◀ Selected materials should be safe, durable and attractive.

2.2.2.8 MATERIALS & FINISHES

This section discusses design criteria for the selection of materials and finishes for the public areas within the system. Consideration is placed on comfort and attractiveness as well as safety, durability and cost. Refer to Fig. 7 for detailed guidelines on materials selection.

▶GUIDELINES

- Minimize hazards from fire and smoke by using materials with low burning rates and non-toxic characteristics. Materials must comply with all code requirements.
- Ensure proper attachment and bond strengths to reduce hazards from dislodgement due to temperature change, vibration, impact, wind, aging, etc.
- Provide non-slip material at entrance stairways, platform edges and other areas exposed to weather elements.
- Use materials that will provide long and economical service with wear, strength and weathering qualities that resist the effect of abrasion, impact, temperature changes and sunlight. Use only materials whose appearance and color can be maintained throughout their useful life.
- Select materials that are stain resistant, that hide minor soiling and on which casual vandalism can be easily erased with normal maintenance procedures. Materials should be easily cleaned in a single operation with standard cleaning equipment and cleaning agents. Repair and replacement should be considered in the selection of materials.

FIG. 7

TECHNICAL CONSIDERATIONS

▶MATERIALS SELECTION

Stations should be designed to create a feeling of warmth, attractiveness and quality, and to instill in transit patrons a civic pride that will encourage good housekeeping and good behavior.

SURFACE

Materials should be hard, dense, non-porous, non-staining, acid and alkali-resistant for long life and low maintenance. Surfaces within reach of the public, up to 8' above the floor, should be more resistant to damage than is necessary for surfaces above that point.

COLOR

Colors should be predominantly light in tone to aid in maintaining high illumination levels, but with sufficient contrasts and accents to provide visual interest and warmth, as well as to conceal minor soiling.

TEXTURE

Smooth surfaces are preferred over rough ones for ease in cleaning and because they are less prone to catch settling dust. Rough surfaces are desirable where a non-slip feature is important and in areas that are difficult to reach for cleaning, because even though these surfaces may accumulate dust, they will not appear dusty.

UNIT SIZE

Units should be large enough to reduce the number of joints, yet small enough to facilitate replacement if damaged. Monolithic materials may be used if they have inherent soil-hiding characteristics and can be easily repaired in an unnoticeable fashion.

JOINTS

Small, flush joints should be provided. Since joints are a major source of maintenance problems, they should be limited in number and should be of the best possible materials. Horizontal joints should not be raked, but be flush or tooled concave. To prevent cracking, monolithic materials should have adequate control joints and expansion joints at proper spacing. The use of easily damaged joint covers or soft joint filler materials should be avoided.

COST

Costs should be within budget of the station and should be consistent with long life, frequency and expense of maintenance, convenience, replacement considerations and overall aesthetic and functional qualities.

AVAILABILITY

Materials should be provided in sufficient quantity that their delivery and / or installation, whether for one or several stations with concurrent completion schedules, will not involve cost penalties or delays for either materials or labor.

NON-PROPRIETARY MATERIALS

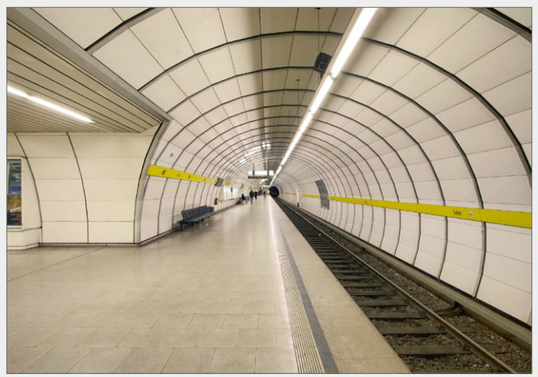
To obtain competitive bids, proprietary items should be used only where it is established that no other materials exist which will meet the particular design requirements. All other items should be specified on a 'performance specification' basis.

INSTALLATION STANDARDS

Materials should be detailed and specified to be installed in accordance with industry standards and the manufacturer's printed directions for long life, low-maintenance installations.

FLAMMABILITY

Interior finishes should meet the requirements of the Uniform Building Code (UBC), Chapter 42, as well as NFPA 130 and all other applicable codes. The finishes for all exit ways should be Class I as defined by the UBC, and Class A as defined by NFPA 130. Platforms, concourses, corridors, stairways and vestibules should be considered exit ways. Finishes in all other areas should be Class II as defined by the UBC, and Class B as defined by NFPA. Combustible adhesives and sealants may be used when they meet the requirements stated above.



◀ Turnstile areas should be large enough to accommodate peak hour volumes.

◀ Secured ancillary facilities must be provided accordingly.

2.2.2.9 FARE COLLECTION & CONTROL

One of first things encountered upon entering a station is the fare collection and control area. These areas may serve single or multiple entrances and are often at or near the confluence of multiple paths of travel. To prevent congestion and confusion, access must be simple, direct and easily navigated, and the space allocated must be sufficiently generous to easily accommodate peak travel volumes – when congestion and passenger confusion are even more likely. Conflicting movements between arriving and departing passengers must be avoided.

The layout of this area is critical, as it presents the potential to create a serious bottleneck in passenger flow through the station. Passengers, especially new or infrequent riders, must orient themselves, read and understand system signage and schedule information, choose their direction of travel, determine the fare required and access passes or money. Riders who hesitate due to confusion tend to stop moving and can create a traffic jam even before they arrive at turnstiles, making it all the more important to provide plenty of space and to arrange information and services with the novice traveler in mind.

▶GUIDELINES

- Queuing distances and space provided for the fare collection area should be based on projected future peak volumes, as opposed to average daily volumes, as smooth passenger flow is most critical at these peak travel times.
- Information displays (schedules, system maps, etc.) should be located as near the station entry as possible and well before the fare gates. At larger stations, duplicates of this information should also be located near the fare gates, but out of the path of travel to allow infrequent or new riders to confirm directions and double check information without blocking other passengers.
- The customer service kiosk should be prominently located with generous queuing space provided on both the 'free' and 'fare paid' sides.
- Lighting, HVAC and structural elements should be located so as not to block travelers' view of information displays.
- Information displays, lighting, HVAC and structural elements should be located well out of reach of passengers.

2.2.2.10 EMPLOYEE & ANCILLARY FACILITIES

Ancillary facilities are the non-public areas that support and sustain transit operations. These facilities are much more likely to be required for underground stations and space should be provided accordingly. Ancillary facilities may include:

- Traction power facilities;
- Station power and electrical rooms;
- Heating, ventilating and air-conditioning (HVAC) rooms;
- Mechanical rooms;
- Storage facilities;
- Maintenance and Janitorial rooms;
- Communications rooms; and
- Transit personnel offices, lounges and restrooms.

▶GUIDELINES

- The design of ancillary and support facilities is contingent upon the functional requirements of the individual spaces and their locations. However, their design must be subordinate to the public transit-related functions of the station.
- Ancillary and support facilities should be provided with secure and restricted access to and from the station's public spaces.
- In general, access points to these facilities should be consolidated to minimize security equipment, simplify access control, and minimize potential disruption of the public space.
- Ancillary facilities should also be located away from platforms, perhaps on mezzanine levels, and near appropriate vertical transportation systems, suitable for staff access and equipment removal and installation.

◀ Secured bike storage facilities will encourage people to use active modes of transportation.

◀ Platforms must provide safe and clear circulation routes between trains and exits.

2.2.2.11 BICYCLE FACILITIES

The use of bicycles to access transit stations should be encouraged, and connections to bike paths and routes should be carefully considered as part of the station planning process. As an incentive to bike riders, easily accessible, well designed and secure facilities should be provided on-site. Also consider providing other services, such as storage facilities for personal belongings, as well as maintenance and repair services.

▶GUIDELINES

- Storage facilities should be covered and situated on a hard, well-drained surface near the station entry, with proper illumination and clear signage.
- Allow sufficient space for expansion of bike storage facilities.
- Avoid conflicts with pedestrians, auto and bus services.
- Provide lockable storage options, including secure stanchions and bicycle lockers.
- Consider security issues and local regulations regarding visual transparency / opacity of storage lockers, etc.
- Provide security monitoring of bicycle storage areas.

2.2.2.12 PLATFORMS

The station platform is one of the most important elements of the station and must be carefully designed. It should provide safe, easily navigated, unobstructed access to and from train loading areas.

Platforms are sized to accommodate specific car lengths, future expansion and the anticipated passenger load levels, site availability and the placement of circulation elements. The platform must accommodate multiple passenger circulation functions including travel along its length, boarding, disembarking, queuing to board, queuing to access elevators, escalators and stairs and waiting for trains.

Due to the presence of large, potentially fast-moving trains, the platform can be a dangerous place and safety is a prime consideration. Passenger safety can be enhanced through the clarity of the physical layout and the size of the platform, as well as through the use of durable, non-slip surfaces, tactile banding at platform edges and other safety features.

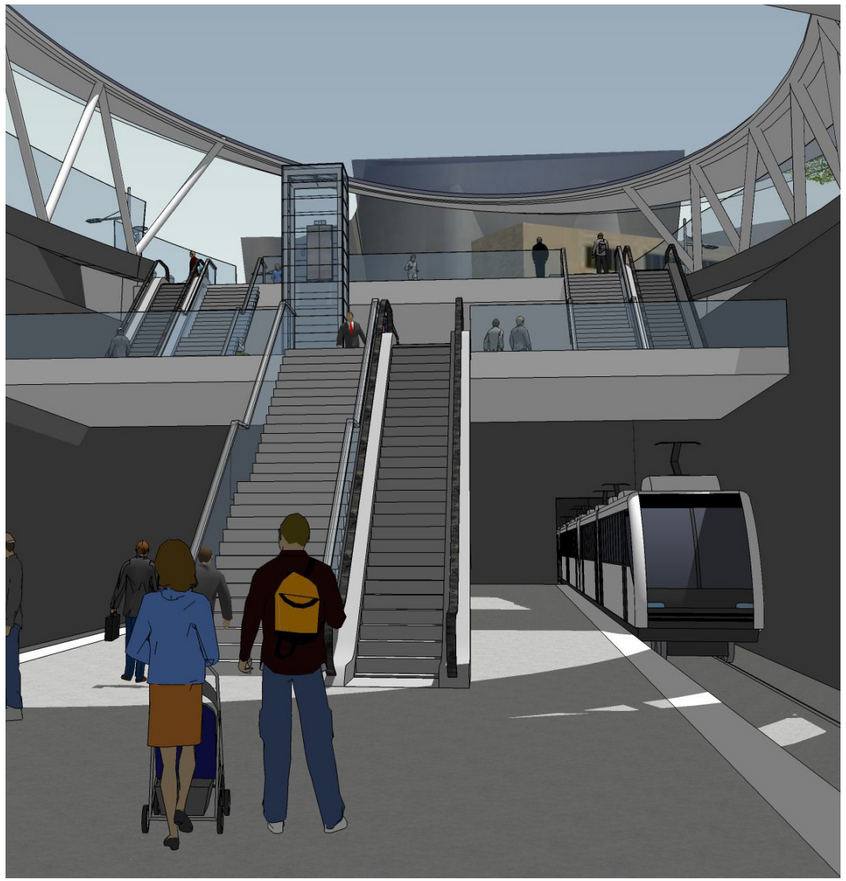
Determining factors in establishing size:

- Train length and anticipated growth;
- Width of vertical circulation elements;
- Clear minimum distances required between platform edge and obstructions;
- Platform safety edge;
- Passenger volumes;
- ADA requirements;
- Additional buffer zone;
- Additional space required during peak travel times;
- Projected increase in passenger volume; and
- Emergency exiting requirements.

▶GUIDELINES

- Avoid conflicting circulation patterns.
- Support safe passenger circulation and access to and from trains.
- Facilitate timely clearing of platform.
- Minimize need for passengers to make decisions on platform, causing hesitation and obstructing flow of traffic.
- Locate access points and vertical circulation elements to evenly distribute vehicle loading and unloading points.
- Minimize visual obstructions, avoid alcoves and hidden areas.
- Ancillary or non-transit functions should not be located on the platform as they may obstruct, inhibit or impede circulation.
- Maintain a clearly delineated, direct path for emergency egress, with easy access to exits or areas of refuge.

◀ Mezzanines increase security by offering opportunities to observe the platform below.



◀ Mezzanines also allow more natural light to filter down to the platform.

2.2.2.13 MEZZANINES

The station mezzanine is one of the primary experiences for transit riders and should provide a welcoming setting that enhances the experience of public transit. The mezzanine also offers the opportunity to present an expression of the station character and the design theme of the transit system through the use of artwork, graphics and other design features.

The mezzanine should ensure the smooth flow of pedestrian traffic, comfortably accommodating multiple passenger circulation routes and facilitating passenger orientation and control. Mezzanines may contain ticket purchase and fare collection turnstiles, directional signage and transit system information, as well as non-public or ancillary spaces such as station agent business centers and security control mechanical and ventilation equipment.

Some influences on mezzanine location include the number of entrances, passenger volume, platform length and code requirements. In some cases, multiple mezzanines may be required.

▶GUIDELINES

- The mezzanine should be bright, airy, open, spacious and filled with natural light.
- Establish a strong visual connection between the mezzanine and the platform to assist in passenger orientation.
- Provide clear, unobstructed access to and from station platforms.
- Access points and vertical circulation elements should be conveniently located.
- Ensure sufficient space is provided to accommodate peak periods and projected growth in ridership.
- Allow sufficient queuing space at elevators, stairs and escalators.
- Minimize travel distances and the number of horizontal and vertical transitions.
- Separate opposite passenger flows when possible.
- Minimize the need for passengers to make decisions on the platform, causing hesitation and obstructing traffic flow.
- Maintain clearly delineated, direct paths for emergency egress, with easy access to exits or areas of refuge.

2.2.2.14 UNDERGROUND CONNECTIONS

Underground connections link remote entries to the station. Their primary advantage is that they can slightly extend the 'reach' of a station and provide an alternate means of access, allowing some passengers to avoid crossing busy streets.

However, by 'removing' transit riders from the street level, and allowing passengers to disperse from the station without engaging in street activity, underground connections can dilute pedestrian activity in the proximity of the station, compromising the effectiveness of casual supervision ('eyes on the street') and actually diminishing pedestrian safety. Moving people from the more open, active street into a tunnel may also have a negative effect on local retail and services and ultimately on the vitality of the station area.

Tunnels also increase the cost of a station and while they may seem to help 'solve' the problem of getting people across a busy street, the same dollars spent on upgrading the streetscape and improving the pedestrian crossing experience may have a much more positive impact on the pedestrian environment.

Tunnels, especially in off-peak travel times, can also be dangerous and care must be taken to include security monitoring equipment, further adding to station cost. If provided, tunnels must be large and bright enough to feel safe and to provide as positive an experience for the transit user as possible.

Unfortunately, while underground connections may seem to offer convenience and safety, they have more negative impacts than positive. For these reasons, pedestrian tunnels should be avoided whenever possible.