MULTIMODAL AND ON-DEMAND TRANSPORTATION INTEGRATION PLAN

Multimodal and On-Demand Transportation Integration Plan was developed by the ITS America Multimodal and On-Demand Mobility Working Group in coordination with the ITS America Multimodal Technology Committee.

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EXECUTIVE SUMMARY

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This Plan is a strategic reference for public- and private-sector organizations working to deploy, expand, or sustain multimodal and on-demand transportation services. It emphasizes that successful multimodal systems depend on more than technical integration alone; they also require strong governance, collaborative processes, public trust, effective partnerships, consistent standards, system interoperability, comprehensive design, and responsiveness to public needs. Across these themes, the document highlights how integrated transportation systems can improve safety, efficiency, mobility, and quality of life while helping agencies better serve communities through coordinated, technology-enabled, and context-appropriate approaches.

This Plan is consistent with ITS America's policy initiatives and principles, which emphasize transportation digital infrastructure, interoperability, and technology deployment as essential components, rather than optional enhancements, of a modern, multimodal transportation system to allow people to make seamless complete trips across modes.[1]

[1] "2026 Surface Transportation Reauthorization Policy Principles - ITS America." ITS America, 26 Mar. 2025, itsa.org/advocacy-material/2026-surface-transportation-reauthorization-policy-principles/; "ITS America Response to USDOT Surface Reauthorization RFI - ITS America." ITS America, 22 Aug. 2025, itsa.org/advocacy-material/its-america-response-to-usdot-surface-reauthorization-rfi/.

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INTRODUCTION

This Plan is intended as a living reference document for public- and private-sector entities seeking to deploy, scale, or maintain multimodal and on-demand transportation systems. It is not a step-by-step implementation guide. Each transportation service begins from a different starting point and based on different transportation demands, with unique institutional structures, funding models, policy constraints, and levels of organizational maturity.

Multimodal transportation refers to the seamless integration and utilization of different modes of transportation to be easily accessed by people driving, getting a ride, taking transit, riding bicycles or scooters, or walking within a single journey. Multimodal transportation includes both fixed-route and on-demand transportation.[2] In the context of intelligent transportation systems (ITS), this involves leveraging advanced technologies to efficiently manage and optimize the multimodal network, ensuring smooth transitions between various modes, improving safety, and making overall mobility easier.

The goal of this document is to **enumerate key considerations** for agencies transitioning from single mode services to multimodal and on-demand systems and integrating existing services to incorporate additional modes or integrated user experiences.

Each section of this Plan expands on considerations for multimodal integration. Section numbers are intended to aid navigation only and do not indicate priority. Readers may review this Plan in its entirety, or only use individual sections, as suits their needs and desired outcomes. Where possible, use cases and examples are linked to provide context and reference if replication is desired.

[2] "Shared Mobility Definitions." Federal Transit Administration, December 12, 2023. https://www.transit.dot.gov/regulations-and-guidance/shared-mobility-definitions

ROLE OF TRANSPORTATION DIGITAL INFRASTRUCTURE

IN MULTIMODAL AND ON-DEMAND INTEGRATION

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Transportation Digital Infrastructure (TDI) is the foundational enabler that allows multimodal and on-demand transportation systems to function as an integrated whole rather than a collection of siloed pilots or isolated services. As travelers, vehicles, and goods move across modes, providers, and jurisdictions, TDI provides the digital layer—data, communications, platforms, security, standards, and governance—that enables reliable and actionable information exchange, coordinated operations, and consistent, high quality user experiences.

In this context, TDI underpins core multimodal capabilities such as real-time trip planning, integrated booking and payment, situational awareness, dynamic service coordination, and performance monitoring. Treating TDI as core infrastructure, on par with physical assets, reduces fragmentation, lowers integration costs, and enables solutions to scale beyond individual programs or regions. At the system level, this shared digital foundation supports common benefits across public and private stakeholders, including improved safety through proactive operations, greater efficiency and reliability from coordinated networks, expanded access to mobility options, stronger resilience during disruptions, and a more competitive and innovative transportation ecosystem.

By embedding TDI into multimodal and on-demand integration planning from the outset, agencies can ensure that investments reinforce one another, protect local needs while enabling interoperability, and deliver durable outcomes that evolve with changing technologies and user needs.

ROLE OF SYSTEM INTEROPERABILITY

Interoperability refers to different transportation systems being able to communicate and exchange information in a standardized and mutually understandable way.[3] The Mobility Data Interoperability Principles (MDIP) coalition has adopted the following principles for interoperability:

1. *All systems creating, modifying, or consuming mobility data should be interoperable.*
2. *Interoperability should be achieved through the development, adoption, and widespread implementation of open standards that support the efficient exchange and portability of mobility data.*
3. *Transit agencies and other mobility service providers should have access to tools that present high-quality mobility data accessibly, equitably, and in real-time to assist travelers in meeting their mobility needs.*
4. *Transit agencies, other mobility service providers, and travelers should be able to select the transportation technology components that best meet their needs.*
5. *All individuals and the public should be empowered through high-quality, well-distributed mobility data to find, access, and utilize high-quality mobility options that meet their needs as they see fit, while maintaining their privacy.*[4]

INTEROPERABLE TRANSPORTATION SYSTEMS ENABLE:

- Easier use of the transportation system
- Consistent traveler information across platforms
- Faster status updates
- Improved service performance
- Smoother transfers between modes to enable a complete trip

Data Sharing, Governance, and Transparency

Clear guidelines for data sharing are a critical component of a consistent regulatory approach. Agencies can support transparency and innovation by establishing policies that define what data is needed for operational oversight and public accountability, how that data will be protected, and under what conditions it may be shared with third parties. When applied consistently, these policies can improve service planning, support more reliable traveler information, and enable the development of user-focused tools and applications.

[3] "Mobility Data Interoperability Principles." Interoperablemobility.org, 2026, www.interoperablemobility.org/. Accessed 28 Apr. 2026.
[4] "Mobility Data Interoperability Principles." Interoperablemobility.org, 2026, interoperablemobility.org/. Accessed 2 Apr. 2026.

Agencies may also benefit from clarifying ownership and stewardship of transportation data, including which level of government is responsible for different categories of information and what open data means within the agency's legal and operational context. Where open data is pursued, anonymization and aggregation practices can help address privacy and confidentiality concerns while preserving the usefulness of the data.

According to the MDIP coalition, an open standard is, "A specific ontology, schema, or format used by the mobility industry to facilitate the consistent communication of information between devices which is:

- Free from cost and restrictions to use,
- Publicly documented in its entirety,
- Actively maintained by an independent organization whose business interests are not actually - and would not give the appearance of being potentially - impacted by the contents of the standard,
- Contains structured releases, versions, or changelogs, and
- Has an open community of contributors and users, and transparent, inclusive governance."[5]

As data and software become integral to how transportation systems are planned, operated, and managed, agencies may need to treat software-based capabilities, including Software-as-a-Service (SaaS), as lifecycle infrastructure assets rather than discretionary tools, supported by stable, predictable funding models that sustain long-term performance, scalability, cybersecurity, and system resilience.

Empirical studies of real-time transit information systems demonstrate that riders are more likely to use services they perceive as reliable and transparent, and that improved information quality increases both satisfaction and ridership.[6]

Agencies can improve system interoperability through a wide variety of tools:

- Digital infrastructure automation, such as transit or tolling open payment systems
- Data standards widely used by the transportation industry, such as General Transit Feed Specification (GTFS) or Mobility Data Specification (MDS)[7,8,9]
- Shared procurement methods and tool development, such as the California Integrated Travel Project (Cal-ITP)[10]

[5] Ibid.
[6] Li, Lisa, and Amer Shalaby. "Navigating the Transit Network: Understanding Riders' Information Seeking Behavior Using Trip Planning Data." Transportation Research Part A: Policy and Practice, vol. 185, July 2024, p. 104096, https://doi.org/10.1016/j.tra.2024.104096.
[7] "The Role of Data Specifications in Creating an Interoperable Transportation System – SUMC Mobility Learning Center." SUMC Mobility Learning Center, 25 July 2025, learn.sharedusemobilitycenter.org/casestudy/the-role-of-data-specifications-in-creating-an-integrated-transportation-system/.
[8] "General Transit Feed Specification." Gtfs.org, gtfs.org/.
[9] "Open Mobility Foundation." www.openmobilityfoundation.org, 11 Sept. 2020, www.openmobilityfoundation.org/about-mds/.
[10] "A Modern and Consistent Transportation Experience throughout California." Cal-ITP: California Integrated Travel Project, 2023, www.calitp.org/.

KEY CONSIDERATIONS
FOR MULTIMODAL AND ON-DEMAND INTEGRATION

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1. Increase Public Trust and Advance New Transportation Technology

Public trust is a prerequisite for the adoption and sustained use of multimodal and on-demand transportation services. Research consistently shows that service reliability, accuracy of information, and timeliness are among the strongest predictors of trust in transportation systems, particularly when new technology is involved.[11] For example, TriMet has real-time bus arrival information based on open transit data standards (i.e., GTFS-RT) displayed at over 90 MAX stations and 400 bus stops to help riders easily see transit information, as shown in Figure 1 below.[12]

Source: TriMet, August 2025
Figure 1: Photo of digital display at bus stop in Portland, Oregon, USA.

Trust can lead to greater acceptance and intention to use emerging transportation technologies, and phased implementation or pilot programs can help build public trust and familiarity during deployment.

[11] Carreira, R., Patricio, L., Jorge, R.N., Magee, C. "Understanding the travel experience and its impact on attitudes, emotions and loyalty towards the transportation provider – A quantitative study with mid-distance bus trips." Transport Policy, vol 31, January 2013. https://doi.org/10.1016/j.tranpol.2013.11.006; Chakrabarti, S. & Giuliano, G. "Does service reliability determine transit patronage? Insights from the Los Angeles Metro bus system." Transport Policy, vol 32, August 2015. https://doi.org/10.1016/j.tranpol.2015.04.006; Dell'Olio, L., Ibeas, A., Cecín, P. "Modelling user perception of bus transit quality." TransportPolicy, vol 17, November 2010. https://doi.org/10.1016/j.tranpol.2010.04.006

[12] Miller, Mark. "Riding TriMet Is Easier than Ever, Thanks to These New Features - TriMet News." TriMet News, 18 Aug. 2025, news.trimet.org/2025/08/riding-trimet-is-easier-than-ever-thanks-to-these-new-features/. Accessed 28 Apr. 2026.

Shared procurement and templated best practice procurement language can help agencies collectively require common standards, data requirements, and technical expectations into vendor contracts to help align multimodal system integration implementations across jurisdictions. For example, the California Integrated Travel Project (Cal-ITP) Mobility Marketplace provides guides for agencies to plan, purchase, launch data plans, route scheduling, tap-to-ride, and GTFS-Realtime systems through one contract vehicle that support interoperability and easy integration across multi-agency multimodal systems.[13]

Leadership, Training, and Organizational Trust

Leadership plays an enabling role by:

- signaling institutional commitment to multimodal integration,
- allocating resources for staff training and change management, and
- adopting standards that support interoperability and long-term scalability.

When leadership invests in training and professional development, staff confidence in new systems increases. That internal confidence improves the quality of public-facing interactions, which in turn influences public trust. This relationship is well documented in organizational change and public-sector innovation literature.[14]

ITS America practitioner resources on emerging technologies underscore the importance of leadership readiness, workforce training, and institutional capacity as prerequisites for successful deployment and long-term adoption of advanced transportation systems.[15]

Public Education and Transparency

Public education and marketing are critical to public acceptance and usage, particularly when services rely on unfamiliar technology or booking methods. New services frequently underperform not because of poor design, but because potential users are unaware of them or uncertain how to access them.[16]

Effective strategies include:

- centralized “one-stop” information hubs for multimodal services,
- clear explanations of how services work and who they are for, and
- transparent communication about safety practices and system performance, including third-party testing where applicable.

The Pinellas Suncoast Transit Authority’s SunRunner information portal is one example of a “one-stop” information hub that consolidates routes, parking, shelters, and service details in a user-oriented format.[17]

[13] “Modernize Your Transit System.” California Mobility Marketplace, 2026, www.camobilitymarketplace.org/. Accessed 28 Apr. 2026.
[14] “Employee Empowerment: Building Confidence and Initiative with Training.” HSI, hsi.com/blog/employee-empowerment-building-confidence-and-initiative-with-training “Benefits of Continuous Learning in the Public Sector.” Sacramento Web Design Group Blueprint, 11 Aug. 2025, cpshr.us/blog-article/benefits-of-continuous-learning-cps-hr/ Geerts, J.M. Maximizing the Impact and ROI of Leadership Development: A Theory- and Evidence-Informed Framework. Behav Sci (Basel). 2024 Oct 16;14(10):955. doi: 10.3390/bs14100955. PMID: 39457826; PMCID: PMC11505461.
[15] “AI Applications for Transportation Operations and Asset Management: A Practical Guide for Decision-Makers - ITS America.” ITS America, 3 Feb. 2026, itsa.org/advocacy-material/ai-applications-for-transportation-operations-and-asset-management-a-practical-guide-for-decision-makers/.

Advance Partnerships and Collaborations

Public–private partnerships (P3s) can accelerate multimodal deployment by combining public-sector stewardship with private-sector innovation. Successful partnerships are characterized by early communication, clear role definition, shared performance expectations, and structured feedback loops.

From an agency perspective, partnerships are most valuable when they:

- align private offerings with public policy goals,
- reduce implementation risk through shared responsibility, and
- generate actionable demand signals that inform private-sector investment.

Private partners benefit by gaining clearer insight into public-sector needs, procurement pathways, and long-term market opportunities, improving the likelihood that products can scale beyond pilots.

Contract Structure and Duration

Contracts should reflect agency goals and lessons learned from past practices. While there is no single ideal length for private contracts, agencies should aim for terms that promote investment and stability without limiting competition or adaptability; too short a contract may discourage meaningful commitments, while too long may hamper flexibility. The best contract length balances continuity, competition, and responsiveness to change.[18]

To avoid technological stagnation, agencies should:

- define outcome-based performance measures,
- require periodic system upgrades or capability reviews,
- include provisions for subscription-based services, and
- include provisions for interoperability with future services.

ITS America's procurement guidance highlights that these approaches can reduce implementation risk for agencies while improving scalability, competition, and long-term system performance.[19] Further guidance on incorporating interoperability in procurements is available from MDIP.[20]

[16] "Marketing in the Transit Environment." Nationalrtap.org, 2024, www.nationalrtap.org/Toolkits/Marketing-Toolkit/How-To-Guide-For-Marketing-Transit/Marketing-in-the-Transit-Environment.
[17] The SunRunner Gets You From Beach to 'Burg. (2026). PSTA. https://psta.net/services/sunrunner/.
[18] "Success Factors in Private Contracting for Public Transportation - the Eno Center for Transportation." The Eno Center for Transportation, Oct. 2025, enotrans.org/eno-resources/success-factors-in-private-contracting-for-public-transportation/. Accessed 25 Mar. 2026.
[19] "Procurement Solutions for Modern Transportation Technologies - ITS America." ITS America, 8 July 2025, itsa.org/advocacy-material/procurement-solutions-for-modern-transportation-technologies/.
[20] "Interoperable Procurement." Mobility Data Interoperability Principles. https://interoperablemobility.org/procurement/. Accessed 3 Apr. 2026.

Standards-Based Vendor Access

Requiring vendor compliance with industry-recognized standards helps ensure a level playing field and reduces integration risk. State-assisted bench contracts, contract and purchasing schedules, or master services agreements, such as California's multi-vendor mobility services benches, can lower barriers for smaller vendors while preserving competition.[21]

Large and Mega-Event Mobility

Large events (e.g., Olympics, World Cup, major festivals) create short-term but extreme demand variability. P3s allow agencies to leverage existing platforms and infrastructure to meet these needs without permanent over-investment. LA Metro is working to provide riders and agency staff with better trip detour communication for major events, like the upcoming World Cup and Olympics, and other unplanned trip disruptions.[22]

Rather than prescribing specific actions, agencies should consider an outcomes-based approach, which can include:

- establishing participation guidelines for private partners,
- aligning temporary deployments with long-term community goals, and
- using innovation districts or pilot zones to test solutions that deliver post-event value.[23]

The importance of data collection and interpretation cannot be understated. Agencies should encourage open-source approaches to data interoperability and avoid "walled garden" strategies that limit competition. This will foster a healthy competition that improves mobility for more people, including universal design engineering to enable opportunities and choices for everyone.[24]

[21] "Master Agreements." Ca.gov, 2018, www.dgs.ca.gov/PD/About/Page-Content/PD-Branch-Intro-Accordion-List/Acquisitions/Master-Agreements. Accessed 25 Mar. 2026.
[22] https://www.goswift.ly/blog/disruption-communication-with-rider-alerts
[23] Wear, A. How city governments can foster tech-sector growth without breaking the bank. (2024). World Economic Form. https://www.weforum.org/stories/2024/11/city-governments-foster-tech-sector-growth/.
[24] Ibid.

Develop and Adopt Consistent Standards and Protocols

Consistent definitions, standards, and protocols are foundational to effective multimodal and on-demand transportation systems. Standards related to interoperability, data structure, service definitions, safety, and security enable systems operated by different providers and jurisdictions to exchange information reliably and support coordinated service delivery. Within this context, standards serve as the common language that allows multimodal services to function as an integrated system rather than a collection of disconnected offerings.

PUBLIC AGENCY	PRIVATE INDUSTRY
policy goals	technical expertise
operational needs	implementation experience
accountability requirements	market adoption

Well-defined protocols for data exchange and service description also support consistent, accurate traveler information across platforms. Standardized representations of fares, accessibility attributes, service availability, and operating conditions enable trip-planning and booking tools to present complete and comparable information across modes. This consistency is especially important for communicating constraints or service characteristics, such as wheelchair accessibility, elevator outages, or vehicle capacity limits, so that travelers can make informed decisions before beginning a trip and avoid service disruptions.

Agencies providing core services play a critical role in defining requirements for standards adoption because they retain responsibility for system performance and public outcomes. However, effective and widely used standards are developed through collaboration between the public and private sectors. Public agencies help articulate policy goals, operational needs, and accountability requirements, while private industry contributes technical expertise, implementation experience, and market adoption.

For example, the General Transit Feed Specification (GTFS) gained traction because private mapping and trip-planning applications needed consistent transit data, and agencies aligned around a shared standard to provide it. Similarly, the Mobility Data Specification (MDS) addresses data needs identified by agencies, but broader interoperability depends on increased uptake by technology providers.

Together, these examples illustrate that durable interoperability requires both public leadership and private-sector participation: agencies set expectations for use, while industry adoption determines scale and impact. Intermodal strategies must recognize how all providers work together to ensure seamless mobility access.

4. Enhance Safety and Security in the Multimodal Transportation Ecosystem

Safety and security in multimodal systems encompass physical safety, cybersecurity, and data protection. These dimensions are interconnected: failures in digital security can have physical safety consequences.

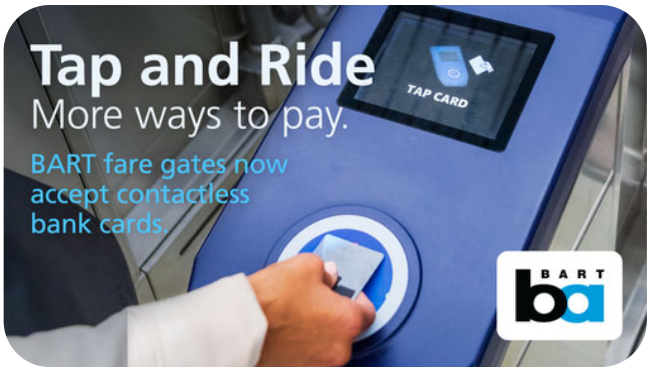
Cybersecurity

Public officials and end users need to trust that their data is secure. Within the scope of multimodal deployment, relevant proactive measures include:

- clear data-sharing agreements that specify security responsibilities,
- minimum cybersecurity requirements for vendors handling operational or personally identifiable information (PII), or other sensitive personal data, and
- incident response protocols aligned with agency IT policies.

As agencies move toward open and integrated payment systems across modes, cybersecurity considerations must also extend to payment transactions and financial data. Multimodal platforms that support open payments should align with established payment security standards for credit card processing, including requirements related to encryption, tokenization, fraud monitoring, and third-party risk management. Clear delineation of responsibilities among agencies, vendors, and payment processors, consistent with agency IT and financial controls, helps ensure that payment systems protect sensitive financial information while maintaining reliability, interoperability, and public trust.

The Bay Area Rapid Transit (BART) system is one of dozens of transit agencies that is transitioning payment to open loop systems so riders can pay with physical contactless credit or debit cards or mobile payment methods, such as Apple Pay and Google Pay, or traditional transit cards, as shown in Figure 2.[25]



Source: Bay Area Rapid Transit (BART), n.d.
Figure 2: Photo of transit rider using physical contactless credit card to pay for ride.

[25] "Tap and Ride | Bay Area Rapid Transit." Bart.gov, 2020, www.bart.gov/tickets/contactless. Accessed 28 Apr. 2026.

ITS America's Privacy Principles[26] emphasize the importance of clear, consistent data-sharing and governance frameworks that balance transparency, operational oversight, and privacy protection while enabling innovation across the multimodal ecosystem. National guidance from the National Institute of Standards and Technology (NIST), the Cybersecurity and Infrastructure Security Agency (CISA), and the U.S. Department of Transportation (USDOT) provides scalable, risk-based frameworks that agencies can adapt to strengthen cybersecurity and data protection practices rather than developing bespoke standards. Together, these resources help agencies manage cybersecurity and privacy risks in increasingly connected, data-driven transportation systems.

Where internal capacity or specialized expertise is limited, agencies may choose to supplement internal governance with external expertise for activities such as system assessments or independent validation, ensuring that cybersecurity practices remain robust while accountability and decision-making authority stay within the agency.

Physical Safety and Perceptions of Safety

Physical security for staff and travelers remains one of the highest priorities of any agency. Where possible, minimizing risk for both is a goal should be included consistently in agency planning and project documentation. In the case of multimodal interoperability, there are often contracted services, for hire vehicles, and increased incorporation of automated vehicles. Safety standards should consider the unique circumstances and requirements of services and agencies but allow for a common approach so that all services provide the same level of traveler safety.

Consistent safety expectations across modes help reinforce user trust and perceptions of safety. The important consideration in this framing is that the traveler can expect a certain level of inherent safety regardless of which mode they choose.

When travelers can expect a baseline level of safety regardless of mode, they are more willing to try emerging or less familiar services. Research shows that perceived safety strongly influences mode choice, particularly for women, older adults, and first-time users.

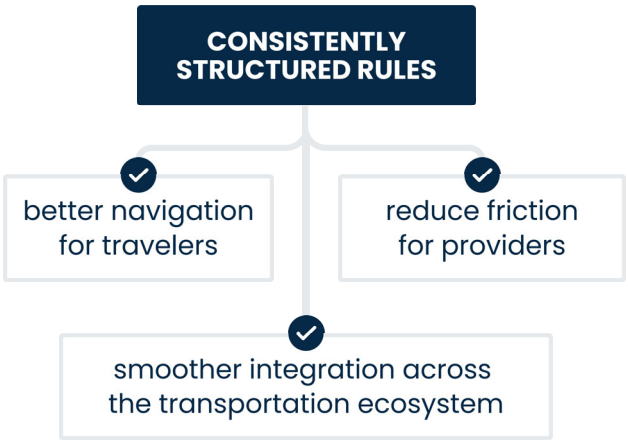
[26] "ITS America Privacy Principles." ITS America, March 27, 2025. https://itsa.org/wp-content/uploads/2025/03/ITS-America-Privacy-Principles.pdf

5. Develop and Adopt Reasonable, Consistent Regulations

Reasonable and consistent regulatory frameworks are an important foundation for multimodal and on-demand transportation systems. For travelers to move seamlessly across modes, they need to understand in advance what to expect in terms of payment, safety, data use, and service availability. Consistency across policies and processes can reduce confusion, support trust in the multimodal ecosystem, and create a more predictable and user-friendly travel experience.

Role of Regulatory Consistency

Regulatory alignment across modes can help agencies and private providers coordinate service delivery more effectively, even when they operate under different business models or institutional constraints. When rules are structured consistently where appropriate, travelers are better able to navigate multimodal systems without needing to interpret a separate set of expectations for each service. This consistency can also reduce friction for service and technology providers and support smoother integration across the transportation ecosystem.



Guardrails for Emerging Technologies

Regulatory frameworks also play a key role in establishing safety expectations for new and emerging transportation technologies. Standardized safety protocols, testing requirements, and reporting expectations that are proportionate to the scale and risk of a service can help agencies evaluate innovation while maintaining appropriate public protections. Streamlined authorization processes, such as clearly defined pilot approvals or phased deployment pathways, can further support innovation by reducing uncertainty while preserving accountability.

Flexibility in Regulation and Procurement

Because multimodal and on-demand technologies continue to evolve, regulatory and procurement approaches may need to be flexible enough to adapt over time. In some cases, agencies may benefit from policies that allow pilot programs or projects to mature without requiring entirely new approval structures for each iteration. Limited waivers from legacy reporting or compliance mechanisms may also be appropriate when interoperable systems already meet policy objectives through alternative means. Procurements through research or academic partners may be a viable option for some entities as well in certain demonstration or pilot contexts.

Similarly, procurements involving data interoperability may benefit from periodic program updates or review points to ensure continued alignment with standards and outcomes. Emerging outcome-based procurement models provide a foundation for aligning regulation, procurement, and performance in an evolving multimodal environment.[27]

> Data-sharing arrangements with private partners, when appropriate and feasible, can also support data portability by helping agencies retain access to data over time and across vendors.

[27] "Procurement Solutions for Modern Transportation Technologies." ITS America & the National electrical Manufacturers Association (NEMA), July 8, 2025. https://itsa.org/wp-content/uploads/2025/07/ITSA-NEMA-White-Paper.pdf

Support Efficiency

Multimodal and on-demand transportation can improve system efficiency and reliability by expanding transportation choices, optimizing network performance, and making better use of existing infrastructure. When thoughtfully designed, these services can help travelers and goods move using the most appropriate mode for each trip, reducing congestion, and supporting more reliable system performance. Public policy plays an important enabling role by helping agencies align efficiency objectives across planning, funding, procurement, and operations. This focus on efficiency, access, and context-sensitive deployment reflects ITS America's broader views that technology-enabled multimodal systems should be tailored to traveler needs while advancing shared national goals for safety, efficiency, and system performance.

Policy Alignment and System Performance

Efficiency gains are more likely when policy goals are identified early and reflected consistently across agencies and jurisdictions. Clear policy direction can reduce barriers to entry for new service providers, support innovation, and help maintain a competitive marketplace that delivers better outcomes for users. Alignment across planning and operational processes can also reduce duplication and support more coordinated service delivery across the multimodal ecosystem.

Funding Stability and Long-Term Efficiency

Sustained efficiency gains require reliable, flexible, and predictable funding for emerging technologies, allowing agencies to test and scale solutions while maintaining adaptable systems. Aligning funding with long-term goals ensures lasting benefits and keeps multimodal systems responsive to travel needs.

Moving People and Goods More Effectively

Multimodal and on-demand systems support the efficient movement of both people and goods. For example, incorporating freight-related considerations into multimodal planning can help agencies better manage interactions between passenger travel and goods movement.

Relevant considerations may include

- curbside management,
- delivery vehicle access,
- and strategies such as off-peak or consolidated goods movement

  (i.e., scheduling shipments outside of typical peak traffic hours and combining smaller shipments).

When these elements are addressed together, agencies can reduce operational conflicts, support lower congestion, and improve overall safety and reliability.

Improve Mobility, Access, and Quality of Life

Multimodal and on-demand transportation can improve mobility and quality of life by expanding travel choices, increasing safety and reliability, and providing seamless access to goods, services, and opportunities. These systems play a critical role in closing mobility gaps for people who face physical, financial, geographic, or technological barriers to travel.

Agencies influence quality of life by offering a balanced suite of multimodal services that reflect local needs, life stages, and geographic and economic constraints, even if they do not direct individual travel choices. Procurement strategies, such as state- or regionally sponsored frameworks and contract piggybacking (i.e., using existing contracts), can help smaller agencies access technology and capacity that might otherwise be out of reach.

Affordability and access could be further improved through partnerships and means-based programs. Examples include LA Metro's LIFE program[28] and means-based fare and toll discounts in the San Francisco Bay Area, such as age-specific discounts or income-qualified reduced fare programs.

Best practices include cross-agency qualification and joint enrollment to reduce administrative burden. These approaches recognize that many people do not drive but still require reliable, dignified mobility throughout all phases of life.[29]

Principles and Approaches for Multimodal Design

To support access and usability across modes, agencies should consider the following high-level principles and approaches:

UNIVERSAL AND ACCESSIBLE DESIGN

that anticipates a wide range of physical, sensory, and cognitive abilities across all services and infrastructure.

TECHNOLOGY FLEXIBILITY

ensuring that services can be accessed through multiple channels (e.g., mobile apps, cards, call centers) and do not rely on a single device or platform.

LIFECYCLE AND LIFE-STAGE AWARENESS

recognizing that mobility needs change over time due to age, health, employment, or caregiving responsibilities.

AFFORDABILITY AND ACCESSIBILITY

including reduced fares, subsidies, or incentives for income-qualified users.

[28] "Low Income Fare Is Easy (LIFE)." LA Metro, www.metro.net/riding/fares/life/.
[29] Zivart, A. "When Driving Is Not an Option." (2024).

Examples of These Approaches in Practice

The following examples illustrate how these principles have been implemented in different contexts:

UNIVERSAL DESIGN GUIDANCE

under Section 508 (29 U.S.C. §794d) promotes universal design practices across digital services and physical infrastructure.[30] For example Metropolitan Transportation Authority (MTA) visually-impaired riders can use an application to be more independent in subway stations to be guided indoors through virtual arrows in an augmented reality (AR) experience, without GPS or Bluetooth, hear real-time train arrivals information, and receive information in 34 languages, as shown in Figure 3 below.[31]

Source: Navilens, n.d.
Figure 3: Audible information for visually impaired users scanning the code in New York City, New York, USA.

ACTIVE TRANSPORTATION INCENTIVES

such as Washington State DOT's e-bike programs, expand access to low-cost mobility options.

AFFORDABILITY PROGRAMS

such as LA Metro's LIFT program and means-based fare and toll discounts in the San Francisco Bay Area, reduce cost barriers for qualifying residents. The City of Houston provides discounted and free rides for different groups including K-12 and college students as well as seniors and veterans.[32]

NON-VISUAL ACCESSIBILITY FEATURES

including audible pedestrian signals and accessible pushbuttons in Oregon, support travelers with visual impairments; some states are extending these concepts through emerging V2X applications.[33]

MODE-FLEXIBLE INCENTIVE PROGRAMS

such as Washington State and San Francisco Bay Area programs provide e-bike incentives.[34]

TARGETED SERVICE PILOTSLE INCENTIVE PROGRAMS

including North Carolina DOT's automated shuttle partnership with Beep in Cary, demonstrate how on-demand services can support seniors and community connectivity.[35]

[30] General Services Administration. "Section508.Gov." Www.section508.Gov, Aug. 2023, www.section508.gov/develop/universal-design/.
[31] NaviLens. "NaviLens EMPOWERING the Visually Impaired." Www.navilens.com, 2021, www.navilens.com/en/.
[32] Freedom to Move: METRO+ HISD Open Doors for Students. (2025). Metro Connections. https://www.ridemetro.org/newsletters/metro-connections/2025/august/METRO-HISD-partnership-high-school-students

Address the Needs of a Wide Range of Geographies and Population Densities

Mobility needs vary significantly across urban, suburban, rural, and Tribal contexts. Each place type varies in density, land-use patterns, travel behaviors, infrastructure conditions, and digital accessibility. Context-sensitive planning ensures solutions align with on the ground realities and that every community, regardless of size or geography, can benefit from safe, reliable, and efficient mobility options.

To support this goal, agencies should incorporate place-based considerations into roadway design, pedestrian and bicycle infrastructure, transit operations, curbside management, and the deployment of on-demand mobility solutions such as micro transit, flexible-route shuttles, paratransit modernization, or ride hail partnerships. Solutions must adapt to local constraints, different geographic needs, and the unique safety and accessibility needs of each environment.

Performance expectations should be place-appropriate. For example:

- Urban success may emphasize congestion reduction and active transportation safety.
- Rural success may emphasize access to essential services.

Transportation systems of the future must reflect regional priorities and operational realities. Rural and Tribal communities should not be evaluated using the same performance expectations as dense urban areas, just as urban systems should not be measured by standards designed for rural contexts. Measuring success based on regionally appropriate metrics, such as improved access to essential services in rural areas or reduced congestion and safer active transportation facilities in urban areas, promotes fairness, enhances community support, and improves outcomes across all settings.

Context-Sensitive Needs Across Place Types

Understanding mobility needs across urban, suburban, rural, and Tribal settings is essential for designing transportation solutions that reflect the unique characteristics and priorities of each place type. The following features are commonly found in these areas. These lists are not exhaustive but illustrate key differences across place types. Additional guidance on context-sensitive design for multimodal corridors is presented by Moore & Wright (2017).[36]

[33] Signalized Intersection Engineering. Oregon.gov. https://www.oregon.gov/odot/ada/pages/signalized-intersection-engineering.aspx.
[34] Weinberger, H. State's first e-bike rebate program launching in April. (2025). Washington State Department of Transportation. https://wsdot.wa.gov/about/news/2025/states-first-e-bike-rebate-program-launching-april.; "Clean Cars for All." Www.baaqmd.gov, www.baaqmd.gov/funding-and-incentives/residents/clean-cars-for-all.
[35] Providing First and Last-Mile Mobility with AVs. (2025). ITS America. https://itsa.org/wp-content/uploads/2025/06/ITSA-Use-Case-Library-2025-COPY.pdf.
[36] Moore, Paul, and Stephanie Wright. "Implementing Context Sensitive Design on Multimodal Corridors: A Practitioner's Handbook." (2017).

URBAN AREAS

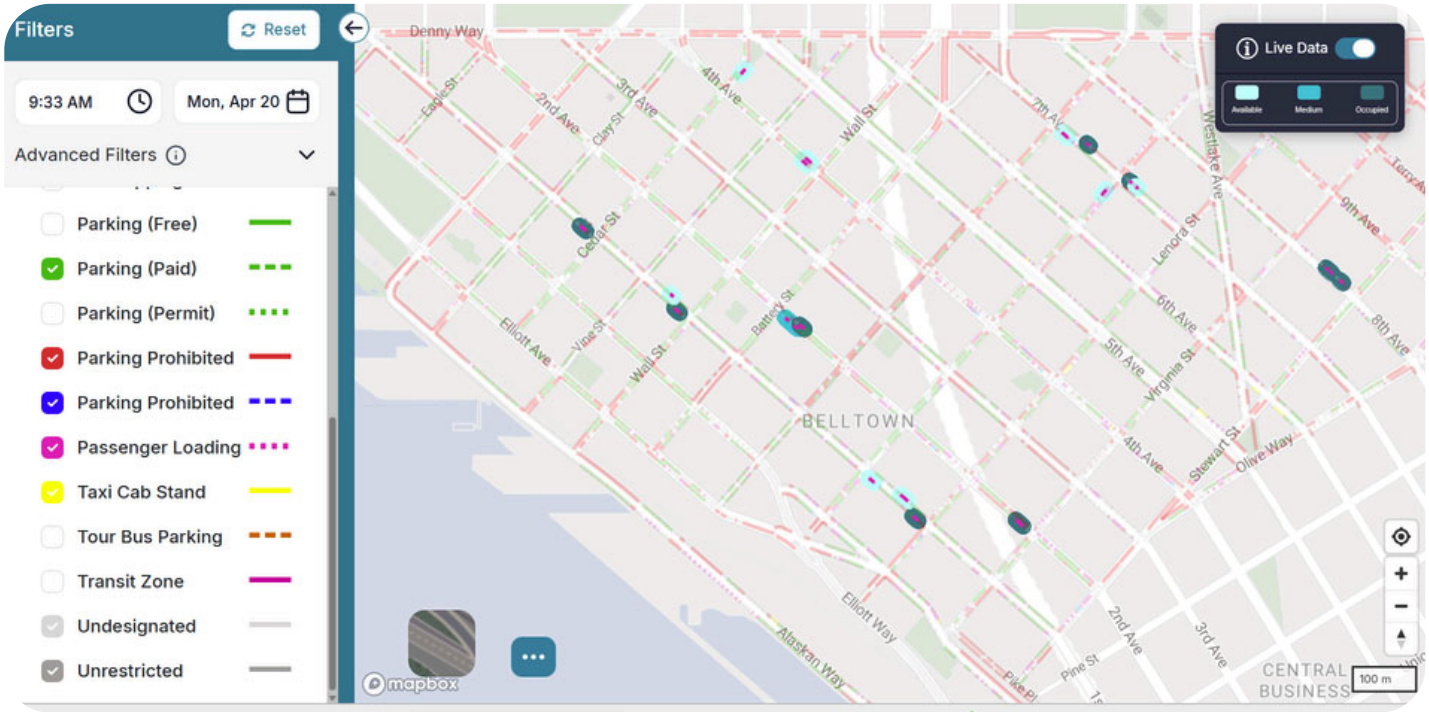
Require

- frequent transit,
- protected bikeways,
- high-quality pedestrian networks,
- efficient curbside management,
- and on-demand services that fill temporal or geographic gaps in fixed-route service.

Mobility can be facilitated by

- real-time transit information,
- curbside data analytics,
- universal payment systems,
- and other ITS solutions.

For example, the City of Seattle won a Strengthening Mobility and Revolutionizing Transportation (SMART) grant to create a live mapping tool that shows the locations of different types of curb space, such as load zones (commercial, passenger, standard), paid parking, and the times these spaces were available for use in the project area.[37] The live tool is based on the Curb Data Specification (CDS) from the Open Mobility Foundation (OMF) to help with standardized curb regulation inventory and curb usage, as shown in Figure 4 below.[38]



Source: City of Seattle, April 20, 2026
Figure 4: Map of curb zones that display permissive and live curb information for road users in Seattle, Washington, USA.

[37] "Seattle SMART Grant Digital Commercial Vehicle Permit Project: Maps and Data - Transportation | Seattle.gov." Seattle.gov, 2021, www.seattle.gov/transportation/projects-and-programs/programs/parking-program/seattle-smart-grant-digital-commercial-vehicle-permit-project-maps-and-data. Accessed 28 Apr. 2026.
[38] Curbiq.io, 2026, seattle.curbiq.io/public-default/. Accessed 28 Apr. 2026.

SUBURBAN AREAS

Benefit from

- improved first/last-mile connections,
- regional transit access,
- and adaptable service models such as micro transit or flexible-route on-demand shuttles.

Mobility can be facilitated by

- complete trip platforms,
- transportation demand management (TDM) programs,
- and more.

RURAL AREAS

Rely on

- dependable demand-responsive services,
- driver networks,
- safe roadway shoulders for vulnerable road users,
- and digital solutions that compensate for lower densities and longer trip distances.

TRIBAL NATIONS

Require

- culturally responsive multimodal and on-demand solutions aligned with sovereignty,
- economic opportunity,
- and community mobility priorities, often built around unique geographic and social contexts.

These differences should guide planning, design, service modeling, and stakeholder engagement across all on-demand transportation planning through all levels of jurisdiction.

Defining Access Across Different Place Types

Similarly, mobility access is characterized by the unique features of each area. Effective planning should establish expectations for access from the start, viewing mobility options as essential parts of design.

URBAN AREAS

- Multiple mobility options within a short walking distance,
- seamless multimodal transfers with real-time information on mass transit schedules,
- micromobility availability,
- and on-demand options.

SUBURBAN AREAS & SMALL TOWNS

- Safe crossings,
- walkable connections,
- micromobility availability,
- and reliable fixed-route or on-demand services providing meaningful travel choices.

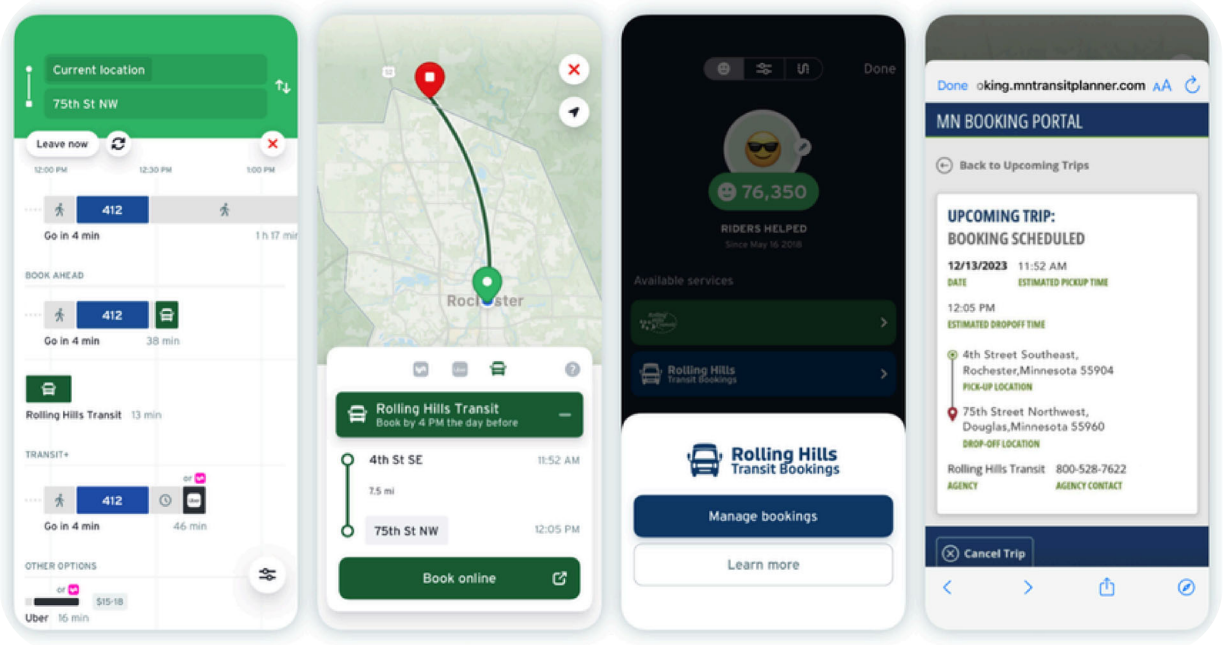
RURAL AREAS & TRIBAL NATIONS

- Ability to reach essential services—health care, groceries, education, and employment—supported by dependable on-demand or flexible-route options.

Integrating User Awareness and Technology Across Place Types

In all environments, multimodal and on-demand services may remain underused when residents are unaware of available options or are uncomfortable using the associated technology. Public information and education campaigns, simple booking options such as call-in or SMS-based access in low-connectivity regions, and outreach tailored to local context can help ensure that these services reach the people they are intended to serve.

Technology platforms should be evaluated based on how well they function across different place types, not only in dense urban environments. Tools capable of supporting a range of operating contexts, such as statewide analytics systems, flexible routing algorithms, or context-aware traveler information platforms, can help agencies provide more consistent service across regions with different land-use patterns, infrastructure conditions, and levels of digital access.



Source: Transit app, November 27, 2025
Figure 5: Transit app and MnDOT trip planner applications for on-demand transit in Minnesota, USA.

For example, the Minnesota Department of Transportation (MnDOT) has helped fifteen transit agencies in Minnesota create discoverable GTFS and GTFS-flex feeds to help riders discover demand-responsive transit trips, plan multimodal trips, call to book a rode, and pay their fares in one application.[39] Figure 5 above displays zone and service information, trip planning, and web-based booking within the app, which are provided through the use of open data standards.[40]

Much of the current funding available to transportation agencies is oriented toward road use and infrastructure development. Incorporating mobility options and associated ITS into ongoing capital planning can help agencies consider multimodal services as part of a broader transportation package rather than as a separate or secondary investment.

Distinct success metrics for different place types can also support more realistic decision-making by recognizing that service expectations may differ across urban, suburban, rural, and Tribal contexts.

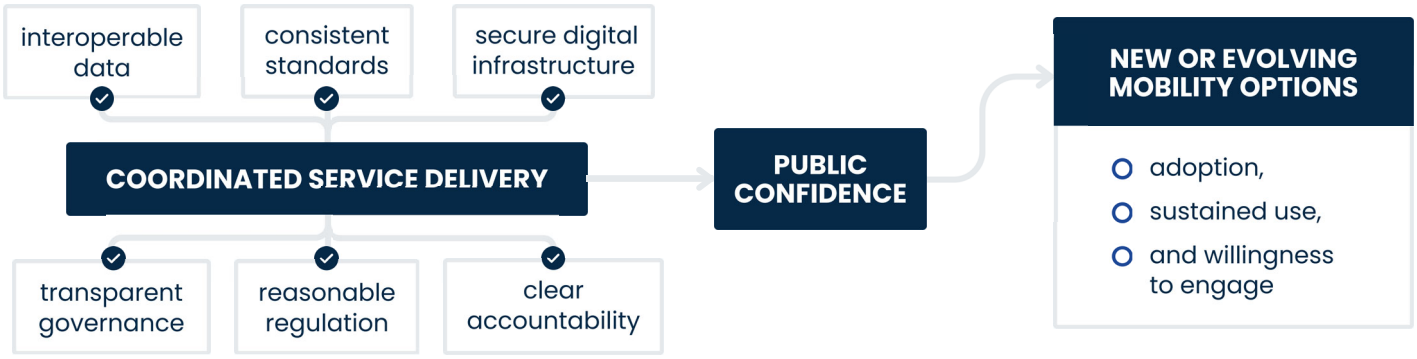
Defining access expectations for each type of environment remains an important part of this process, while preserving the broader goal of offering more than one mobility option wherever feasible. Public education about existing services can also produce meaningful impact at low cost, particularly in communities where available resources are not widely understood. Large-scale datasets that evaluate mobility and safety across place types and across different road users, including commercial vehicles, passenger vehicles, bicycles, and pedestrians, can further help ensure that funding and service decisions reflect real-world conditions.

[39] Transit App. "Bringing Rural Riders into the Fold." Transit, 11 May 2023, blog.transitapp.com/mndot-gtfs-flex-bringing-rural-riders-into-the-fold/. Accessed 28 Apr. 2026.
[40] Transit App. "Demand-Response Service - Transit Partners." Transitapp.com, 25 Sept. 2025, resources.transitapp.com/article/401-demand-response-service.

CONCLUSION

Multimodal and on-demand transportation is a core element of modern mobility systems. Its effectiveness depends on the alignment of governance, standards, partnerships, regulation, organizational capacity, and public trust in support of reliable, user-focused outcomes.

This Plan frames multimodal transportation as a system in which interoperable data, consistent standards, and secure digital infrastructure enable coordinated service delivery. Transparent governance, reasonable regulation, and clear accountability reinforce these technical foundations. Reliable, accurate, and timely services support public confidence, which in turn influences adoption, sustained use, and willingness to engage with new or evolving mobility options.



Public–private partnerships and outcome-based procurement approaches can support scalability, reduce risk, and provide clearer demand signals while maintaining public oversight. Regulatory consistency across modes and jurisdictions further improves usability for travelers and coordination for providers.

Mobility needs and success metrics vary across urban, suburban, rural, and Tribal contexts. Context-sensitive planning and place-appropriate performance measures are essential to achieving effective outcomes across these environments.

This document is intended as a strategic reference. Its themes can support readiness assessment, decision-making, and adaptation of multimodal and on-demand strategies as technologies, policies, and practices continue to evolve.

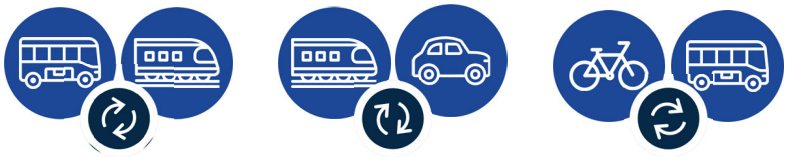
KEY TAKEAWAYS

- Multimodal integration depends on coordinated technical, institutional, and governance elements.
- Public trust supports adoption and long-term use of integrated mobility services.
- Interoperability enables scalability of systems across multiple agencies and makes using multiple transportation systems easier for travelers.
- Regulatory consistency improves usability and coordination across modes.
- Partnerships are most effective when outcomes and responsibilities are clearly defined.
- Place-appropriate solutions and metrics lead to better mobility outcomes.
- This Plan is designed to evolve alongside practice.

SWITCH POINT AMENITIES

- adequate bus stop and layover zones,
- transit shelters with real-time arrival information,
- bike share stations
- park and rides at transit stops
- car share facilities
- taxi stands
- WI-FI service
- bicycle storage,
- repair facilities,
- retail
- open space at major mobility hubs

Switch points and mobility hubs help provide seamless integration of different transportation modes and support first-last mile connections to make easily switching between much, such as from rail to bus, car to rail, or bicycle to bus seamless for transit riders. Switch point amenities may include adequate bus stop and layover zones, transit shelters with real-time arrival information, bike share stations or park and rides at transit stops as well as car share facilities, taxi stands, WI-FI service, bicycle storage, repair facilities, retail, and open space at major mobility hubs to make transfers and waiting easier.[41]



Multimodal transportation impact analysis (MTIA) and travel demand management (TDM) studies help developers and public agencies coordinate better estimate the transportation demands of land use developments and other transportation impacts, such as major events, to more effectively address traffic, transit, bicycle, pedestrian, and other modal needs.[42]

[41] "Mobility Hubs: A Reader's Guide." LA DOT. https://ladot.lacity.gov/sites/default/files/documents/mobility-hubs-readers-guide.pdf.
[42] "Multimodal Transportation Impact Analysis for Site Development (MTIA)." ITE-A Community of Transportation Professionals, 2018, www.ite.org/technical-resources/topics/transportation-planning/multimodal-transportation-impact-analysis-for-site-development-mtia/. Accessed 28 Apr. 2026.


ITS AMERICA