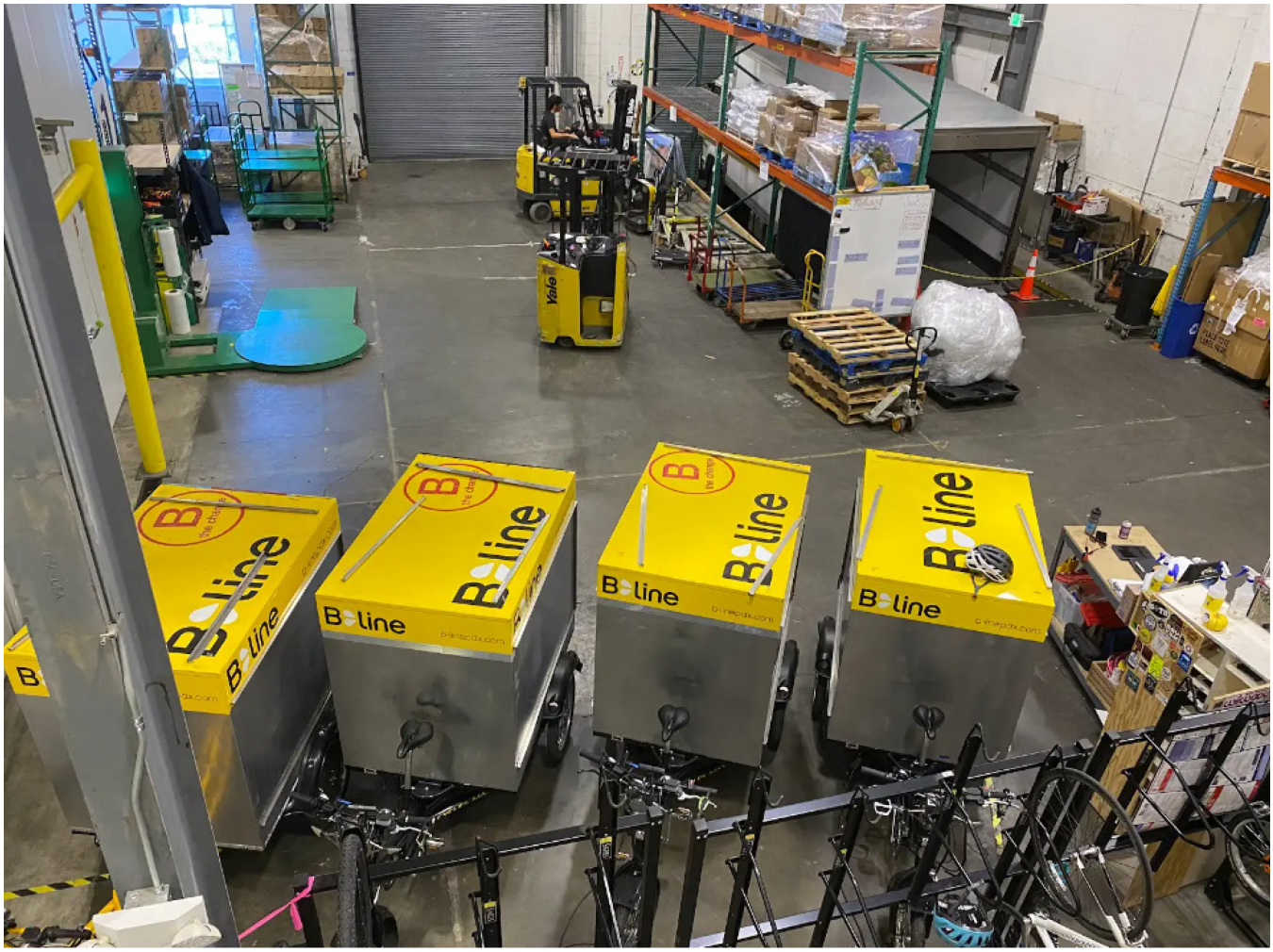


# Micro-Delivery Hub Feasibility Study

## Proposed Actions to Increase the Use of Small Electric Delivery Vehicles in Portland

**October 8, 2024**

THE BUREAU OF
PLANNING &
SUSTAINABILITY

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# Introduction

As of 2021, the transportation sector was responsible for 44 percent of total carbon emissions in Multnomah County. While emissions in most sectors have declined since 2000, emissions in the transportation sector have continued to increase. According to a 2024 statement from the Oregon Department of Environmental Quality, medium- and heavy-duty vehicles are responsible for an estimated 9.3 million metric tons of greenhouse gas emissions in Oregon annually which accounts for approximately 42 percent of all greenhouse gases from the on-road vehicle fleet. This, coupled with the growth of e-commerce, which has resulted in an increased amount of delivery vehicle use, is the motivation behind the Portland Bureau of Planning and Sustainability's efforts to address carbon emissions from freight. Decarbonizing freight is a priority for the City of Portland. Reducing greenhouse gas emissions from the freight sector has been called for in the Climate Action Plan (2009 & 2015), the Sustainable Freight Strategy (2012), the Climate Emergency Declaration (2020), The Climate Emergency Workplan (2022) and the 2040 Freight Plan (2023). Additionally, research shows that low-income and communities of color face exponentially higher health impacts from diesel pollution. Nearly 40 percent of Black, Indigenous, people of color (BIPOC) Portlanders live close to the city's biggest sources of air pollution, such as freeways and industrial facilities. This report explores the feasibility of zero-emissions micro-hubs as a key component to a safer, less congested, and cleaner urban logistics and freight network, with the goal of a net-zero carbon emissions transportation system by 2050.

## Purpose

The City of Portland's Climate Emergency Declaration and 2040 Freight Plan emphasize exploring micro-delivery solutions to reduce emissions and congestion and enhance pedestrian safety. Diesel is the most common fuel source used to power heavy duty trucks. Exposure to diesel particulate matter is linked to numerous serious health problems including respiratory issues such as asthma, heart disease, cancer and premature mortality. Not only do heavy trucks pollute the air, they also pose a safety hazard to pedestrians and bikers on narrow urban streets. To ensure a safer, cleaner environment, Portland is exploring options to support micro-delivery vehicles such as cargo bikes and smaller electric vehicles. Small human-powered or electric vehicle (EV) delivery modes promise cleaner, safer deliveries. This shift towards micro-deliveries is currently being tested in other cities. For example, Boston and New York are already piloting micro-delivery programs. By establishing micro-delivery hubs, which are small urban facilities used to transfer, bundle and store goods, Portland can ensure efficient delivery while minimizing emissions and promoting pedestrian safety. By enabling and encouraging micro-mobility solutions, Portland can create a cleaner, safer environment for its residents and pave the way for a more sustainable future. This report describes the existing land use and transportation framework in Portland, as it relates to micro-delivery hubs and micro-delivery devices. It examines current policy and zoning code obstacles and explores how existing micro-delivery companies are adapting to the current environment. The report also discusses efforts in other cities to accommodate micro-delivery and micro-delivery devices. Lastly, the report recommends zoning code changes and pilot project considerations to encourage and enable more micro-delivery hubs to locate in Portland.

# Background

## Existing Planning Policy

The need to examine the feasibility of micro-delivery hubs in Portland is discussed across several current policy, planning and program efforts, highlighting their potential as a key component of a sustainable last-mile logistics network.

- 2022-2025 Climate Emergency Declaration Workplan: Climate Emergency priority LU-3 identifies the need for further study and potential code updates for urban logistics hubs, specifically within the currently restricted Central City zone, paving the way for their integration into core urban areas.
- Portland 2040 Freight Plan: Recognizing their potential in Strategy 7A.1, the plan calls for investigating regulatory barriers, assessing feasibility, and exploring research opportunities for micro-hubs, alongside other first-mile/last-mile solutions like shared loading docks and cargo bikes.
- Zero-Emission Delivery Zone Grant (U.S. DOT SMART grant): This grant enables implementation of Portland's 2040 Freight Plan Strategy 7A.1. It was awarded to Portland in 2023 and fosters innovation in emissions reduction for freight by supporting a mandatory zero-emission delivery zone pilot in downtown Portland. The pilot project aims to increase existing micro-delivery operations and expand the use of e-cargo bikes as a "last-mile" delivery solution. Pilot project staff will use data, sensors, and curb access monitors to gain a better understanding of curb usage.

The inclusion of micro-delivery hubs in these planning documents and program above, establishes the concept in a broader framework of modernizing the city's freight and logistics network and reducing transportation related carbon emissions. Micro-delivery hubs are a critical element in Portland's vision for a cleaner, equitable, and more sustainable city. By studying the feasibility, addressing regulatory hurdles, and exploring integration within existing land uses, Portland is laying the groundwork for a future where sustainable deliveries thrive, emissions are reduced, and the urban fabric is safe and walkable.

## Existing Land Use Within Portland, Oregon

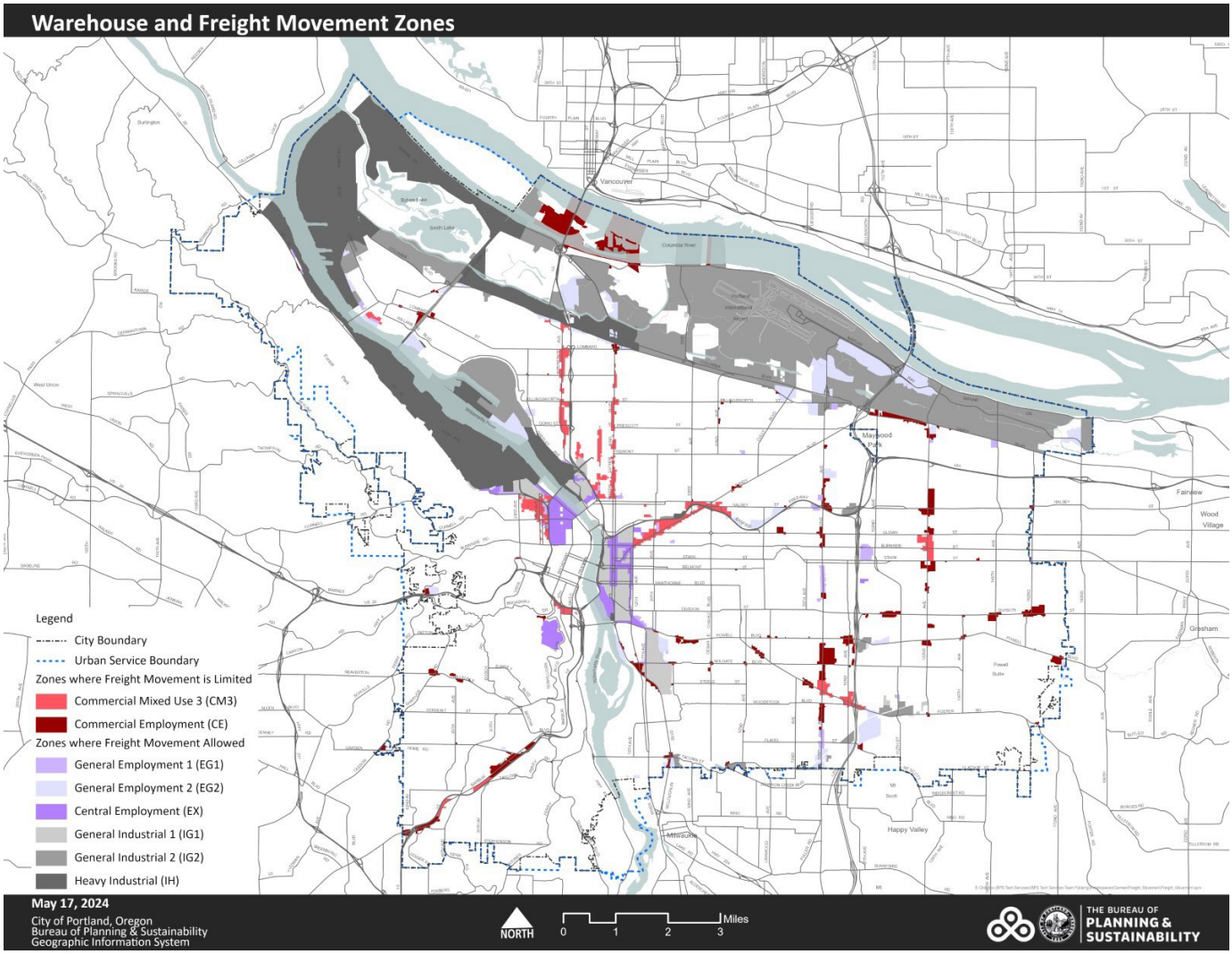
It is important to think about characteristics of micro-delivery hubs such as facility needs and associated land size, where they should be located and other land use-related parameters. Currently, micro-delivery hubs are not explicitly defined in the zoning code, the activities associated with this use are broadly covered by "Warehouse and Freight Movement" and "Retail Sales and Services." Next is a discussion of how these uses are defined, regulated and where they are allowed in the city. Table 1 provides a summary of the regulations for "Warehouse and Freight Movement" uses.

## Warehouse and Freight Movement

Micro-delivery hubs are permitted by the zoning code through the "Warehouse and Freight Movement" use. The "Warehouse and Freight Movement" use is an Industrial Use category characterized by firms that are "involved in the storage, or movement of goods for themselves or other firms. Goods are generally delivered to other firms or the final consumer, except for some will-call pickups. There is little on-site sales activity with the customer present." This use is allowed without restrictions in general industrial, heavy industrial, and employment zones.

**Industrial:** IG1, IG2, IH

**Employment:** EG1, EG2, EX




*Map 1 illustrates the zoning districts that currently allow "Warehouse and Freight Movement" without limitations (purple, lavender and grey) and the zoning districts that currently allow "Warehouse and Freight Movement" with limitations (dark and light red).*

## Table 1 – Micro-Delivery Hub Allowed Zones

| | Commercial/Mixed Use Zone | | Employment and Industrial Zone (Table 140-1) | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Use** | CM3 | CE | EG1 | EG2 | EX | IG1 | IG2 | IH |
| **Warehouse and Freight Movement** | L (2,4) | L (2,4) | Y | Y | Y | Y | Y | Y |

Y = Yes, Allowed

L = Allowed, But Special Limitations

The following conditional uses apply:

- Industrial use and size limitations. These regulations apply to all parts of Table 1 that have a [2]. Utility Scale Energy Production and Industrial Service are conditional uses. All other industrial uses are allowed, and all industrial uses, including Utility Scale Energy Production and Industrial Service, are limited in size as follows. Amounts in excess of the limits are prohibited:
    - In the CM3 zone, the total net building area of all Industrial uses on the site may not exceed the total square footage of the site; and
    - In the CE zone, each individual Industrial use is limited to 40,000 square feet of net building area.
- Exterior development limitation. This regulation applies to all parts of Table 1 that have a **[4].** Exterior display or storage of industrial equipment, such as tools, equipment, vehicles, products, materials, or other objects that are part of or used for the business operation is prohibited.

While "Warehouse and Freight Movement" is not permitted within most of the Central City, the proximity of Montgomery Park, Lower Albina, and Central Eastside offers opportunities to establish micro-delivery hubs in the downtown area without a zone change. "Warehouse and Freight Movement" is also allowed with limitations in two commercial/mixed use zones and through the conditional use review process in a campus institutional zone. In the Commercial/Mixed Use 3 (CM3) zone all industrial uses, including "Warehouse and Freight Movement" are limited in size to the total square footage of the site. In the Commercial Employment (CE) zone each individual industrial use is limited to 40,000 square feet of the net building area. Both zones prohibit outdoor storage of materials and equipment. In the Institutional Residential (IR) zone "Warehouse and Freight Movement" uses are subject to a conditional use review process. The approval criteria address the physical compatibility, livability, public services, and consistency with any area plans.

## Retail Sales and Services

Currently, micro-delivery hubs exist within many big-box retail stores, such as Target and Walmart. These hubs typically occupy a designated space within the back-of-house area, fulfilling local orders for efficient delivery. However, due to the limited size and scope of these dedicated areas compared to the overall retail function of these stores, the primary use is classified as "Retail Sales and Service," not "Warehouse and Freight Movement."

This means that micro-delivery hubs can exist within commercial zones that permit "Retail Sales and Service" as long as the retail portion of the floor plan is the primary use. The retail portion of the space must occupy at least 50 percent of the total floor plan for the micro-delivery hub to qualify as accessory to the primary use.

"Retail Sales and Service" use is "involved in the sale, lease or rent of new or used products to the public. They may also provide personal services or entertainment or provide product repair or services for consumer and business goods. Accessory uses may include offices, storage of goods, manufacture or repacking of goods for on-site sale, food membership distribution and parking." Generally, Retail Sales and Service is an allowed use in most commercial zones (CM2, CM3, CE and CX) and within EX. There are limitations in Multi-Dwelling Zones (RM), CR, CM1, and within the Employment and industrial zones (EG1, EG2, IG1, IG2, and IH). These zones can be found throughout the city, including within designated Centers and Corridors.

## Retail vs. Warehouse and Freight Movement

Micro-delivery hubs challenge traditional zoning classifications. While some businesses serving as last-mile delivery hubs fall under "Retail Sales and Service" due to merchandise sales, others operate under different categories, highlighting inconsistencies in the current framework.

FedEx Ship Centers, UPS Stores, and similar businesses fall under "Retail Sales and Service" despite their primary function of delivery, as they also sell goods and merchandise. This classification may not accurately reflect their core activity of last-mile distribution. In contrast, Amazon drop-off areas within Whole Foods or similar uses are considered accessory to the retail area because they occupy less than 50 percent of the floor plan. This highlights the importance of space allocation clarity in determining zoning classifications. Furthermore, post offices often offer various services beyond mail sorting and distribution, blurring the lines between retail and warehouse functions. While the service offerings of a post office may qualify as "Retail Sales and Services," they may not always meet the 50 percent floor plan requirement for this classification. Additionally, as federal facilities, post offices can be exempt from local zoning regulations, adding another layer of complexity.

Considering the evolving landscape of last-mile delivery, it is critical to re-evaluate existing zoning regulations. Businesses like Fed Ex, UPS, and post offices already play a significant role in last-mile distribution within the city center and surrounding areas. Recognizing their function and potential for further integration into micro-delivery hubs can inform future zoning updates.

# Case Studies and Peer Reviewed Research

## Examples of Zero Emission Delivery Companies in Portland

To understand how existing companies within the city of Portland are contributing to enhancing the last-mile delivery, below is a summary on how each company is operating and contributing to the reduction in overall emissions.

### B-Line

B-Line is a last-mile distribution to Portland's urban core, located in the Central Eastside. B-Line manages cold storage and warehousing at the Redd. The Redd offers à la carte services to local food entrepreneurs, like packaging stations and co-working office spaces. B-Line began in 2009 with the focus to deliver goods and services via a cargo bicycle fleet, while reducing congestion and carbon dioxide emissions, and developing local green-collar jobs. They maximize their deliveries by ensuring that they have goods to pick up while dropping off a delivery. For example, when dropping off goods at a grocery store, they also pick up recyclables or expired food and deliver those to another destination. B-line envisions growing the network of delivery hubs (maximum of 2,000 square feet in size) in locations that are currently difficult to reach from their current location. This would include areas to charge bikes, a last-mile deployment center, and perhaps an employment center designed according to the neighborhood need.


*B-Line Facility Cargo Bike Parking*

The maximum distance traveled by B-Line's electric cargo bikes, for deliveries, is currently 4.5 miles from its existing distribution hub, which is in Portland's Central Eastside neighborhood. However, traveling 4.5 miles by electric cargo bike to deliver goods is far from ideal. According to Franklin Jones, B-Line's

Founder and CEO, electric cargo bike deliveries, that are 3 miles from the distribution center, are doable but the ideal delivery distance from the distribution center for electric cargo bike deliveries is within a one-mile radius of the distribution hub where goods are stored or transferred from larger vehicles. One mile is described as "the sweet spot" for delivery by B-Line electric cargo bikes.

## Legwork Local Delivery

Legwork Local Delivery was a zero-emission delivery company located in Portland. The owner of Legwork was interviewed by BPS staff for the purposes of this report, but it has since gone out of business. They used two (2) electric cargo vans, and a Nissan Leaf to deliver goods within the greater Portland Metro. They did not have a physical location, but instead helped other companies' deliver goods, therefore only required an area to park and charge their vehicles overnight within the central eastside.

## Nossa Familia Coffee Roastery


*Nossa Familia Founder, alongside the electric vehicle fleet. Image courtesy of PECNW.com.*

Nossa Familia Coffee Roastery is a 20-year roastery, distributor, wholesaler, and coffee shop. Their existing warehouse, within the Montgomery Park neighborhood, hosts their office, storage, parking, and overall operations. Their fleet consists of two electric sprinter vans, which they charge at their warehouse. They focus on delivering larger orders within the region. Smaller deliveries are completed through other carriers.

# Examples of Zero Emission Delivery Hubs in Other Cities

While the concept of micro-delivery hubs is relatively new, some cities are embracing this innovative approach to transform last-mile delivery. In Europe, several cities are actively reimagining their urban landscapes to accommodate cleaner, more efficient delivery methods. In the United States, cities like Boston and New York are rethinking how delivery takes place. Here are some international and national examples of zero emission delivery hubs:

## London: Last Mile Logistics Hub


*Amazon Cargo Bike: Courtesy of Amazon.*

In December 2020, the City of London approved a micro-delivery hub to reduce congestion and emissions in central London. Thirty-nine parking spaces in an underused garage were transformed into a parcel consolidation hub for final delivery by e-cargo bikes. Amazon Logistics was chosen out of 10 couriers to operate the Last Mile Logistics Hub allowing them to take 85 delivery vehicles off the road each day, which will eliminate 23,000 delivery trips every year. Using electric cargo bikes and people on foot, Amazon Logistics can serve all deliveries within a one-and-a-half-mile radius of the hub in the City of London as well as some parts of the central London sub-region without the need for motorized freight vehicles. Since this pilot, Amazon has expanded electric cargo bike deliveries to other locations like Glasgow.

## London: Urban Logistics Hub, Better Bankside

*Better Bankside Hub. Micro-device parking and storage.*


*Storage within Better Bankside Hub. Both images courtesy of C40.*

Better Bankside, a business improvement district (BID) located in the center of London, has taken an innovative approach to tackling delivery challenges. They have transformed a disused viaduct into a micro-logistics facility, offering a one-stop solution for local businesses. This unique hub serves several key functions:

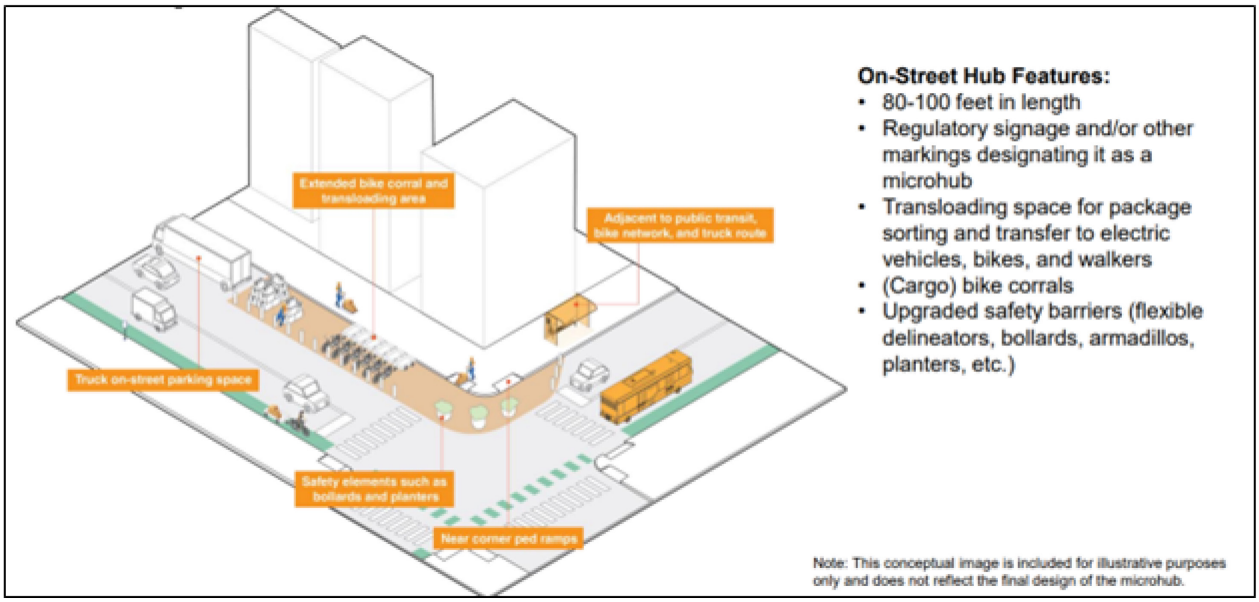
- **Consolidated deliveries:** Businesses can now deliver their goods to the hub instead of making individual trips throughout the city center, reducing delivery congestion and emissions.
- **Storage space:** The hub provides a dedicated storage area, allowing businesses to keep one pallet of goods on hand.
- **Office and bike facilities:** The hub offers office space for businesses and secure bike parking.
- **EV/cargo bike charging:** The hub features charging points for electric cargo bikes.

Launched in 2024, the hub is managed by a third-party operator, who oversees daily operations, records delivery metrics, and measures efficiency gains for participating businesses.

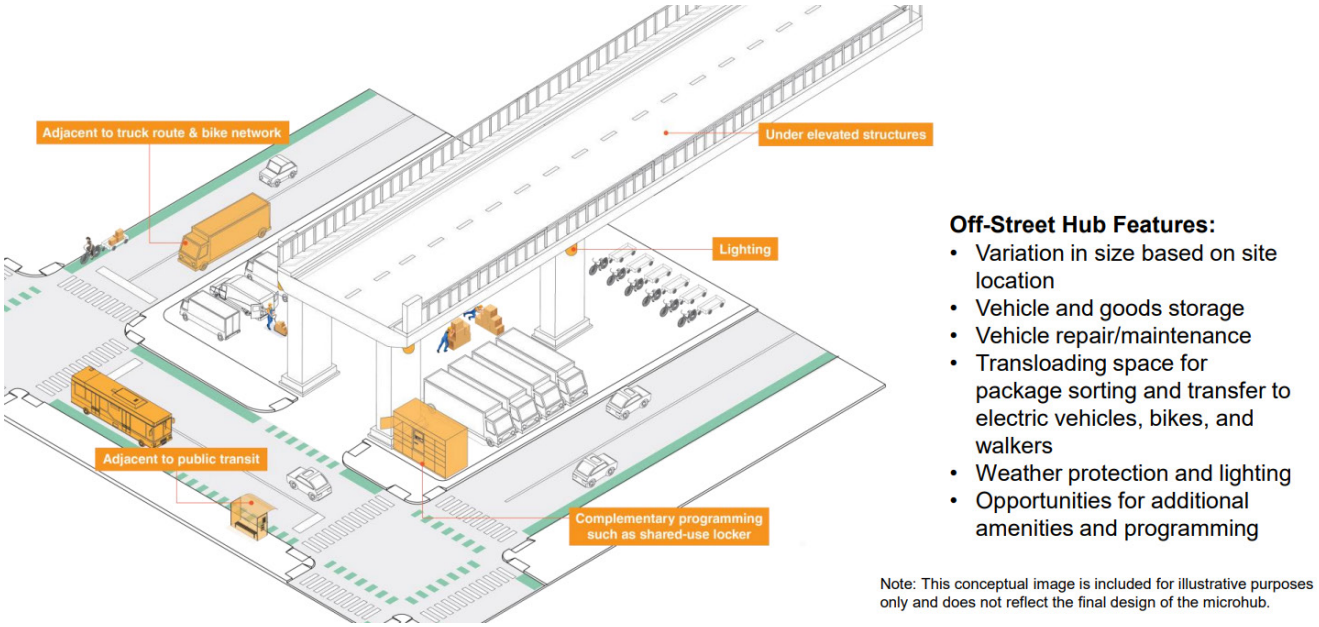
## Boston: Boston Delivers


Boston, Massachusetts, is piloting "Boston Delivers" a delivery service for local businesses that uses e-cargo bikes to transport goods. This 18-month program, funded by a Massachusetts Clean Energy Center grant, aims to tackle urban congestion, improve pedestrian safety, and reduce air pollution. Boston Delivers helps address the surge in online orders and provides businesses with a sustainable delivery solution. The program initially focused on the Allston Main Street District but is now expanding to more neighborhoods across Boston. The program is operated by Net Zero Logistics (NZL), a leader in micro-delivery with previous work in New York City. NZL manages their own fleet of e-cargo bikes, performs the deliveries, and oversees the day-to-day logistics. The service operates from a micro-delivery hub, in the form of a traditional office/staging area. It's an indoor space owned by Boston University, leased to NZL, and the City of Boston uses grant funds to pay the rent. The City has contributed a number of curbside parking spaces outside of the entrance, including a "small vehicle loading zone" to accommodate trans-loading. Everything is stored at the staging location overnight. Bike charging happens during the day for safety reasons. The micro-delivery hub is strategically located within a commercial strip adjacent to the university campus, offering a centralized location for storing goods, providing rest areas and secure bike parking and charging for electric bikes. Net Zero Logistics oversees the entire delivery process.

## New York: Micro-Delivery Hub Pilot




*New York Conceptual On-Street Hub Slide. Courtesy of New York DOT.*




*New York Conceptual On-Street Hub Slide. Courtesy of New York DOT.*

New York's local delivery hub pilot is estimated to start in the summer/fall of 2024 and is a result of Local Law 166 of 2021, which required the New York Department of Transportation (NYDOT) to issue a request for expression of interest (RFEI) from entities interested in facilitating, operating, or using micro-distribution centers and to seek feedback on potential challenges and opportunities. Through this effort, they defined the following:

- **Micro-distribution center**: A space located within the public or private right-of-way where goods are transloaded by multiple operators from larger freight vehicles to smaller, low-emission and electric vehicles, or human-powered modes (e.g., cargo cycles, hand carts) for final delivery.
- **Micro hub vehicle**: A small, low-emission, or electric van or truck, or human-powered vehicle used to carry goods from a distribution center to a final receiver or destination. (i.e., Handcart, Bicycle/E-Bike, Cargo Bike, Bicycle/E-Bike + Trailer, Electric Van…etc.)
- **Local micro-distribution**: The movement of goods from a local distribution point to a final receiver via a low-emission or human-powered mode.

Locations will be selected based on proximity to high-density areas with mixed land use, as well as proximity to truck routes, transit, bike lane networks, and engagement with local communities and businesses. Selected pilot sites will explore specific hours of operation based on surrounding land use and stakeholder feedback. During the first phase, NYDOT will monitor hub operations, collecting data and refining strategies to ensure there is equitable implementation and enforcement for both small and large companies. Phase two of the program, will expand the number of local delivery hubs and delivery partners, explore regulatory changes and incentives, examine new technology and amenity options, and gather lessons to develop a permanent local delivery hub program. A final report on the program is targeted for late 2026.

# Findings

The findings of this report speak to the benefits of micro-delivery hubs their locational and space requirements and other considerations and opportunities.

## Benefits

By enabling shorter trips for zero-emission delivery vehicles, these hubs play a pivotal role in building a more sustainable and livable city. Micro-delivery hubs strategically position goods closer to final destinations, significantly reducing travel distances for delivery vehicles. This translates to the ability to use smaller last mile delivery vehicles with lower greenhouse gas emissions, positively contributing to Portland's climate action goals. Delivery by cargo bike and by foot has the added benefit of enhancing pedestrian safety in a dense urban environment. By reducing the instances of conflict between pedestrians and motor vehicles, especially larger delivery trucks, micro- delivery hubs have the potential to increase pedestrian safety and walkability.

## Locational Requirements for Micro-Delivery Hub

The following are location criteria for a successful micro-delivery hub:

1. **Density** – Micro-delivery hubs thrive in areas full of activity, particularly those experiencing high population and job density. In such areas, typically located within the central city or similar

districts, there's a substantial concentration of both households and businesses, creating a critical mass for frequent deliveries.

2. **Land Use** – Micro delivery hubs should be in areas compatible with their operations, such as mixed-use zones with access to parking and loading facilities.

3. **Accessibility** – Proximity to major transportation networks, including bike lanes, pedestrian areas, and truck routes, is crucial for efficient access and delivery.

    a. **Bike Network** – Micro-delivery hubs operate optimally when used in conjunction with cargo bikes for last-mile delivery. To ensure their effectiveness, these hubs should be located near a well-integrated city bike network. This integration allows cargo bike riders to efficiently navigate the city after collecting deliveries from the hub.

    b. **Freight Street** – The micro-delivery hub should be located near a Regional Truckway and on either a Priority Truck Street, Major Truck Street, or a Truck Access Street, as designated by the Transportation System Plan. Micro-delivery hubs within these locations would provide ease of access for trucks dropping off larger loads. The following are defined by the Transportation System Plan:

        - Regional Truckway: Usually a highway/freeway, intended to facilitate the movement of all types of trucks.

        - Priority Truck Street: Priority Truck Streets are intended to serve as the primary route for access and circulation in Freight Districts, and between Freight Districts and Regional Truck-ways.

        - Major Truck Streets: Major Truck Streets are intended to serve as principal routes for trucks in a Transportation District. (i.e., Powell, Sandy, MLK, SW Bertha Blvd)

        - Truck Access Streets: Truck Access Streets are intended to serve as access and circulation routes for delivery of goods and services to neighborhood-serving commercial and employment uses. (i.e., some of the Corridors)

4. **Location** – The location of a micro-delivery hub should be located one to three miles from the final delivery destination. The National Association of City Transportation Officials recommends a micro- delivery hub to be three miles or less from the destination. Interviews with local industry leaders identified a one-mile distance from the final delivery destination as ideal for human-powered delivery. Understanding commerce density is also important to consider when determining the ideal location for a micro delivery hub. Hubs should be located to enable easy access to areas with medium and high commerce density. Franklin, B-Line's CEO, stated that it is

beneficial to locate micro delivery hubs close to smaller business districts that are near residential neighborhoods.

# Space Requirements and Integral Features of a Micro-Delivery Hub

At a minimum, to meet the space requirements of a micro-delivery hub, the facility should have the following:

1. **Bike charging/storage** – If a facility delivers via bicycle or e-bicycles they will need a location to store bikes, as well as an area to charge them. Fire safety for e-bicycle storage facilities would be handled by the Portland Fire Bureau. The safety of e-bicycle batteries is best served by provision of proper maintenance and storage that a dedicated facility would provide. Third-party battery certification by established firms like UL Solutions, a National Recognized Testing Laboratory, can also build trust and ensure safety.

2. **Loading** – Micro-delivery hubs rely heavily on efficient loading areas to ensure smooth operations and minimize disruptions. These areas can be located on private property or designated in the right-of-way along the curb, with both options requiring careful consideration to avoid conflicts with bikers and pedestrians and avoid exacerbating existing traffic congestion.

    a. **Off-street Loading** – Central city locations, while offering numerous benefits for micro-delivery hubs, present unique challenges regarding loading and unloading activities. To minimize negative impacts on the public right-of-way and ensure smooth operations, access to off-street loading space is important.

    b. **Flexible On-street Loading** – As delivery companies embrace smaller, cleaner vehicles, the need to reimagine on-street loading zones becomes increasingly urgent. Portland's ongoing experiment with Zero-Emission Delivery Zones sets a positive precedent, paving the way for further innovation in urban infrastructure. One crucial step in this direction is the creation of dedicated loading zones specifically designed for cargo bikes and other small, sustainable vehicles.

3. **Employee Amenities** – Providing basic amenities like bathrooms, break rooms, and designated resting areas is crucial for employee comfort, satisfaction, and health. B-Line's initiative of providing clothes/shoe dryers for bike delivery staff to dry their gear on rainy days, exemplifies the proactive approach companies can take to address challenges, unique to human powered delivery service, that their employees face. This not only promotes employee comfort but also contributes to their health and well-being during the rainy season.

4. **Office** – Micro-delivery hubs require dedicated office space to support their operations and staff. This space should seamlessly integrate with the overall hub design and provide a functional and comfortable environment for employees.

5. **Storage** – While drop-off capabilities are important, the main function of a micro-delivery is the storage area. This space plays a vital role in optimizing last-mile delivery operations and ensuring efficient fulfillment of customer orders.

6. **Space Needs** – A micro hub should have sufficient space for all of the needs mentioned above. The space needs will vary depending on the volume of packages coming in and out of the facility. The City of DC's Department of Transportation and Metropolitan Washington Council of Governments (MWCOG) commissioned a Delivery-Micro Hub Feasibility Study in June 2023 by Nelson Nygaard which states that operators generally need around 2,500 square feet of storage to load, unload and store deliveries. B-Line's current mobility hub is an 18,000 square foot warehouse located in Portland's central eastside. Franklin, B-Line CEO, believes that the ideal square footage for a micro delivery hub is between 1500-2000. B-Line's current facility is larger than they need.

# Considerations and Opportunities

Several considerations need to be addressed for the successful implementation of micro-delivery hubs in the city. One crucial aspect is limiting the size and frequency of trucks accessing these hubs. Limiting truck access could decrease the risk of pedestrian and bike conflicts in dense areas which would make it easier to allow micro-delivery hubs to be in additional zones and enable increased location flexibility. This can be achieved through weight restrictions, designated zones prohibiting heavy-duty freight, and smart traffic management strategies. Additional barriers include the following:

- **Single User** – Understanding the intended user of a micro-delivery hub is crucial, especially regarding the number of carriers involved. Traditionally, delivery companies operate independently and can be hesitant to share resources or collaborate with competitors. This raises the question of whether a micro-delivery hub should be operated by a single carrier or managed by a neutral third-party company. Examples:
    - B-Line in Portland operates as a multi-carrier hub, facilitating last-mile deliveries for various carriers and businesses.
    - Net Zero Logistics in Boston, provides a neutral third-party hub, offering fulfillment and logistics services to various companies.
    - Amazon's micro mobility delivery hub in Croydon enables Amazon to bring more electric-powered deliveries to customers in South London. This is an example of a single carrier micro-delivery hub.

- **Real estate availability and cost** – Secure and affordable space for charging infrastructure, vehicle and goods storage can be a significant challenge, due to locational limitations and cost to lease these spaces.
- **Delivery mode profitability** – The number of deliveries efficiently conducted with an e-cargo bike or smaller vehicle may not yet match the profit margins of traditional delivery methods.
- **Lengthy permitting processes** – Stakeholders stated that current permitting procedures can add delays and complications to the implementation of micro-delivery hubs and electric vehicle infrastructure.

Despite these challenges, several opportunities exist to encourage the growth of micro-delivery hubs and electric delivery vehicles:

- **Incentivizing micro-delivery hub development** – Integrating micro-delivery hubs within new construction projects or including locker systems on ground floors can offer convenience and accessibility.
- **Utilizing underutilized spaces** – Repurposing areas like the Lloyd Center through zoning adjustments or areas beneath the 405-freeway deck, can create a hub for micro-delivery and mobility services. The zoning for the Lloyd Center currently does not allow for micro-delivery hubs but areas beneath the 405-freeway deck are zoned to allow for the use. Coordination between the state of Oregon would be required if areas below the freeway deck are considered.
    - Alternatively, underutilized parking garages within the central city can be used to facilitate micro-delivery hubs.
- **Co-location in transit stations** – Charging stations, rest areas and pick-up lockers could be located in transit stations, integrating elements of micro-delivery hubs into the transit system.
- **Streamline Permitting through Code updates** – By working with the Bureau of Development Services and industry leaders, zoning and development code updates can help streamline the permitting process for this use. The goal would be to clearly define a Micro-Delivery Hub in the code and articulate the locational, space and permitting requirements clearly.

By carefully considering both the challenges and opportunities, Portland can strategically implement micro-delivery hubs and electric delivery vehicles to create a more sustainable and efficient urban transportation system.

# Proposed Actions

## Zoning Code Updates

As e-commerce continues to increase, it is important to explore ways to support the use of clean micro-delivery vehicles in more areas of Portland. The zoning code use category of "Warehouse and Freight Movement" includes large warehouses and distribution centers, supported by heavy-duty freight vehicles. This use category also includes smaller micro-delivery hubs, supported by smaller electric vehicles and cargo bikes. Heavy-duty freight vehicles that serve large logistics hubs, should remain limited to industrial areas to avoid air pollution exposure in residential areas and dangerous conflicts between freight, pedestrians, bicycles and buses, which are more likely to happen in commercial, residential and mixed-use zones. However, smaller micro-delivery hubs, which deploy smaller vehicles and cargo bikes, are less likely to result in poor air quality and dangerous conflicts with pedestrian, cyclists and transit riders. Allowing micro-delivery hubs to be in a wider variety of commercial and mixed-use zones, closer to residential zones, would facilitate the use of electric cargo bikes and smaller delivery vehicles by decreasing the distance needed to get goods to the final destination.

### 1. Create a specific "micro-delivery hub" use category and definition in the zoning code:

While currently classified as industrial due to their functional similarity to warehouses, micro-delivery hubs hold unique characteristics that warrant a reevaluation of their zoning status. Unique characteristics include the use of smaller, often zero-emission, delivery vehicles and electric cargo bikes that are safer to operate around pedestrians and bikers and are cleaner and quieter. Creating a specific "micro-delivery hub" use category, or otherwise distinguishing them from "Warehouse and Freight", would provide clarity and eliminate ambiguity in the zoning code. This category should clearly define the essential features such as type of delivery vehicle (small and zero-emission), maximum square footage of a micro-delivery hub, ensuring compatibility with surrounding land uses. The category should allow for variations in design and function to accommodate the evolving nature of last-mile delivery.

### 2. Consider allowing micro-delivery hubs to be located in commercial and mixed-use zones (CM2 zone):

This will expand the area within the city where micro-delivery hubs can be located. Locating micro-delivery hubs closer to final delivery destinations, will support the use of electric cargo bike and small zero-emission vehicle deliveries. Due to the use of smaller zero-emission vehicles and cargo bikes, there will be decreased risks of conflicts with pedestrian, bikers and transit riders as well as reduced negative impacts on air quality and neighborhood noise.

## 3. Consider allowing micro-delivery operations to be categorized as a "Retail Sales and Service" use within the CM2 zone and allow for a larger storage area:

Eliminate or reduce the requirement to have 50 percent of the floor area be for sales, as long it has a ground floor pedestrian welcoming presence (office space or open to the public) for urban design reasons and to ensure that there are active storefronts in the Central City. Motorized delivery loading and unloading should take place on secondary streets and away from main streets to avoid pedestrian and other conflicts. To address possible land use impacts, consider limiting: the size of the overall facilities, the number and type of delivery vehicles, the time of the day when deliveries occur (consider off-peak hour deliveries), and the location of loading docks. Post office zoning and function considerations informed our thinking about allowing some flexibility within the retail sales and services use category for micro-delivery hubs. Small neighborhood post offices are categorized as a retail sales and service use but the main function is distribution. The important features that contribute to a reduction in negative impacts in the surrounding area are the smaller vehicle size, which decreases the risk of dangerous conflicts with pedestrian, and a welcoming ground floor presence to align with other commercial spaces in the area and enhance the pedestrian environment.

## 4. Incentivize e-cargo bike off-street delivery loading/parking spots for new and existing developments:

The Code currently requires large developments, with over 50,000 square feet of non-residential area, to provide two off-street loading spaces. Developers typically do not want to provide two off-street vehicle loading spaces because it takes away from other usable space. Consider requiring less space for vehicle off-street loading if developers create space for cargo bike delivery loading/parking, where vehicle loading zones are required. Designated space for cargo bike loading/parking minimizes the building area devoted to loading, increases the efficiency of cargo bike delivery service and increases safety by decreasing the risk of conflict with pedestrians and vehicles on the street.

## 5. Explore the feasibility of requiring EV-ready infrastructure to support heavier duty vehicles:

New multi-dwelling and mixed use, commercial and industrial developments are currently required to install EV-Ready infrastructure to support Level 2 chargers in Portland. Level 2 chargers are most often used for light duty vehicles. Fast chargers are useful to support larger vehicles and require more electrical capacity and may require larger conduit infrastructure than level 2 chargers. Explore a study of the technical and logistical requirements of EV-Ready infrastructure to support medium and heavy-duty delivery vehicles in industrial and employment zones. Employment and industrial uses, as diverse as Manufacturing and Production, Warehouse and Freight Movement, Wholesale Sales and Industrial Service rely on medium and heavy-duty delivery vehicles, which are currently diesel or gasoline powered but may transition to electrical in the medium-term. Understanding the impediments and costs to installing large conduit EV-Ready infrastructure can help shape future regulation.

# Piloting Micro-Delivery Hubs and Small Distribution Centers in Portland: Exploring Benefits and Neighborhood Integration

Portland can leverage the potential of micro-delivery hubs by conducting pilot programs. Pilot projects provide valuable insights into how these micro hubs can benefit communities and integrate seamlessly within existing neighborhoods. Following the successful examples of pilot programs in Boston and New York, Portland should partner with Portland State University and others to identify optimal locations for micro-hubs and comprehensively understand their impact.

## 6. Identify funding to incentivize micro-delivery hubs:

The City should identify and pursue grants and other sources of funding to support the development of micro-delivery hubs. Grant funding can offer the opportunity to pilot innovative strategies to reduce greenhouse gas emissions from the freight sector and integrate micro-delivery hubs into existing and new development. One such example is the SMART Stage 1 Grant that PBOT received from the US DOT to pilot a Zero-Emission Delivery Zone in downtown Portland. This pilot project is currently underway and will temporarily change regulations at truck loading zones inside the pilot project area to restrict parking, loading, and unloading access to zero-emission commercial vehicles only. This pilot project will support B-Line's existing micro-delivery hub by diverting some deliveries within the project area to B-Line's e-cargo trikes and other incentives to encourage the adoption of zero-emissions vehicles by delivery companies. Additional grant funding or funding from other sources could be used to expand on PBOT's pilot project and add additional micro-delivery hubs to increase the use of small low-carbon or zero emission delivery vehicles.

## 7. Pilot locker facilities (such as Amazon pickup areas) in CM zones:

Locker facilities, such as Amazon customer pick-up lockers, are currently only allowed to locate in places as an accessory use. Enabling lockers to be located in more areas in Portland will likely increase access to lockers, reduce delivery vehicle miles traveled, reduce congestion and reduce the risk of goods theft. Consider allowing locker facilities to locate in more areas. The goal is to have enough of these lockers to enable most Portlanders to easily walk to pick-up their deliveries. Consider allowing these lockers to be a stand-alone primary use rather than needing to be categorized as an accessory use. Lockers act as pedestrian supported distribution centers and could have a store front presence. Where lockers are located inside a building, such a facility would need to be staffed when open to ensure the safety of users and delivery personnel. Piloting a locker facility as a stand-alone facility in a CM zone would enable an analysis of the impact on the surrounding area.

### 8. Continue engagement with industry stakeholders:

Collaboration with PBOT, BPS and industry stakeholders through continued research and open discussions is vital in shaping a micro-delivery hub program that tackles critical needs and caters to the specific requirements of carriers. Continued communication remains essential to navigate challenges and ensure the successful integration of micro-delivery hubs into the city's transportation network.

# Equity Considerations

At the intersection of environmental justice, the future of Portland's urban freight network has a role to play in addressing equity, reducing carbon emissions, and improving air quality for a more just society. Facilitating the use of zero emission micro mobility deliveries creates the opportunity to improve air quality in the City of Portland. Given that low-income and BIPOC Portlanders are disproportionately impacted by poor air quality, this work has the potential to benefit this demographic of Portlanders. Additionally, decreasing barriers to clean delivery services has the potential to grow clean jobs and could increase access to jobs for low-income and BIPOC Portlanders.

# Conclusion

Micro-delivery hubs have the potential to improve last-mile delivery in Portland, offering safety, air quality and emission reduction benefits, improved traffic flow, and an alternative delivery mode aligned with the Climate Emergency Workplan and the 2040 Freight Plan. While currently permitted through the existing "Warehouse and Freight movement" and "Retail Sales and Services" (with restrictions) uses, their implementation requires careful consideration and adaptation.

Several industrial and employment zones, including Montgomery Park and areas primarily located east off the Willamette River (such as, Lower Albina, and Central Eastside) allow for micro-delivery hubs without restrictions. This proximity facilitates the ability for micro-delivery hubs to serve the downtown area without requiring zone changes.

While existing regulations allow for micro-delivery hubs, additional guidelines may be necessary to ensure smooth operation and compatibility with the urban environment. Public engagement and stakeholder collaboration are crucial to address concerns regarding noise, traffic, aesthetics, and fostering community acceptance.

As micro-delivery hubs gain importance, zoning regulations may need to evolve to accommodate their unique needs and operations. Dedicated micro-delivery hubs in strategically chosen locations within urban areas could offer a more efficient and sustainable last-mile solution.

Micro-delivery hubs represent an opportunity to improve the efficiency and sustainability of last-mile delivery in Portland. By adapting zoning regulations, fostering collaboration, and carefully considering

their integration within the urban fabric, we can leverage their potential to contribute to a more vibrant, livable, and environmentally responsible Portland.

# Key Terms

**Last-Mile**: The "last mile" of delivery is the final step in a product's journey from a warehouse shelf to the buyer's door. This final leg of shipment tends to be the least efficient and most costly because (1) the vehicle delivering the package to its final destination may not optimize the number of packages it is carrying to any given location; (2) the vehicle may have to wait for an available space to unload; (3) the business or individual customer may not be there to accept the delivery; and (4) urban congestion slows delivery. E-commerce trends amplify these inefficiencies.

**Micro-Delivery Hub**: A relatively small, urban logistic facility, where goods are transferred, bundled, and/ or stored before final delivery, serving a limited geographical range. At the facility, goods are shifted from heavy or medium freight vehicles to smaller, low-emission or electric vehicles; or soft transportation modes (e.g., walking, handcarts, cargo bikes and other micro-delivery devices) for last mile deliveries.

**Micro hub vehicle**: A small, low-emission, or electric van or truck, or human-powered vehicle used to carry goods from a distribution center to a final receiver or destination. (i.e., Handcart, Bicycle/E-Bike, Cargo Bike, Bicycle/E-Bike + Trailer, Electric Van…etc.)

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**About City of Portland Bureau of Planning and Sustainability**
The Bureau of Planning and Sustainability (BPS) develops creative and practical solutions to enhance Portland's livability, preserve distinctive places, and plan for a resilient future.

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