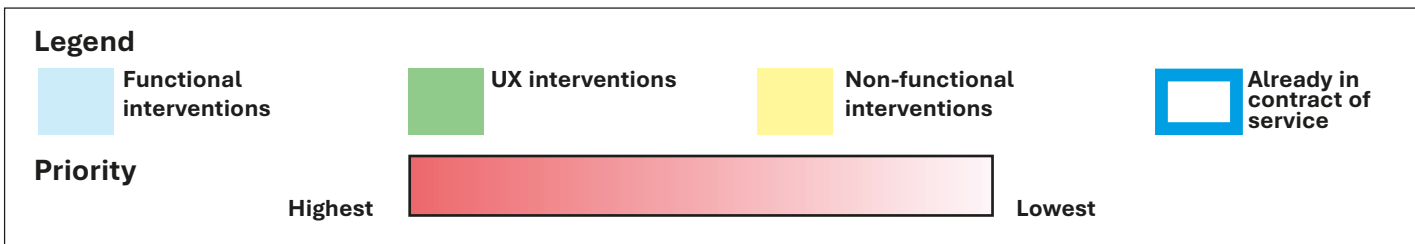
solo
uscita
exit only

campagna
delle buone regole

Solution n.3

Legend

Functional interventions · UX interventions · Non-functional interventions · Already in contract of service

Priority — Highest → Lowest

Timeline (2022–2026):

- 3.5, 3.12, 3.7 (2023)
- 3.19, 3.10, 3.14 (2024)
- 3.9, 3.11, 3.16 (2025)
- 3.2, 3.3, 3.17, 3.4, 3.6, 3.8 (2026)

Solution n.4

Mean of transportation: urban buses
Goal: Recommendations for transport provider staff

4.1 Have drivers stop when they see a cane for people with visual impairments (the use of which is recommended for all people with visual impairments when they are waiting at a bus stop, to signal their presence)
4.2 Train all drivers in the use of manual and electric ramps
4.3 Drivers should limit the cruising speed of the bus when wheelchair users are onboard
4.4 Ensure that drivers always stop in front of a wheelchair user waiting at the bus stop, who must be clearly visible
4.5 Make sure that the drivers, upon returning to the depot, check the operation of the assistance devices for people with disabilities (e.g. voice assistant, push-button panel, ramp) and report any malfunctions so that the transport company can intervene immediately
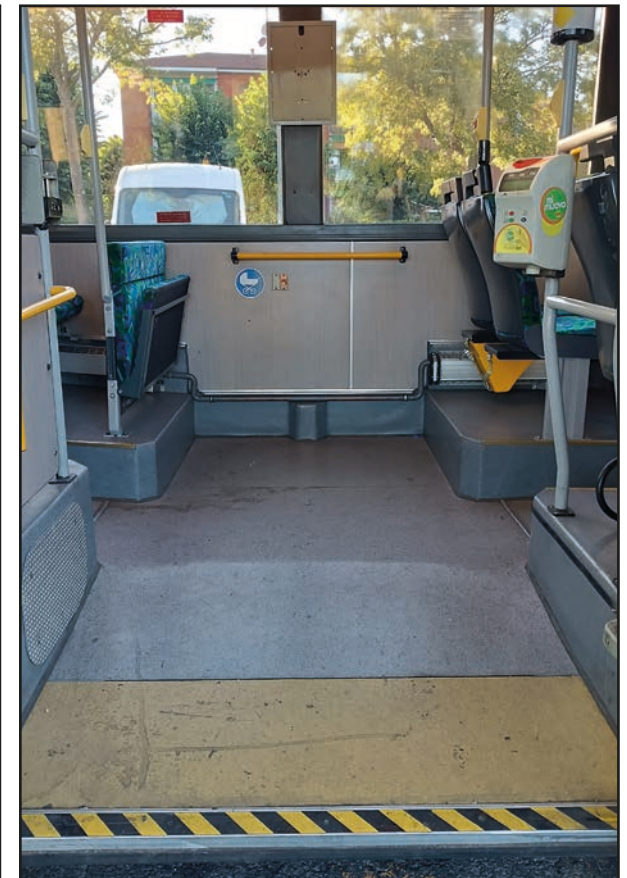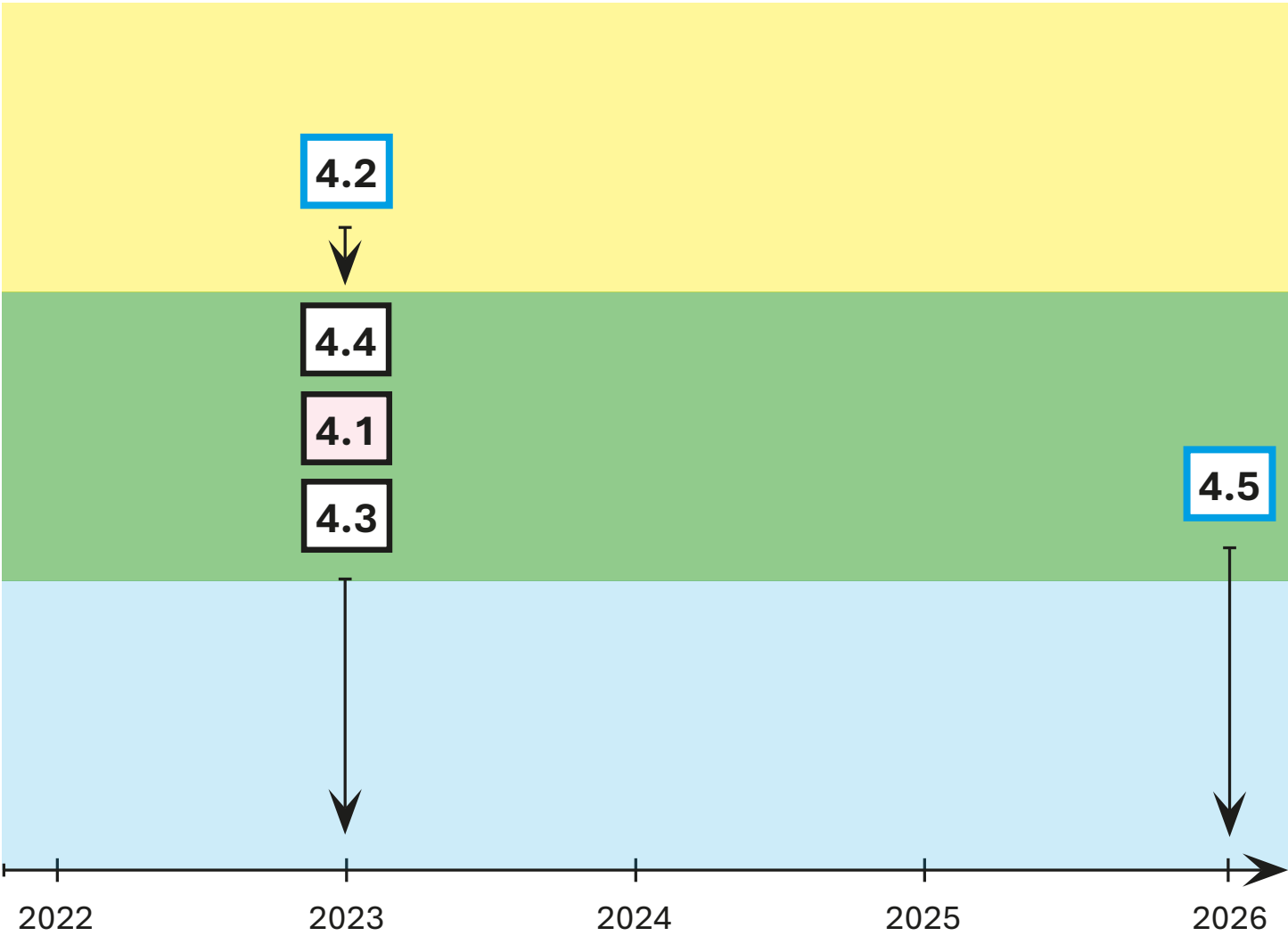
Solution n.4

Legend

Functional interventions — UX interventions — Non-functional interventions — Already in contract of service

Priority: Highest — Lowest
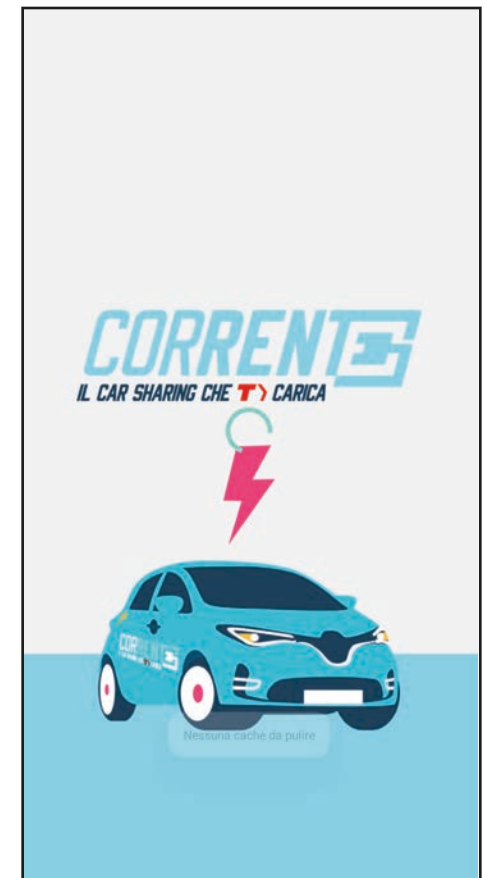
4.2 4.4 4.1 4.3 4.5

2022 2023 2024 2025 2026

Solution n.5

Mean of transportation: car sharing
Goal: Recommendations towards an accessible car sharing

5.1   Make car sharing booking app accessible for visually impaired people, giving them the possibility to make a booking for a third person (the one that actually signed the agreement of use)
5.2   Put in the car sharing fleet some cars suitable for transporting people moving on a wheelchair; they should be big enough so comfort and safety are always guaranteed to all passengers (also when the ramp is not being used)
5.3   Put in the car sharing fleet some adapted cars that can be driven by people with physical disabilities; these cars can be adatped only when needed with a self-mounting kit

credits: www.motorionline.com