



Ulster County / New Paltz Intermodal

Technical Memo Two

Facility Requirements

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EXECUTIVE SUMMARY

This memo provides a recommended minimum program of bus facility components in support of the New Paltz Intermodal Facility Plan. Based on a review of best practices and the specific needs of the operators using the existing New Paltz bus station facility, the following minimum facility requirements, program design goals, and site characteristics are provided. Based on the data available today and limited anticipated growth in transit operations, there is no distinction between short and long-term needs for the facility.

INTERMODAL FACILITY

Ultimately, the objective of an intermodal facility in New Paltz will be to improve the experience of being a transit user in New Paltz while elevating the visibility of transit to the community. A well planned facility will allow for timed connections among routes, offer a comfortable passenger waiting facility for non-timed connections, and support the transportation needs of New Paltz and neighboring communities. In addition, transit facilities can also provide patrons to local businesses while people wait for and transfer between buses.

A new transit center should:

- Have adequate boarding/alighting space, layover space, and circulation space to ensure smooth operations;
- Provide safe and convenient access for pedestrians, bicyclists, and drivers for drop-offs and pickups;
- Provide a pleasant atmosphere for passengers while waiting or transferring;
- Meet the needs of bus drivers (including driver amenities such as restrooms and break room); and
- Provide an operations outpost for bus operators, allowing for ticket sales, luggage/freight storage, and necessary back office functions.

BASIC FACILITY PROGRAM

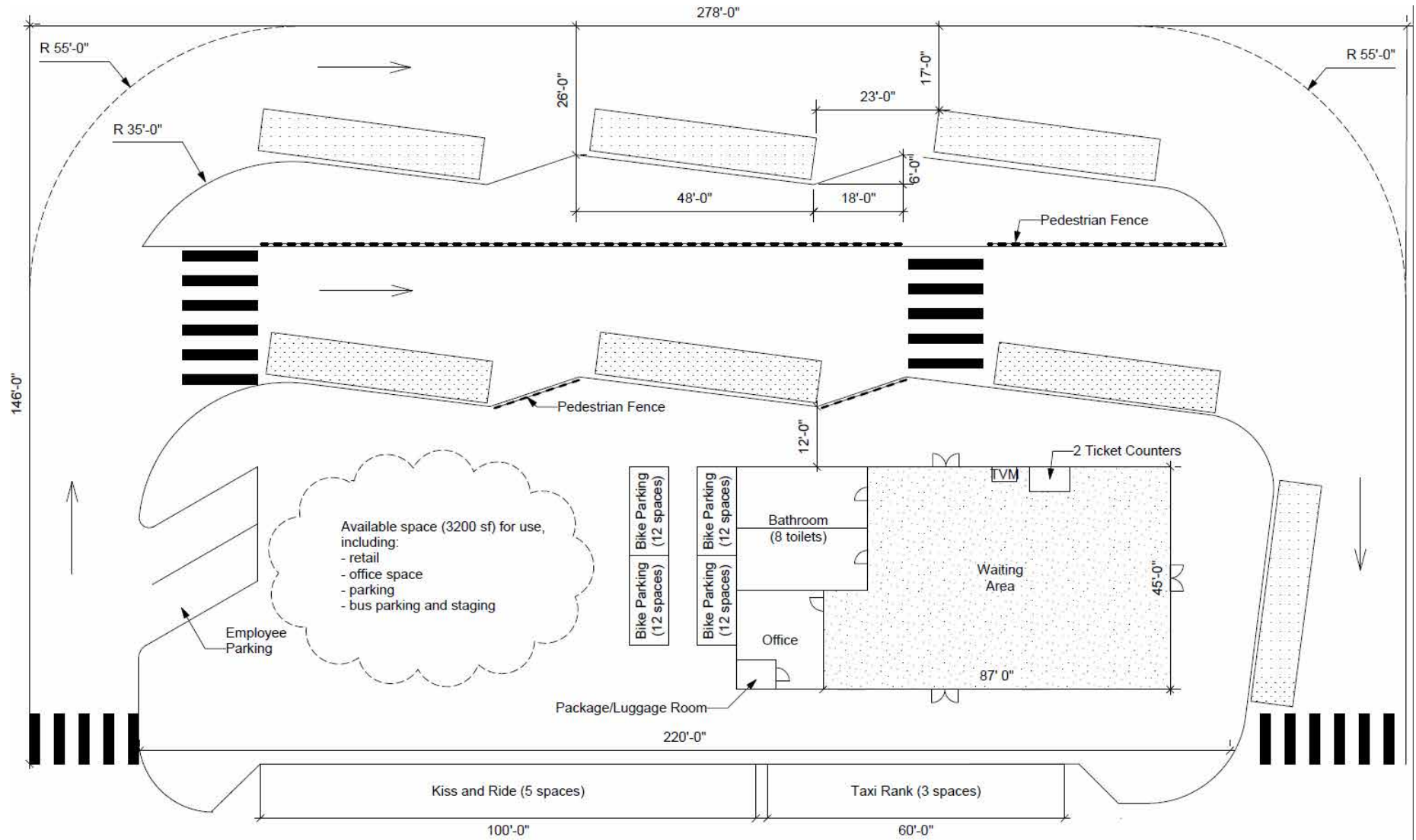
Project team staff met with the Technical Advisory Committee, including representatives from Trailways, UCAT, Town of New Paltz, and NYSDOT, to discuss a preliminary approach to intermodal facility requirements and site design. Based on the discussion, the following minimum program is proposed for a new facility:

- Space for seven full-size (45-foot) buses for dropping off or picking up passengers (to be shared by UCAT and Trailways).
- Sawtooth bus bays with sheltered queuing space for passengers.
- Building structure that will include (1) an indoor waiting area for passengers with room for seating and information display, (2) two ticket windows and two ticket vending machines, (3) public restrooms with eight toilets, (4) secure office space for two operator staff, (5) closet storage for packages and luggage. Based on these minimum requirements, the project team calculates the need for a 3,900-square foot building.
- Space adjacent to the site for up to three taxis.
- Space adjacent to the site for up to five private vehicles for passenger pick-up and drop-off.
- Bicycle parking spaces to support demand and encourage growth of bicycle-to-transit trips.

In addition, an array of other modest amenities might be included such as a public telephone, an information kiosk (system map, bus information), bus stop signage, outdoor lighting, garbage/recycling cans, clocks/real-time arrival bus information, public art, and security cameras.

An example station plan is shown in Figure 1 with a footprint of approximately 38,600 square feet (140' x 278'). Approximately 3,200 square feet of available unprogrammed space (resulting from the length of the bus bays) is included for potential uses such as retail, office space, vehicle parking, bus parking, and staging. Approximately 278 feet of street frontage is required to accommodate a kiss and ride, taxi rank, and bus access to the facility. If the kiss and ride and taxi ranks are located on a separate side of the parcel, a minimum frontage between 180 and 220 feet is required.

Figure 1 Example Station Plan



Facility Program Design Goals

The minimum facility requirements respond to the following goals identified by the New Paltz Intermodal Facility Study Team:

- Elevates the visibility and quality of transit user service in New Paltz.
- Provides a comfortable passenger facility.
- Promotes development and activity in downtown New Paltz.
- Allows local and long-haul bus operations to grow.
- Provides a minimum number of bus gates necessary to support the continued service of operators UCAT and Trailways using dynamic gate assignments.
- Uses gate designs that provide maximum flexibility for varied bus operations and vehicle types. While Trailways prefers pull-in bus gates for long-haul service passengers that involve backing vehicles up, UCAT prefers pull-through gates for transit service passengers.
- Provides pedestrian improvements to reduce conflicts with buses and automobile traffic, including wider sidewalks, sufficient queuing space, and reduced crossings.
- Maximizes passenger convenience, access, and connectivity between multiple modes at the station site, including transit, walking, bicycling, taxis and private vehicles.
- Minimizes conflicts between private vehicles, taxis and buses to increase operational efficiency and safety. Separating circulation facilities for buses reduces conflicts and minimizes cars blocking buses from entering or leaving a gate.
- Provides two employee parking spaces.
- Includes only essential design elements in the minimum facility requirements for the station site and locate non-essential elements off-site where possible. For example, public parking is not an on-site requirement, so as not to exclude potential station sites without space for parking, such as locations in downtown walkable communities.

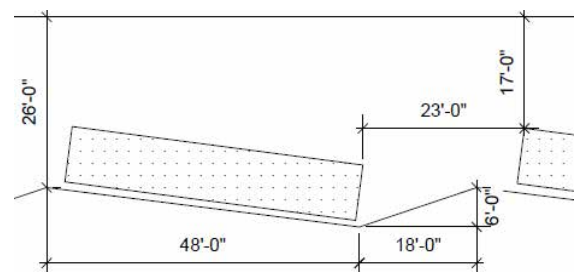
Minimum Facility Requirements

GATES

The facility will require sufficient space to accommodate the buses serving the location. The number of gates required is based on the total number of buses to be served during the peak period, the amount of time each vehicle is stopped at the gate, and the operation flexibility of gate designs to accommodate.

Based on arrival and departure info provided by the operators, a minimum of seven sawtooth gates should be sufficient to accommodate the UCAT and Trailways services stopping in New Paltz. Sawtooth gates are preferred as they allow independent bus movements, meaning that the gates can be shared or allocated in real-time between the operators, and vehicles can leave the space without backing up. Typical sawtooth gate designs require 66 feet of curb space to accommodate a 45-foot bus, the largest vehicle used by Trailways, as shown in Figure 2. A minimum of 23 feet between the front and rear of adjacent buses allows for independent bus movements.

Figure 2 Typical Sawtooth Gate Design



CURB CUTS AND DRIVE LANES

The curb cut and entrance to the facility may be shared between buses and private vehicles. However, at a minimum, there must be a separation for buses to travel to and from the gates, and private vehicles to access passenger pick-up and drop-off areas. Similar configurations are seen at Thruway rest stops which provide separate circulation for commercial trucks between the exit and entrance ramps. Drive lanes that are shared must be a minimum of 18 feet wide, with additional width at turns. Curb radius should be 55 feet on the outside and 35 feet on the inside.

While the example station plan features curb cuts and drive lanes wide enough to accommodate both buses and private vehicles, the proposed site design eliminates the need as private vehicle pick-ups/drops offs are accommodated at the curb to reduce conflicts with buses. Curb cuts or other design features should be used to prevent private vehicles and taxis from blocking the turning movements of buses entering and exiting the facility.

PASSENGER WAITING AREA

Passenger waiting areas are defined for passenger queuing and waiting for the next bus arrival. As per the *Transit Cooperative Research Program (TCRP) Report 100, Transit Capacity and Quality of Service Manual – 2nd Edition*, to achieve Level of Service C, 7-10 square feet of queuing area per person is needed, as shown in Figure 3. Based on this standard, a minimum inside waiting area of 1,960 to 2,800 square feet is required to attain a Level of Service C for a queuing area to accommodate the projected 280 passengers boarding and alighting during peak periods. Inside waiting areas and outside queuing areas are the most space-efficient approach because multiple gate entrances are not necessary when people queue outside.

A maximum pedestrian space and corridors area of 7,000 square feet is sufficient to attain a Level of Service C for walkways, providing 15-25 square feet per passengers at peak periods. The area of walkways varies with the layout of the bus facility. A minimum of 8-12 feet in walkway width is necessary alongside bus gates to accommodate passenger queues and boarding. When multiple gates are adjacent, greater width is desired to minimize conflicts between queues and delineate space for passengers to pass through.

Figure 3 Levels of Service for Queuing Areas

LOS	Average Pedestrian Area		Average Inter-Person Spacing	
	(ft ² /p)	(m ² /p)	(ft)	(m)
A	≥ 13	≥ 1.2	≥ 4.0	≥ 1.2
B	10-13	0.9-1.2	3.5-4.0	1.1-1.2
C	7-10	0.7-0.9	3.0-3.5	0.9-1.1
D	3-7	0.3-0.7	2.0-3.0	0.6-0.9
E	2-3	0.2-0.3	<2.0	<0.6
F	< 2	< 0.2	Variable	Variable

Source: TCRP Report 100, Transit Capacity and Quality of Service Manual – 2nd Edition

RESTROOMS

A minimum of eight toilets are recommended in the facility based on an assumed demand ratio of one toilet for every 30 women and every 60 men at the peak period with an even gender split. The restroom facilities are assumed to fit within an area of approximately 600 square feet.

TICKET SALES

A minimum footprint of 40 square feet for 2 ticket counters and 15 square feet for 2 ticket vending machines is sufficient to accommodate operator needs. For ticket sales, UCAT only requires ticket vending machines and Trailways only uses computer terminals, which must be securable at night.

LUGGAGE, SHIPPING, AND PACKAGE STORAGE

Both operators rely on passengers handling their own baggage. Trailways requires a secure room for luggage that is separated from passengers, as well as to store packages being shipped. A luggage and package room that is a minimum of 80 square feet (8' x 10') is recommended to accommodate these activities.

BACK OFFICE/ADMINISTRATIVE SPACE

A secure room is required by Trailways for back office/administrative activity. A 300 square foot space, located near the ticket counters, is the minimum recommended to accommodate two employees. The space must be accessible as per ADA regulations.

RETAIL

While there is no minimum amount of retail space needed for the facility, retail services are recommended. The specific demand for the transit facility should be further investigated as part of ongoing planning.

BUS PARKING AND STORAGE

A minimum of two spaces for parking and staging 45-foot buses have been requested by UCAT and Trailways, however these spaces can and should be located off the terminal site outside of downtown New Paltz where real estate is more readily available at a lower cost. On-site overnight parking is not necessary.

PUBLIC PARKING

While there is no minimum amount of on-site public parking required for the facility, on-site parking is highly recommended for user convenience. Off-site or adjacent parking may be a possible solution, and therefore exact parking space requirements have not been included at this early stage in order to avoid limiting potential site options. The actual amount of parking which could be made available will depend on site selection – those with more space will be able to provide more parking. Where on-site parking is provided, handicapped parking will need to be included. This will be looked at in further steps once potential sites are identified. Those with more parking potential will then score higher than those without.

EMPLOYEE PARKING

Two parking spaces for employees have been requested by Trailways. As use of these spaces is limited to staff, the spaces can be accessed by the site's one driveway.

TAXI RANK

Taxis provide on-demand door-to-door travel and are best for short-distance trips. The person making the trip does not need to drive themselves, does not need to reserve in advance, and can access the service at many different locations. For these reasons, taxis are an excellent first/last mile connector to bridge the gap between a transit station and a person's origin or destination.

Curb space for up to three autos, measuring a minimum of 60 feet, is recommended to be located adjacent to the site to accommodate taxi pick-ups. Locating the taxi rank along a curb can minimize the amount of space required for circulation, compared to an arrangement that requires driveway access into the site. Additional

taxi staging space can be located off of the station site, with drivers called up or located in view to proceed to the rank when needed.

PASSENGER PICK-UP AND DROP-OFF

Curb space for up to five autos, measuring a minimum of 100 feet, is recommended to be located adjacent to the site to accommodate passenger pick-up and drop-off, also known as kiss-and-ride. The kiss-and-ride should be located within direct view of the station entrance along a curb to minimize the footprint required by driveways for private vehicle access to the site.

BICYCLE AMENITIES

High-quality, secure, and ample bicycle parking is essential for encouraging bicycle-to-transit connections. Providing parking at transit stations can shift current drive-to-transit trips to bicycle and expand the ridership potential of the transit stop. In addition, providing well-designed and conveniently-located bicycle parking can improve station function by reducing the number of bicycles parked in undesirable locations such as access ramps, stairwell railings, or fences.

The number of bicycle racks recommended at the station is based on area wide bicycle accessibility, which should be encouraged by connecting the station area to comfortable and convenient bicycle routes. As bicycles extend the catchment area of the bus station and increase ridership potential while using limited in-site space and without adding private cars to the station area, 48 bicycle parking spaces are recommended, requiring 576 square feet. Bicycle racks should be located in a clearly visible location within 50 to 120 feet of a station entrance. At a minimum, racks should be sheltered by a roof or canopy to provide protection from inclement weather. Secure bicycle parking, such as access-controlled corrals, is recommended.

The center of u-shaped bicycle racks should be a minimum of 4 feet from any wall or vertical element. Racks should be spaced 3 feet from neighboring racks, and a minimum of 5 feet from signs, benches and other obstacles. One u-rack can accommodate two bicycles in an area of 8 by 3 feet. As an example, 6 racks to accommodate 12 bicycles require an area measuring 18 feet long and 8 feet wide.

Figure 4 Example of Sheltered Bicycle Parking



Portland, OR

Source: Nelson\Nygaard

Site Characteristics

The following describes preliminary site evaluation characteristics to evaluate potential intermodal facility sites in the next phase of the study.

SITE LOCATION

- Proximity to existing and planned commercial uses and employment destinations.
- Proximity to transit-supportive uses, including trip origins and destinations.
- Compatibility with neighboring land uses.
- Reasonable vehicular access to major arterials.
- Safe and convenient access to the site for all users, including people traveling on foot, bicycle and motor vehicle.
- Potential for economic development or development in surrounding neighborhood.

SITE SIZE

- Ability to accommodate minimum facility requirements: approximately 38,600 square feet (140' x 278'), including available space on the street for taxis and kiss & ride.
- Site shape to efficiently accommodate requirements and operations. Pass-through lots minimize the circulation space required for buses, but add route distance if vehicles must recirculate to resume route travel.
- Site accommodates the desired orientation and building placement for location (e.g., building at front of lot to maximize pedestrian exposure in downtown, walkable areas; curb frontage is sufficient to accommodate taxis and kiss-and-ride).

IMPACT ON OPERATIONS

- Location facilitates convergence of bus routes.
- Location minimizes uncontrolled turns for buses and all modes accessing the site. Lots at signal controlled intersections may result in improved operations as vehicles have a dedicated signal phase before entering and/or after exiting the facility.

CIRCULATION

- Low potential for auto/bus conflicts.
- Low potential for pedestrian/bus conflicts.

Matrix of Requirements for Each Operator

Bus operator requirements have been synthesized from interviews with stakeholders, including UCAT and Trailways. The operators identified desired amenities and requirements related to bus operations and circulation, parking, staffing and office space, as well as passenger amenities. Operator requirements were reviewed to develop a minimum program that utilizes the smallest functional facility footprint for site selection purposes. Minimum requirements were developed by including essential requirements and shared facilities where possible.

Amenities/Needs	UCAT	Trailways	Minimum Program
Operations and Circulation			
Bus Gates	3-4 pull-through dedicated gates for 40 buses	5 gates for 45' buses which could be shared	7 sawtooth gates for 45' buses, which are shared between the operators
Curb cuts and drive lanes	Separate circulation for buses and private vehicles.	Separate circulation for buses and private vehicles.	Separated or shared entrance. Drive lanes and circulation must be separate for buses and private vehicles.
Passenger pick-up/drop-off area	Unknown	Unknown	Curb space for up to 5 vehicles (100') located adjacent to the site.
Taxi rank	Taxis require separate space to avoid conflicts with buses.	Taxis require separate space to avoid conflicts with buses.	Curb space for up to 3 vehicles (60') located adjacent to the site. Additional staging can be located off site.
Ticket Sales	Ticket vending machine	At least two ticket windows	Two ticket vending machines and two ticket windows.
Bus Maintenance	No maintenance space required	No maintenance space required	None
Parking			
Bus Parking/Storage	Staging space is useful. No overnight parking required.	Staging space required during high-demand periods.	Bus parking/staging spaces for two 45' coaches near station.
Staff parking	Private vehicle parking is not required.	Two employee parking spaces desired.	Two employee parking spaces.
Public parking	Private vehicle parking is not required.	Private vehicle parking is not required.	Private vehicle parking is not required.
Bicycle parking	No specific requirement	No specific requirement.	Recommend
Staffing and Office			
Staffing Hours	Monday to Friday, 5 a.m. to 11 p.m.	Monday to Friday, 5:30 a.m. to 11:00 p.m. Saturday and Sunday, 6:00 a.m. to 11:00 p.m.	Monday to Friday, 5 a.m. to 11 p.m. Saturday and Sunday, 6:00 a.m. to 11:00 p.m.

Amenities/Needs	UCAT	Trailways	Minimum Program
Back Office Space	Not required	Secure space for employees	300 sq. ft. secure room for two employees near ticket window.
Employee Break Area	Break area desired	Not required	No specific requirements; ADA accessible break area for up to 5 employees recommended.
Luggage, shipping and package storage	Not required	Secure space required to storage lost luggage and packages being shipped.	80 sq. ft. storage room for luggage, shipping and packages.
Security	Security guard not needed	Security guard not needed	No security guard
Passenger Amenities			
Passenger waiting area (indoors)	Sufficient seating for approximately 10 people and space for 80 people.	Sufficient seating for approximately 75 people and space for 200 people.	Minimum inside waiting area of 2,800 sq. ft. to accommodate 280 people with 2 benches per gate.
Passenger queuing area (outdoors)	Sheltered queuing area	Sheltered queuing area	Provide minimum of 8' to 12' walkway width along gates for queuing.
Retail	Cafes, restaurants and newsstands preferred, with vending machines as backup.	Cafes, restaurants and newsstands preferred, with vending machines as backup.	To be determined.
Restrooms	Required	Required	8 toilets
Information Displays	Electronic displays near gates or waiting area	Electronic displays near gates or waiting area	Monitors at entrance, ticket windows and gate door. Audio equipment throughout.
Complementary Land Uses	No specific requirements, but not opposed to community rooms.	No specific requirements, but not opposed to community rooms.	No specific requirements, but not opposed to community rooms.