Station and Parking Design Guidelines

February 2022

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These *Guidelines* constitute internal standards and guidance only, are not now and never been meant to substitute for legal requirements. In the case of any conflict between these Metra Station and Parking Design Guidelines (the *Guidelines*) and the requirements mandated by federal, state and local statutes and regulations, the statutes and regulations shall control over these *Guidelines*.

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1 INTRODUCTION

Metra is the largest commuter railroad in the nation based on miles of track. The agency provides service to and from downtown Chicago with 242 stations over 11 routes totaling nearly 500 route miles and approximately 1,200 miles of track. In 2019, Metra operated nearly 700 weekday trains, providing nearly 290,000 passenger trips each weekday. The service area encompasses a region of more than 3,700 square miles and six counties in northeastern Illinois: Cook, DuPage, Will, Lake, Kane, and McHenry. Metra owns and operates four rail lines (Rock Island, Metra Electric, Milwaukee District North, and Milwaukee District West). Three lines are operated by Metra employees over freight railroad-owned track through trackage rights or lease agreements (Heritage Corridor, North Central Service and Southwest Service). Four additional lines are operated directly by freight railroads through purchase-of-service agreements (BNSF, Union Pacific North, Union Pacific Northwest, and Union Pacific West).

1.1 USE OF DOCUMENT

1.1.1 GENERAL

These *Guidelines* are intended to support Metra staff, consultants, and municipalities in the design and construction of new station and parking facilities and in major repairs and alterations to existing facilities. The *Guidelines* apply to station and parking facility projects whether they are implemented by Metra, municipalities, developers, or other organizations.

The *Guidelines* are a living document that is updated periodically, in whole or in part. The date of the latest revision is indicated in the page footer.

Individual projects are administered by a Metra-designated Project Manager (PM), who is the point person for communication between outside entities and Metra. The Metra PM will direct communication as needed to relevant departments.

The *Guidelines* provide both compulsory design criteria (typically denoted by the use of the word “shall”), as well as background information, guidance, and recommendations. The latter are intended to help designers produce work that incorporates Metra’s preferences and procedures. Designers are required to obtain, via the Metra PM, approval to deviate from the compulsory criteria.

Unique project conditions not addressed in the *Guidelines* should be reviewed with the Metra PM as early as possible. Metra welcomes design innovation and encourages updates to the *Guidelines* in response to technological and design advancements. Recommendations for revisions can be submitted to the Metra PM for consideration.

Metra strives to be a good steward of public funding by cooperating with local communities in developing our facilities. The *Guidelines* should be used in conjunction with municipal standards to ensure that the facilities meet local objectives.

1.1.2 CODES & STANDARDS

The *Guidelines* describe Metra’s internal design criteria and are not intended to substitute for industry standards, nor legal requirements. Users of the *Guidelines* are required to fulfill their legal and professional obligations to comply with all applicable regulations, codes, and standards.

In the case of any conflict between the *Guidelines* and federal, state, and local statutes and regulations, the statutes and regulations shall govern. The designer shall bring any such conflict to the attention of the

Metra PM, who will determine whether the more restrictive criteria should apply in order to meet Metra's operational needs or other constraints.

1.1.3 EXISTING FACILITIES

The *Guidelines* constitute Metra standards and guidance for new station and parking projects, and for major repairs and alterations to existing facilities. It is Metra's intent to bring existing facilities into compliance with the current *Guidelines* and codes to the extent feasible and the *Guidelines* are not intended to be universally retroactive to existing facilities. Refer to Section 3.2.1 for more detailed information.

1.1.4 MATERIALS AND PRODUCTS

Because material and product requirements apply to multiple station elements and locations, these requirements are consolidated in Chapter 9. This content is arranged using Construction Specifications Institute (CSI) division numbering. This chapter also summarizes applicable federal procurement requirements that need to be incorporated in project specifications.

1.2 GUIDING PRINCIPLES

The following principles apply to the design of any station or parking project, and complement project-specific criteria:

- Safety and security of passengers, employees, and the public is a design fundamental.
- Deliver designs that equitably address the needs, preferences, and distinctive character of each of the diverse communities that Metra serves. Make station facilities accessible to all people, including the young, old, and disabled.
- Strive for design excellence.
- Enhance the passenger experience. Encourage transit use by creating convenient and comfortable station facilities. Plan clear passenger connections between rail platforms and all connecting modes (bike, pedestrian, automobiles, and connecting transit services).
- Create community assets by creating context-sensitive stations that are visually and physically connected with the surrounding neighborhood.
- Prioritize durability, maintainability, and operational efficiency.

1.3 PROCESS

1.3.1 DESIGN COORDINATION

Metra expects its architectural and engineering consultants to produce design and construction documents that are properly coordinated across all technical disciplines. All members of the design consultant team are responsible for ensuring multidisciplinary coordination across individual design packages. Prior to each milestone submission, discipline leads shall ensure that their design content reflects the most current design and that all drawings and details are correctly cross referenced within their own discipline and with all other disciplines. Refer to sections of the *Guidelines* titled "Visual and Functional Coordination" for discipline-specific documentation requirements.

1.3.2 WEBLINKS

The following weblinks provide additional system and technical information:

FACT BOOK:
A broad overview of Metra's mission, vision, ridership figures and key numbers:
https://metra.com/sites/default/files/assets/2019_fact_book_0.pdf

ENGINEERING DEPARTMENT WEBSITE:
Contains the CADD Manual and the most recent standard details and other items required to complete a set of project deliverables: https://metra.com/engineering

STATION SIGN PROGRAM SPECIFICATION:
https://metra.com/sites/default/files/inline-files/20200501_metra_station_sign_program_spec.pdf

SYSTEM MAP:
https://metra.com/sites/default/files/assets/maps-schedules/system_map_fares_zones_08_2020.pdf

1.3.3 STAKEHOLDERS

Designers need to engage with multiple internal and external stakeholders impacted by a proposed project to learn of all potential issues that might affect its success. Designers must develop a project team contact list to facilitate efficient communication by including all design team members, Metra departments, and other stakeholders, some of which are listed below:

- Metra Departments:
  - Project Delivery, Stations, and Parking Design;
  - Engineering;
  - Safety;
  - Community Relations;
  - Operating Departments;
  - Disadvantaged Business Enterprise (DBE) / Business Diversity;
  - Real Estate and Contract Management;
  - Strategic Planning and Performance;
  - NEPA Team;
  - Police and Security Services.
- Elected officials and community leaders of the relevant local municipality;
- Owners and developers of adjacent facilities and sites;
- Host Railroad (if Metra does not own the railroad the station is located on);
- Adjacent railroad(s) impacted by the project scope of work;
- Illinois Commerce Commission (ICC) (if at grade rail crossings are involved).

1.3.4 ACCESSIBILITY

Metra is committed to creating accessible station and parking facilities for all patrons and staff. Americans with Disabilities Act (ADA) compliance is a fundamental responsibility of the design and construction teams. All new and altered station and parking facilities shall conform to the current version of applicable federal, state, and local regulations. Refer to Chapter 7 Accessibility for further specifics on various elements. Designer is responsible for integrating ADA compliance into all applicable elements of a project.

1.3.5 SUSTAINABILITY

Encouraging travel by commuter train is the most meaningful sustainability goal that can be accomplished on a station project. The design of station facilities should thus focus on the customer experience, while

also reducing operating costs to promote ridership. Within this framework, the following sustainability principles should be considered by all technical disciplines:

- Evaluate the entire site to maximize benefits of exterior wall materials, hardscape and landscaping, stormwater retention systems, etc.
- Use durable and resilient materials that withstand heavy use, vandalism, corrosion and have a minimum 50-year life span under constant public use.
- Detail to allow for partial replacement of individual damaged components by using readily available materials in standard factory finishes that allow field refinishing.
- Reduce energy consumption through strategies such as building envelope design, daylighting, occupancy sensors, Light Emitting Diode (LED) fixtures, and others.
- Reduce water use through efficient fixtures with automatic controls.
- Achieve high indoor air quality by ensuring proper ventilation and selecting non-VOC finishes.
- The consultant is responsible for compliance with the local jurisdiction's sustainability criteria.

1.3.6 ARTS IN TRANSIT

Metra does not currently have a formal art-in-transit program. Metra will consider inquiries from municipalities and community groups who propose to fund and maintain art projects on Metra property. See the Metra Community Enhancement Program Procedures (CEPP) for more information on unsolicited art projects (https://metra.com/about-metra/community-enhancement-program).

1.4 REGULATORY REQUIREMENTS

1.4.1 BUILDING CODES

Metra's policy is to comply with the codes, ordinances, and regulations of the jurisdiction(s) in which the Project is to be constructed. Metra participates in local permitting processes. For each project site, designers are responsible for identifying the applicable requirements, and producing designs that are compliant with those requirements.

1.4.2 INDUSTRY STANDARDS

Designers are responsible for referring to the latest version of all applicable industry standards and regulations that apply to the project. The following is a partial summary of the governing bodies and relevant standards that may apply. See Section 4.1 Codes & Standards for more information.

1.5 DEFINITIONS & ABBREVIATIONS

In addition to the listing below, see the APTA and FTA glossaries for further definitions and abbreviations commonly used in the public transit industry:

BALLAST:
|An integral part of the track structure, generally composed of crushed stone in which ties are embedded.

BOARDING CROSSWALK ISLANDS (BCI):
Pedestrian crosswalks that do not extend fully across multiple railroad tracks. BCI's are only found in existing station facilities with revenue track that does not have a platform, such as a station that has three mainline tracks with only an outside platform and no street grade crossing at the station.

CANOPY / LOGGIA:
Overhead structure that provides a covered area between station buildings and/or boarding platforms, or that provides covered waiting space over a platform.

CROSSING, CONTROLLED AT-GRADE:
An at-grade roadway crossing for cars and pedestrians with automatic barrier and/or a warning signal to indicate approaching trains. Use of pedestrian-only barrier gates will be determined by Metra on a case-by-case basis.

CROSSING, PEDESTRIAN AT-GRADE:
A grade-level pedestrian crossing at top of rail elevation.

CROSSING, PEDESTRIAN OVERPASS:
A grade-separated, over-railroad, pedestrian crossing. May be combined with a roadway or bike trail overpass.

CROSSING, PEDESTRIAN TUNNELS: A grade-separated, under-railroad, pedestrian crossing. May be an independent tunnel or combined with a roadway underpass or tunnel.

DEPOT:
An enclosed, heated structure located adjacent to the platform with the highest Peak Train-Boardings, which is typically the inbound side. Depots vary in size and layout and accommodate passenger waiting areas in addition to an array of other functions which may include ticketing offices, crew facilities, vendor spaces, and/or other passenger amenities.

DETECTABLE WARNING:
A standardized surface feature built in or applied to the edge of a boarding platform or other walking surfaces to warn of hazards on a circulation path.

HARDSCAPE:
Paved ground-surfaces intended primarily for non-motorized circulation including boarding platforms, plazas, sidewalks, and transfer/drop areas. Hardscape may also be used at bicycle pads, news boxes, fee collection kiosks, and passenger shelters. Paving materials vary widely and may include colors, stamping and/or patterns, in addition to standard clay brick pavers, concrete, precast concrete, and/or asphalt. Tree grates, trench grates and related materials may also be considered part of the hardscape.

HEADHOUSE:
An enclosure around a stairway, ramp, or elevator providing access/egress to a boarding platform. Headhouses may be designed to accommodate minimum waiting and/or heated area requirements, in which case they shall comply with the requirements of the Guidelines for those elements.

KISS & RIDE:
A facility designed to accommodate commuters being dropped off by automobile (personal car, rideshare, taxi, van, etc.) to continue their journey by public transport. It provides for quick drop-offs and pick-ups as well as allowing for short-term waits or driver/passenger exchanges.

LANDSCAPING:
The design of site contours, retaining walls, and natural tree and shrub plantings to define a desired aesthetic, control pedestrian movement, and/or to integrate buildings and facilities into their surrounding context. See Hardscape.

LEVEL OF SERVICE (LOS):
A qualitative measure used to characterize the quality of a pedestrian and/or vehicular area based on density, congestion, and flow ranging from LOS A (least congested) to LOS F (most congested).

PEAK TRAIN-BOARDINGS (PTB):
The highest number of passengers boarding a single train on a given day, according to Metra planning and/or historical data, and to which a growth factor (typically 20%, or as otherwise determined by Metra) is applied. At this writing, Metra uses pre-COVID ridership for historical data.

PEDESTRIAN BARRIERS:
A structure and/or planted area that discourages or prevents pedestrians from entering hazardous and/or non-public areas. They may consist of railings, fences, walls, bollards, planters, sign kiosks, or landscaping.

PEDESTRIAN DIVERSION:
Fencing to divert pedestrian traffic along a sidewalk away from an area for safety or to be protected, such as signal facilities or track and roadway crossings.

PERMEABLE PAVEMENT:
Paving surfaces that cause water from rain or snow melt to be absorbed directly into the ground to minimize stormwater runoff.

PLATFORM, INBOUND:
At stations configured with two platforms, the inbound is that which serves trains traveling towards Metra terminal stations in downtown Chicago

PLATFORM, LEVEL BOARDING:
A platform whose elevation is set to align with the finish floor of Metra rail cars.

PLATFORM, LOW-LEVEL:
A platform set at 8 inches above top of rail. This type of platform typically serves Metra's diesel train lines.

PLATFORM, OUTBOUND:
At stations configured with two side platforms, the outbound is that which serves trains travelling away from Chicago.

PATHWAYS, PRIMARY:
The circulation path most commonly used by the majority of pedestrians to access the site and station facility, and to circulate among its constituent elements. Primary pathways are required to be fully compliant with ADA accessibility requirements and vary greatly, ranging from at-grade sidewalks to grade separated pedestrian tunnels and bridges.

PAX:
Abbreviation for passengers.

RIDERSHIP:
Metra passenger data recorded prior to COVID-19 pandemic stay-at-home orders.

SHELL SPACE:
Unfinished space in the depot designed to accommodate a future vendor including an entry door, serving window, security gate, storage closet, electricity, and heat.

SHELTER:
A partially enclosed platform structure with, a roof, and no doors that provides a protected area for passenger waiting and may accommodate parking fee collection boxes and/or outdoor ticket vending. This structure should include an on-demand activated overhead heater(s) with a timed shut-off. Typically located on inbound side of tracks, though ridership levels may support an outbound location. See Warming House.

SHIELDING:
The use of protective screening and the use of break-resistant materials.

STATION:
Refers to the site and structure(s) which comprise a passenger rail facility, including the entrance drives, parking facilities, platforms, depot structures, canopies, shelters, tunnels, and overpasses.

STATION DISPLAY:
Visual Information System meeting the federal ADA mandated for Transportation Facilities requirements to provide public address information in both visual and audible messages. Station display shall be in outdoor rated enclosure with LCD screen with train tracking information and the emergency messages.

TACTILE PANELS:
See “Detectable Warning”.

URBAN HEAT ISLAND EFFECT:
The additional heating of air over a city as the result of the replacement of vegetated surfaces with those composed of asphalt, concrete, rooftops, and other man-made materials. These materials store much of the sun’s energy, producing a dome of elevate air temperatures up to 10oF greater over a city compared to air temperatures over adjacent rural areas. Light colored rooftops and lighter colored pavement can help to dissipate heat by reflecting sunlight, and tree planting can further help modify the local temperature through shading and evapotranspiration.

VISUAL INFORMATION SIGNAGE (VIS):
Visual Information Signage This term refers to the horizontal-scrolling red LED letter dynamic message displays currently in use at Metra stations (see photo below). This hardware is being phased out systemwide. See STATION DISPLAY definition above.

WAITING AREA:
The area of a depot, loggia, warming house, shelter, headhouse or covered platform dedicated to standing or seated waiting passengers. Circulation spaces, such as hallways or vestibules, are considered passageways and not included in calculated waiting areas.

WARMING HOUSE:
A fully enclosed structure with four sides, a roof and doors that provides a protected waiting area for passengers. This structure should include an on-demand activated overhead heater(s) with a timed shut-off. Typically located on inbound side of tracks, though ridership levels may support an outbound location. See Shelter.

WINDBREAK:
A vertical structure with no roof that is located on, or adjacent to, the platform to shield waiting passengers from the wind. Windbreaks should be provided only when it is infeasible to provide a Platform Shelter and should be located under canopies wherever possible.

2 PLATFORMS

This section discusses platform requirements at Metra commuter rail stations. Refer to Appendix 1 for diagrams illustrating required platform clearance envelopes.

For station projects that include new, reconfigured or replacement platforms, the project team should familiarize itself with the current (or planned) train operations at the station. Examples of questions to address include: Will there be predominately inbound/outbound boardings at specific platforms? Will operations shift during certain times of the day, on weekends, or when nearby maintenance or construction activities occur? Do Amtrak, South Shore or freight trains use the facility? Do trains express past the station? Are there flag stops? These questions should be addressed early in the process to avoid redesign work later on.

2.1 HEIGHTS

The Metra rail system includes both low- and high-level boarding platforms which are defined based on their height above the top-of-rail elevation.

The Metra Electric District (ME) lines have high-level boarding platforms providing passengers with a level-boarding experience as they move between the train car and platform. These lines include the Main Line, South Chicago Branch, and the Blue Island Branch. High-level, level-boarding, platforms are also used on the Chicago, South Shore Line, and South Bend Railroad (CSS&SB, or NICTD) lines.

All boarding platforms along the diesel lines of the system are low-level platforms and do not provide level-boarding. By agreement with the Federal Transit Administration (FTA), where passenger platforms are shared with freight, Metra is not required to seek FTA approval for level boarding as documented in FTA letters dated September 8 and December 22, 2015. Where passenger platforms are not shared with freight, Metra's provision of two car-borne lifts on each diesel train accommodates passengers with disabilities and meets the performance standards of 49 CFR § 37.42(a), as documented in FTA letters dated June 14, 2018, and August 28, 2018. See Table 2-1 below for platform design criteria.

2.2 TYPES

2.2.1 SIDE PLATFORMS

Single side platforms serve single-track lines which accommodate trains running in both directions on the same track. In this configuration, the depot, parking lot, and platform should be located on the same side of the tracks. If no depot will be provided at the station, the platform should be located as close to public access and parking as possible, with all required waiting area structures provided on the platform. At stations with single side platforms, space for a second side platform and additional track should be identified and reserved for future use.

Double side platforms serve two separate tracks accommodating trains running on separate tracks. In this configuration, the depots and parking lot should be located alongside the track with the highest peak train boardings, which is typically the inbound track. If no depot will be provided at the station, one of the platforms should be located as close to public access and parking as possible.

2.2.2 CENTER PLATFORMS

Center platforms are located between the two tracks that they serve and accommodate passengers traveling in both directions. They are used where site conditions, track and/or station configuration, make

side platforms difficult or infeasible to build. Both the electric and diesel lines have stations with center platform configurations. Center platforms are typically accessed from the ends of the platform and can be configured with a single access point at one end, or with an access point at each end of the platform. At stations with a single access point, space for a second at the opposite end of the platform should be identified and reserved for future use where feasible. Access points to center platform stations should be located as close to public access and parking as possible.

2.2.3 PLATFORM CONSTRUCTION & MATERIALS

Platforms and their components shall be designed for high-salt environments using anti-corrosive materials. Details of typical platform types/materials will be made available for review and use. Provide a detectable warning along the edge of platforms adjacent to the tracks, at the ends of the platform, and at the transition to public walks or streets.

2.2.4 LOW-LEVEL PLATFORMS (DIESEL LINES)

Construct low-level platforms of bituminous concrete with a non-skid surface on a creosote timber-box frame. Provide a 2-foot wide detectable warning along every trackside edge. The minimum horizontal clearance from centerline of the closest track to the face of the platform is 5’-6” on tangent track. This clearance can be reduced to 5’-1” if the platform is built on a concave curve. The exact distance will be determined on a case-by-case basis depending on host railroad clearances, but in no case shall be less than 5’-1”. The clearance distance for structures that protrude above the surface of a platform is dictated by each owner-railroad’s track clearance diagram. Designs must be coordinated with host railroad design standards as they may supersede Metra’s requirements in some cases. See Metra platform design details and clearance diagrams in the Appendix for more information.

2.2.5 HIGH-LEVEL PLATFORMS (ELECTRIC LINES)

Construct high-level ME platforms of reinforced polymer composite panels with a nonskid surface or precast concrete planks. Support platforms with reinforced concrete piers and steel or concrete crossbeams designed for high-salt environments using anti-corrosive materials. Provide a 2-foot wide detectable warning along each trackside edge. The minimum horizontal clearance from centerline of the closest track to the face of the platform is 5’-7”. The minimum horizontal clearance for intermittent, permanent, structures under a platform, such as a platform support pier, is 6’-0”. The minimum horizontal clearance for permanent structures that extend vertically above the platform surface, such as platform enclosures, canopies, roof line, and/or light poles, is 8’-6”. See Metra platform design details and clearance diagrams in the Appendix for more information.

2.2.6 PLATFORM MATERIAL UPGRADES

Where applicable, Metra will tailor platform finishes to meet municipal design standards, with the express understanding that additional cost associated with design or material upgrades (including concrete or stamped asphalt) shall be the responsibility of the municipality.

2.2.7 PLATFORM SLOPES

Where applicable, Metra will tailor platform finishes to meet municipal design standards, with the express understanding that additional cost associated with design or material upgrades (including concrete or stamped asphalt) shall be the responsibility of the municipality.

2.3 PLANNING

2.3.1 NEW PLATFORM LOCATION CONSIDERATIONS

To facilitate movement of passengers along a platform, the design of platforms should consider the location of passenger waiting areas, parking areas, points of public access, and snow removal methods. Where there are multiple points of access to a platform, consideration should be given to encourage even distribution of passengers along the train length.

Where feasible, at-grade platform lengths/locations should be planned to minimize the dwelling of trains at road crossings which interrupt automobile and pedestrian cross-traffic. Where the ends of appropriately-sized platforms are located within 30 feet from existing roadways and grade crossings, pedestrian diversion sidewalks should be considered.

The ICC requires the Railroad Right-of-Way to be clear of brush, shrubbery, trees, weeds, crops, and all unnecessary permanent obstructions such as unauthorized signs and billboards for a distance of at least 500 feet each way from every vehicular or pedestrian grade crossing where such things would materially obscure the view of approaching trains to travelers on the grade crossing. For more information see: https://www.ilga.gov/commission/jcar/admincode/092/092015350C02050R.html. Any project located within 500 feet of a grade crossing should consider the ICC as a stakeholder to consult from the earliest stages of design.

2.3.2 NEW PLATFORMS ON TANGENT TRACK

To provide the conductor with a full view of passengers and not limit passenger view of oncoming trains, platforms should be located on tangent (straight) track whenever possible. Where platforms must be located on a curve, consult with Metra Engineering on a case-by-case basis.

2.3.3 PLATFORM DIMENSIONS

Platform length is typically based on a multiple of the car length plus 40 feet as a braking margin. Actual platform lengths may vary due to site constraints. Platform length is based upon the peak train boardings at stations located on the line that the platform serves, which is provided by Metra. Platform length is recommended to be designed in multiples of 8 feet to accommodate the modular length of full detectable warning panels. All obstructions, including trash cans, salt boxes, platform enclosures, light poles, and signage, shall be located outside of the minimum clearances shown in the train envelope diagrams. Platform dimension requirements vary by platform type and line, as summarized in the following tables:

TABLE 2-1: PLATFORM STANDARD DIMENSIONS

Platform Height	Platform Type	Minimum Width	Minimum Slope	Horizontal distance from track centerline to edge of platform	Vertical distance from top of rail (TOR) to top of platform
High-Level (Electric Lines)	Center	13’-0”	1.7% away from center of platform	5’-7” on tangent track	4'-3 1/2"
	Side	10’-0” clear	1.7% away from tracks		
Low-Level (Diesel Lines)	Center	15’-0”	1.7% away from center of platform	5’-6” on tangent track 5’-1” on curves	8” (Note 1)
	Side	10’-0” clear	1.7% away from tracks (but slope away from depots)		

Note 1: The host railroad may require a height of ~9” in cases where planned track rehabilitation will raise the TOR.

Table 2-2 below presents platform lengths as established by Metra based on Peak Train Boardings. Differences between inbound and outbound platform lengths are to accommodate Metra operational train-loading practices. In many cases, this results in inbound platforms that are shorter than outbound.

TABLE 2-2: PLATFORM LENGTHS (IN LINEAR FEET)

	Peak Train Boardings (PTB)	**Diesel Lines** (Note 4)	**Electric Lines (ME & South Shore Line)** (Note 5)
INBOUND	1 to 105 (Note 1)	255 LF (3 Cars)	210 LF (3 Cars)
	106 to 140	340 LF (4 Cars)	295 LF (4 Cars)
	141 to 175	425 LF (5 Cars)	465 LF (6 Cars)
	176 to 210	510 LF (6 Cars)	465 LF (6 Cars)
	211 to 245	595 LF (7 Cars)	550 LF (7 Cars)
	246 to 280	680 LF (8 Cars)	635 LF (8 Cars) (Note 2)
	281 to 315	765 LF (9 Cars)	635 LF (8 Cars) (Note 2)
	316 to 350+	850 LF (10 Cars)	635 LF (8 Cars) (Note 2)
	351 to 385+	935 LF (11 Cars)(Note 3)	635 LF (8 Cars) (Note 2)
OUTBOUND	1 to 105	425 LF (5 Cars)	210 LF (3 Cars)
	106 to 140	510 LF (6 Cars)	295 LF (4 Cars)
	141 to 175	595 LF (7 Cars)	465 LF (6 Cars)
	176 to 210	680 LF (8 Cars)	465 LF (6 Cars)
	211 to 245	765 LF (9 Cars)	550 LF (7 Cars)
	246 to 280	850 LF (10 Cars)	635 LF (8 Cars) (Note 2)
	281 to 315	935 LF (11 Cars)	635 LF (8 Cars) (Note 2)
	316 to 350+	935 LF (11 Cars)	635LF (8 Cars) (Note 2)
	351 to 385+	935 LF (11 Cars)(Note 3)	635LF (8 Cars) (Note 2)

Notes to Table 2-2:

Note 1: Where PTB is less than 25 and the total daily station ridership is less than 100, the platforms may be shorter. The Metra PM will advise if shorter platforms will be allowed.

Note 2: Joint Metra / South Shore Line platforms are 720 feet long.

Note 3: Platforms that are eleven cars long are only built on lines where eleven-car trains are used. Metra's PM will notify the consultant if a station is to have eleven-car platforms.

Note 4: These platform lengths accommodate the cars Metra is procuring which have two doors per side. The lengths are calculated by the ((# of cars) * 85') + 40' of braking margin.

Note 5: The lengths are calculated by the ((# of cars -1) * 85') + 40' of braking margin. Applicable to stations served by train cars with one door per side.

2.3.4 PLATFORM LENGTH EXCEPTIONS

For Diesel Line stations with a single center platform or a single side platform, the platform length is governed by the length of inbound or outbound trains serving the station, whichever is greater.

Electric Line stations typically have a single, center platform. The platform length is governed by the length of inbound or outbound trains serving the station, whichever is greater. Do not design platforms longer than indicated in Table 2-2. ME train sets typically have an even number of cars.

Joint Metra and South Shore Line (operated by NICTD) station platforms are 720 feet long as the South Shore Line operates eight car trains with passenger cars that have different door placements than

Metra's. There may be unique site constraints that limit the length of a platform to shorter than stated in the *Guidelines*. Evaluate these exceptions with the Metra PM.

2.3.5 EXISTING PLATFORM MODIFICATION

Existing platforms that do not conform to these *Guidelines* should be replaced or modified to be compliant during station rehabilitation where feasible. Metra will determine whether such modifications warrant property acquisition, or changes to existing track geometry.

Where existing platforms are longer than required, they may be shortened with Metra's approval. Consider such items as controlled crossings, station buildings, and/or stairways when determining the required length of platform to remain. In addition to peak train boardings, specific line operations and individual site conditions may determine the length of platform to be maintained. Where feasible, any excess platform length should be replaced with an accessible walkway to the existing station access point. Any new walkways should be separated from the adjacent tracks by a 4-foot-high fence.

2.3.6 ACCESSIBILITY

Platform heights above top of rail elevations are specific to the type of railcar using them. On Electric Lines, which have level-boarding platforms, train cars are equipped with a flip-plate to bridge the gap between the platform and the car floor. On diesel lines, which do not have level-boarding platforms, Metra provides at least two lift-equipped rail cars per train, and Amtrak provides movable lifts that are stored on the platforms that they serve. Joint Metra and Amtrak station platforms require a concrete pad to accommodate the mobile lift enclosure. The ADA-required 5-foot clear turn radius shall be maintained on the platform beyond the edge of any flip-plate or passenger lift in their fully deployed position. Coordinate mobile platform lift requirements with Amtrak.

Platform slopes and cross-slopes shall be compliant with ADA requirements. Running slopes shall be designed to a maximum of 4.5% and cross-slopes to a maximum of 1.5%. Where platforms slope downward at the ends and at pedestrian track crossings, the platform surface shall be integrated with adjacent sidewalks and track crossings such that ADA compliance is maintained. The platform shall slope away from any structures located on or adjacent to the platform, including but not limited to, depots, shelters, and stairways.

2.3.7 PLATFORM FENCING & GUARDRAILS

Platform fencing or guardrails should be located along the back side of the platform at locations where there is a vertical drop of 30 inches or greater; where active tracks are located behind the platform; where there is a sloped embankment at the platform edge; where there is a need to control passenger circulation; or at any other location where it is deemed necessary. Fencing typically should be black vinyl coated chain link unless ornamental fencing is warranted based on site conditions or stakeholder requests. All chain-link fencing should have a top rail and bottom wire.

2.3.8 TEMPORARY PLATFORMS

Temporary platforms may be used when construction work at station facilities or tracks prevents the use of existing boarding platforms. Construct temporary platforms of durable materials such as preservative and fire-retardant treated lumber and/or bituminous concrete with non-slip surfacing. Provide ADA-compliant detectable warnings at the edges of the temporary platform. Provide temporary directional and informational signage indicating locations and use of temporary platforms. Remove all temporary improvements when permanent platforms are returned to service.

2.4 PLATFORM AMENITIES & OPERATIONS

Platform amenities are those fixtures, furnishings, and equipment providing conveniences to riders. Their placement along the platform should provide convenience without interfering with normal passenger flow. The specific types and quantities of amenities will vary between stations as many communities have their own unique standards for seating, trash containers, advertising, etc. Newspaper, food, beverage, or commercial vending machines are not permitted on platforms.

2.4.1 SEATING

Distribute seating along the platform and across station buildings. Provide seating at identified passenger pickup areas. Attach benches and seating units with secure, tamper resistant anchors. Design benches of durable, weather and vandal resistant materials and construction. Intermediate armrests, or reasonably scaled skate deterrents, are required to deter extreme sports. Design and locate seating to not hinder pedestrian movement on the platform. Center platform seating should be placed in the center of the platform. Side platform seating should be placed on concrete pads located behind the platform, not directly on the platform. Coordinate the minimum number of seats to be provided with Title VI requirements and verify station-specific needs with Metra. See Sections 3.2.4 Waiting Area Requirements and 9.11 Division 12 – Furnishings for further information.

2.4.2 TRASH CONTAINERS

Coordinate the minimum number of trash containers to be provided with Title VI requirements. Containers with permanent lids and spring-loaded access doors should be provided to minimize bee and insect problems. Center platform trash containers should be placed in the center of the platform in areas where they do not obstruct ADA lifts. Side platform trash containers should be placed adjacent to seating and located on the same concrete pads used for the seating which are located behind the platform, not directly on the platform. Trash containers located on the platform should be securely anchored to the platform and not hinder pedestrian movement. Chaining of containers is not considered as secure anchorage. Those located on the outbound platform should be minimal unless there is a reverse commute with high passenger train boardings in the outbound direction. Trash containers should be placed so that they do not encourage climbing onto canopies, roofs, or other high areas. New trash containers shall have rigid, transparent exterior panels in stainless steel frames, and transparent or translucent liners to allow for visibility of contents.

2.4.3 ADVERTISING DISPLAYS

Advertising displays may be incorporated into various vertical surfaces around the station area including canopy walls, platform enclosures, or freestanding signboards located along the back of the platforms. These displays are an important source of revenue for Metra and their quantities, location, size, and mounting are subject to local ordinances in addition to agreements with Metra and advertising vendors. Metra PM will coordinate with Metra Real Estate on a case-by-case basis. Locate displays to not hinder movement on the platform.

2.4.4 COMMUNICATION & SECURITY

See Section 4.6 Communications for specifics on communications and security systems. Coordinate and integrate the quantity, mounting and infrastructure requirements for items such as security cameras, Voice of Metra speakers and digital display screens with the overall design to conceal conduits, provide required visibility and legibility without obstructing other signage, meet acoustic criteria, and not hinder pedestrian movement. See Metra Station Sign Program Specification for more information on signage.

2.4.5 SALT BOXES

Locate salt boxes at strategic locations along each platform to accommodate snow plowing equipment and passenger movement. On center platforms, they should be placed along the centerline of the platform. On side platforms, they should be located along the rear of the platform. Only one salt box is needed per station.

Salt boxes are typically 42 inches deep x 6 inches long x 74 inches high with a roll-top lid (4,500-pound capacity), fabricated from gray-colored polyethylene and set on a 5 inches concrete pad. Elevate the bottom of the box off the ground 1-inch and slope to drain with drain holes. Coordinate salt box type and location with host railroad.

2.4.6 SNOW REMOVAL

Design platforms to allow for snow removal. Method of snow removal, areas of snow storage, and equipment delivery paths and storage areas should be determined and coordinated with Metra during site planning. Depending on location, snow is removed by hand shovel, hand plow, or truck-mounted plow and is typically piled at locations away from the track side of the platform. Provide snow storage areas in locations that do not allow melted snow to drain onto the platform. Since platforms are heavily salted, design station facilities for marine salt conditions.

2.4.7 HEATED PLATFORMS

Where an entire platform is supported by steel structure, such as center platforms on the Electric District, consider using heated composite platforms. In other instances, heated platforms may be included if funded by others.

2.4.8 PLATFORM LIGHTING

Design guidelines and lighting levels for platform lighting is discussed in Section 4.5 Lighting.

3 STATION STRUCTURES

3.1 TYPES

Metra stations vary widely in their configurations and in the types of structures used to provide weather protection and accommodate passenger waiting areas and amenities. The various types of station structures typically used are listed below and further described in this chapter. Definitions of each type are included in Section 1.5 Definitions & Abbreviations.

- Depots.
- Warming Houses.
- Shelters.
- Headhouses.
- Canopies.
- Windbreaks.

3.2 PROGRAMMING

Passenger operations and volume are the primary drivers of station configuration and space programming; however other factors such as unusual site conditions or community involvement in design may warrant variations from the *Guidelines* for new, rehabilitated, expanded, and replacement stations. Any significant deviations from the *Guidelines* shall be approved by Metra prior to design and implementation.

3.2.1 EXISTING STATIONS

When evaluating existing stations, refer to existing and historic plans. When available, Metra PM will provide existing design documents on a project-by-project basis.

Metra intends that the current edition of these *Guidelines* will be incorporated into station rehabilitation and replacement projects to the extent feasible. However, the *Guidelines* are not intended to be universally retroactive to existing facilities. Metra will assess and determine applicability on a case-by-case basis, considering the cost and difficulty of the improvement versus the benefits derived in increased ridership, revenue, maintainability, and the guiding principles listed in Section 1.2.

When evaluating existing stations, compare existing areas and amenities to the *Guidelines* to identify any excess or shortage of space. Existing station structures may be supplemented with an additional structure to bring the facility closer to compliance with the *Guidelines*; for example, adding a warming house or shelter. For existing depots in good condition, excess waiting area may be evaluated for other potential uses such as conversion to vendor areas.

3.2.2 DIESEL LINES

Diesel Line stations are typically configured with one or two side platforms or with center platforms at some locations. Diesel Line stations may include depots, warming houses, shelters, canopies, and windbreaks as station structures to accommodate required waiting areas. See Section 2.2 for platform configuration information and Section 3 Station Structures for information on specific station structure types.

3.2.3 ELECTRIC LINES

Electric lines are configured with center platforms and include headhouses, warming houses, shelters, canopies, and windbreaks as station structures to accommodate required waiting areas. See Section 2.2 for platform configuration information and Section 3 Station Structures for information on specific station structure types.

3.2.4 WAITING AREA REQUIREMENTS

Only areas which have some form of weather protection can be considered waiting areas. The *Guidelines* shall be uniquely applied to each station as site conditions and station type will dictate the optimal waiting area structures to be used. Since the Electric and Diesel Lines have different track and station configurations, their required waiting areas are accommodated in a different manner. If a depot is included in the project scope, Diesel Line stations with higher peak train boardings typically locate their primary waiting area in a depot with supplemental waiting area provided in a depot loggia, warming houses, shelters, and/or under canopies. If the project scope does not include a depot, waiting area requirements are typically accommodated through various configurations of the other shelter types. Electric Lines, typically grade-separated and configured with a center platform, are not wide enough to accommodate a depot, and instead locate their primary waiting area in a warming house, with supplemental waiting in stair enclosure headhouses, shelters, and/or below canopies. Develop waiting area design and space allocations and submit for review during the early stages of design. The following methodology establishes minimums required for standing waiting area, seating, weather protection, and heating:

Step One:
Determine the total minimum waiting passenger load to be accommodated in station waiting area(s):

The waiting passenger load is the sum of the peak train boardings as defined in Section 1.5, in each direction, for each platform. The peak train boarding figures, including growth factor, are determined and provided by Metra.

At stations with side platforms, the outbound platform's waiting passenger load is the highest outbound peak train boarding value and the inbound platform's is the highest inbound peak train boarding value.

At stations with center platforms serving both inbound and outbound trains, Metra will determine how to account for both trains simultaneously servicing the platform.

This yields the total waiting passenger load, which is carried forward into the next steps.

Step Two:
Allocate the total minimum waiting passenger load among waiting area types and amenities as per Table 3-1:

TABLE 3-1: SUMMARY OF REQUIREMENTS FOR WAITING AREA TYPES AND CONFIGURATIONS

PTB	Required Overhead Weather Protection	Required Standing Waiting Area		Required Seats	Heating required for Passengers
	% of PTB	% of PTB	Area (min. 8.5 sf/pax)	Seats	Passengers
1 – 49	100%	90%	PTB*8.5	PTB*10%	PTB*50%
50 - 99	100%	90%	PTB*8.5	PTB*10%	PTB*50%
100 +	100%	90%	PTB*8.5	PTB*10%	PTB*50%

The total waiting passenger load is divided into 10% seated and 90% standing.

The minimum standing waiting area is determined by multiplying the peak train boardings by 90% and then multiplying the result by 8.5 square feet. This represents the minimum waiting area required to maintain a LOS C for the waiting passenger load during peak train boardings.

The minimum number of seats is determined by multiplying the peak train boardings by 10% and rounding-up to the nearest whole. Provide benches and/or unit seating to accommodate each seated passenger.

The approximate seated area is determined by multiplying the peak train boardings by 10% and then multiplying the result by 13 square feet. This represents the approximate waiting area required to maintain a LOS C for the waiting passenger load during peak train boardings. It is to be used as a planning aid, not a strict spatial requirement.

Example A: Side platforms (Note: round figures to nearest whole number)

Inbound platform PTB:	75 pax	(Metra provided)
Standing passengers:	68 pax	(75*90%=67.5, round)
Required standing area:	578 sq ft	(68*8.5)
Seated passengers:	8 pax	(75*10%=7.5 round)
Required seats:	8	
Approximate seated area:	104 sq ft	(8*13)

Outbound platform PTB:	25 pax	(Metra provided)
Standing passengers:	23 pax	(25*90%=22.5, round)
Required standing area:	196 sq ft	(23*8.5=195.5, round)
Seated passengers:	3 pax	(25*10%=2.5, round)
Required seats:	3	
Approximate seated area:	39 sq ft	(3*13=40.5 round)

Example B: Center platforms

The same methodology as above applies, only the outbound and inbound peak train boardings during the AM or PM time periods, whichever is greatest, are added. This example assumes the data above is for the PM time period.

Required standing area:	774 sq ft	(578+196)
Required seats:	11	(8+3)
Approximate seated area:	143 sq ft	(104+39)

Step Three:
Determine how to accommodate the minimum requirements

Minimum waiting area requirements can be accommodated across multiple station elements such as: platform canopies, shelters, warming houses, depot waiting rooms, and loggias. Consider the proposed station configuration, site, access, stakeholder input, and the *Guidelines* to determine the optimal location and type of waiting facilities to be provided for the station.

Provide overhead weather protection for the full waiting passenger load, using some or all of the following elements: platform canopies, shelters, warming houses, depot waiting rooms, and loggias.

Most of the required seats and seating areas should be located within the station areas providing the highest level of weather protection (partially enclosed, fully enclosed, heated, etc.).

To accommodate disabled or elderly persons, provide seating for at least five persons on or convenient to every boarding platform regardless of ridership. This requirement does not apply to platforms that are not wide enough to provide seating.

Provide heat to 50% of the peak train boarding population while waiting in shelters, warming houses, depot waiting rooms, vestibules, and/or under platform canopies. Use on demand heaters with timer switches.

Implementation of future projects at existing stations:

- Obtain peak train boarding, including growth factor, from Metra.
- Determine required seating, standing and seated waiting areas, as set forth above.
- Assess existing station for seats and standing waiting areas already provided and determine whether they are to remain or be relocated.
- Any surplus over the minimum requirements can be maintained, reduced, or repurposed.
- As described in Section 3.2.1 above, supplement any deficit to bring the station as close to minimum requirements as possible.
- Consider the existing station configuration, site, access, stakeholder input, and the *Guidelines* to identify the optimal way to reconcile any surplus or deficit.

3.2.5 SELECTION OF PLATFORM WEATHER PROTECTION

Section 3.2.4 above deliberately gives designers wide latitude regarding the allocation of required waiting space. During the planning process it is also important to consult Metra maintenance and consider community preferences as to the selection of depots, loggias, warming houses, shelters, windbreaks, and canopies.

3.2.6 TICKET VENDING MACHINES (TVM)

QUANTITY:
Each station shall have not less than two TVMs. Provide at least two TVM's at each Warming House. When a station has two headhouses, provide half the required number of TVM's at each headhouse, but no less than one each. The number of additional TVMs provided, if any, will be determined by Metra based on projected peak boardings over the next twenty years. New stations, which do not initially require the future projected number of TVM's at the time of opening, shall have the space designated and reserved for future installation, with empty conduits provided for each future TVM.

LOCATION:
TVM's should always be located near the main entry to station facilities. TVM's can be located at either street level (preferred) or at track level when there is no space at the street level for vending. Most existing TVM's are located in their optimal location, so when rehabilitating a station, the first choice is generally to keep the TVM's in their existing location. Locate TVM's so that the queuing line does not obstruct passenger pathways.

REVENUE COLLECTION:
An Automatic Revenue Collection System (ARCS) is used for selling tickets. The system is linked to the call-for-aid phones, the CCTV, and speaker systems. The conduit sizes and the connections between systems are described in Chapter **Error! Reference source not found. Error! Reference source not found.**.

CALL FOR AID PHONES:
Locate adjacent to TVM's. These phones connect with a central dispatch that will assist passengers having difficulties with the TVM's.

CCTV CAMERAS:
Locate at all ticket vending areas to prevent vandalism of the equipment.

3.3 DEPOTS

3.3.1 NEW DEPOTS

New depot designs shall respect the surrounding community's context, and architectural character. Program and configuration should be based on the prototype layouts shown below. These layouts do not represent specific buildings or room shapes and should be used for general guidance only as actual depot designs will vary due to unique site characteristics and/or special design requirements.

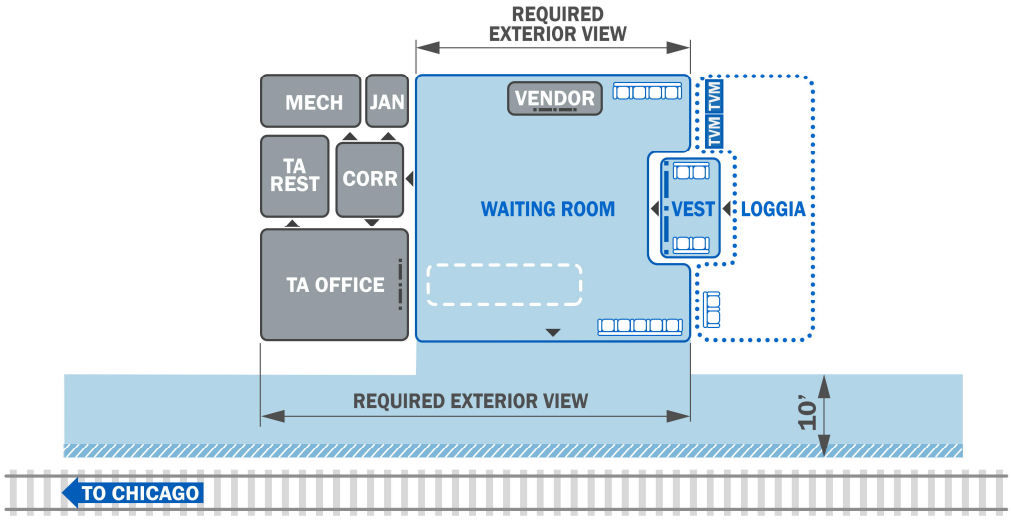


FIGURE 3-1: SMALL DEPOT LAYOUT

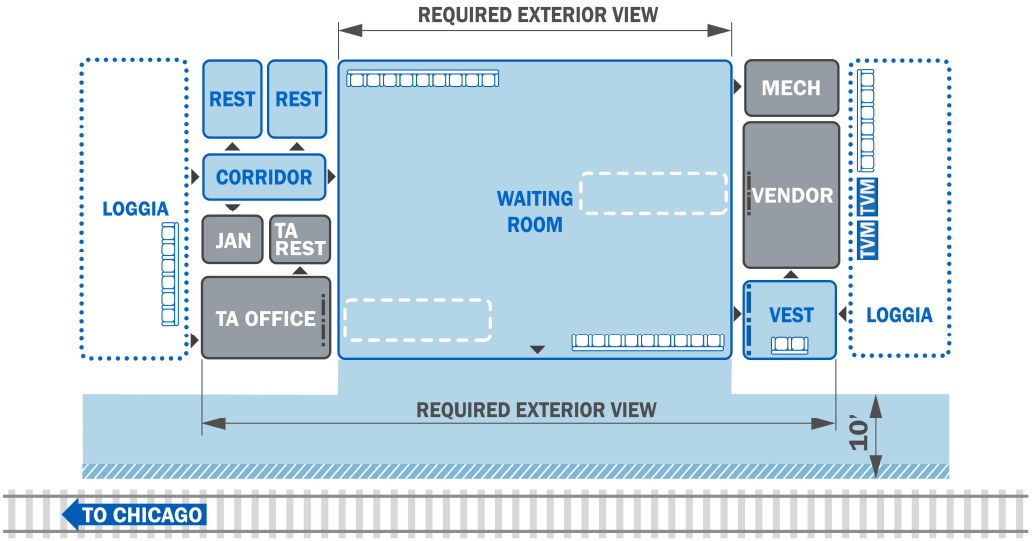
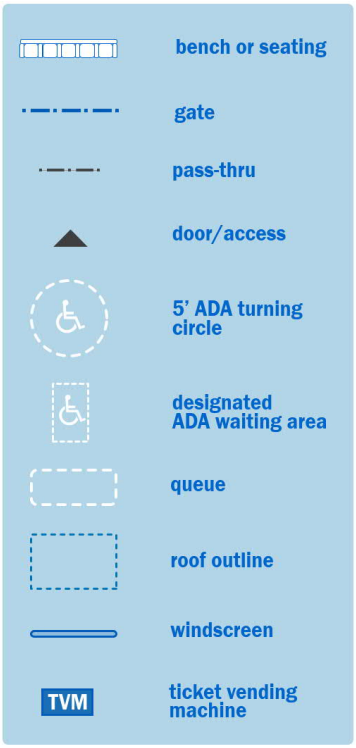


FIGURE 3-2: LARGE DEPOT LAYOUT



CORR	corridor
EMR	elevator machine room
JAN	janitor
MECH	mechanical
MIN	minimum
REST	restroom
TA	ticket agent
VEST	vestibule

FIGURE 3-3 DIAGRAM LEGEND & ABBREVIATIONS

3.3.2 LOCATION

Depots should be located on the side of the track with the highest peak train boardings, typically the inbound side, and as close as possible to the middle third of the platform. At elevated platforms, waiting space within the depot should be located near the most visible adjacent street. Other factors to consider when locating a depot are the principal points of access to the station, the portion of the platform most commuters use for boarding, and visibility of the depot from public roads. The depot should be set back a minimum of 20 feet from the front track-side platform edge to facilitate circulation and allow proper drainage away from the structure. Refer to Chapters 5 Site Design and 6 Parking for more information on the prototypical relationships of various station elements.

3.3.3 WAITING ROOM SEATING

Most of the required seating and standing waiting area should be located within the depot.

Seating shall be located to not hinder pedestrian movement or obstruct queuing lines in stations, should be located along walls wherever possible, and not in the main aisle(s) of the waiting room.

Waiting room unit seating shall have secure, tamper-resistant anchorage to the floor or wall, and be made of durable and vandal-resistant materials with sturdy design and construction. Seating shall comply with ADA requirements and include provisions for the elderly and/or those who are physically and/or mobility challenged. Existing waiting room benches in good condition should be maintained and repaired, but single-seat benches made of plastic shall be replaced with wood, composite or metal seating. All benches shall have intermediate armrests or dividers. See Section 3.2.4 Waiting Area Requirements for further information.

3.3.4 WAITING ROOM VISIBILITY

The glazing in the depot waiting areas should be strategically located to provide maximum visibility of trains, buses and other passenger waiting areas with the bottom of the glazing at 12 inches minimum above finish floor. Mirrors may be used to aid commuters in viewing approaching trains. Consider the visibility of the VIS sign for passengers waiting inside the depot.

3.3.5 WAITING ROOM ENTRY/EXIT DOORS

Provide a minimum of two entry/exit doors to all depot waiting rooms. One of those doors shall be provided on the platform side of the depot, and one on the side facing the station's primary access point. For stations with peak train boardings over 130, a minimum of one door leaf shall be added to the first two doors for each additional 65 peak boardings. For stations with more than two doors, a minimum of two-thirds of all waiting room entry/exit doors shall directly access the platform. Any doors on the platform side must not swing into the minimum required platform width. Doors swinging to alcove side walls are preferred. Refer to Section 9.7 Division 08 – Openings for door material and performance standards.

3.3.6 VESTIBULES

Depots shall have an after-hours vestibule waiting area between the waiting room and the main entry to the depot. The vestibule should be accessible 24 hours a day. Control access to the waiting room with either a lockable pull-down grill, or a second entrance doorway with time lock between the vestibule and the waiting room. Provide seating along the vestibule wall for the use of non-peak commuters.

3.3.7 DEPOT LOGGIAS

A loggia shall provide a minimum of 10 feet of cover from the edge of the depot wall to the fascia of the loggia, except as limited by track clearance requirements. Loggias should be located so that passengers standing under them can see approaching trains. If only a single loggia is provided, it should be located so passengers can see trains approaching traveling in the direction of travel with the highest peak train boardings, which is typically the inbound direction. Adequate lighting shall be provided, as well as a minimum of one VOM speaker.

Furnishings including ticket vending machines, parking fee machines, bike racks, and seating, can be located under a loggia. Loggia should be sized appropriately to provide appropriate weather protection to all of the furnishings located underneath them.

3.3.8 TICKET AGENT OFFICES

The Ventra Electronic Ticketing app has reduced the need for ticket agent offices. Stations with fewer than 800 daily boardings will not have a ticket agent office. For stations with over 800 daily boardings, the need for a ticket office will be determined by Metra on a case-by-case basis. Metra may determine that a ticket agent office is not required or will be deferred to a future date after station opening, in which case a 200 square foot minimum shell space shall be provided. The office and the public areas served by the ticket office shall be ADA accessible. For existing depots with a closed ticket office, the space can be maintained for historical purposes or re-purposed for other uses. Refer to Section 3.9 Historic Stations.

The net office floor dimensions shall not be less than 9 feet in either direction measured from cabinet/counter to cabinet/counter, and a minimum of one ticket window is required facing the passenger waiting area. Specify Level 3 ballistic-rated materials for ticket windows, walls and doors of the office facing public areas. Do not provide wall cabinets within 24" of the ticket window opening. Counter space on either side of the window should be deep enough for a ticket case. In the public space, counter space at the ticket window shall allow for a handicapped accessible Point of Sale (POS) unit and writing surface.

Within the office, counter space should be provided for POS hardware, as well as Voice and Data connections and USB convenience outlets. Credit card signature capture locations and data connections should be provided both inside the office and in the public counter area.

LOCATION:
The ticket office should be centrally located, permitting the agent to oversee the waiting room, platforms, and approaching trains. Implementation of a rectangular or angled bay window should be considered to allow the agent full view of the platform. A queuing area of at least 15 linear feet should be provided in front of the window. The size of the queuing area may increase based on ridership figures.

FURNISHINGS:
Provide built-in counters to accommodate ticket supply, ticket window, work surface or desk, chair, money drawer, POS system, computer, printer/fax, and a drop safe. Locate main station safe out of sight from public. Telephones and other equipment, including any public address system for VOM train announcements, should be readily available and convenient to the agent. An atomic wall-mounted clock should be included in all ticket agent offices and should be easily visible to station passengers. Counter space for check writing should be located next to the ticket window.

STORAGE FACILITIES:
Provide a secure and lockable handicapped accessible storage area with either built-in cabinets or closet, and within or adjacent to, and accessible only from the ticket agent office. Storage units need to be suitable for forms, and other office supplies. Coordinate the amount of storage required with Station Services.

AGENT'S TOILET:
Provide a 60 square foot (minimum), single-occupant, handicapped-accessible toilet room within, or directly adjacent to the ticket office. This toilet room is for the exclusive use of the agent and needs to include a water closet, grab bars, lavatory, wall-mounted mirror and shelf, toilet paper dispenser, soap dispenser, paper towel dispenser, waste receptacle, and a wall mounted light fixture over the mirror.

3.3.9 VENDOR AREAS

Vendor areas are provided based on projected daily boardings, not peak train boardings and based on the typical requirements of a coffee/food vendor. Although this vendor type is the most common at stations, others may include ATMs, newsstands, taxi services, dry cleaners, or shoe repair services. If daily boardings warrant vendor space to be provided at a depot, however a vendor is not yet under contract at the time the depot is being designed, a space should be provided with utilities roughed in, sub-metering locations determined, future vendor duct and pipe riser locations, determined, and concrete decking block-outs provided. The future vendor space can be used as additional waiting area without benches until the vendor moves in, however this additional waiting space cannot be counted towards the minimum required waiting area. Surplus space in existing depots may be considered vendor area. Stations with less than 200 daily boardings generally do not have enough potential customers to support a vendor unless there is potential for additional customers from the surrounding area.

TABLE 3-2: VENDOR GUIDELINES

Projected Daily Boardings (not peak train boardings)	Vendor Area Recommended
200 to 599	Review with Metra
600 to 999	100 SF
1000 to 1999	150 SF
2000+	200 SF

LOCATION:
Locate vendor areas facing the street and waiting areas for maximum exposure while not creating circulation conflicts at entries or restricting the view of inbound trains. Small vendors may be located in the waiting room and allowed to set up a small table, provided the remaining waiting area is compliant with the *Guidelines*.

FURNISHINGS:
Metra will provide the vendor with shell space to finished by the vendor.

SYSTEMS:
Plumbing and sewer pipes will be stubbed out along one wall. Vendor's facilities, determined by ridership numbers, may have dedicated HVAC. Where this occurs, the spaces will be sub-metered with the vendor being responsible for payment of services. Provide sufficient space for anticipated mechanical equipment for any vendors in addition to the mechanical room for Metra. Planned mechanical equipment should fit through a standard doorway. Grease traps may need to be provided for certain food vendors.

3.3.10 PUBLIC RESTROOMS

AREA:
Due to security problems, maintenance expenses, and the short waiting period for most commuters, public restrooms will generally be located only at downtown terminal stations and intermodal transportation centers. Restrooms may be provided at outlying stations if agreements are in place for the local municipality to maintain them. Where agreed to, provide both a Men's and a Women's restroom. Outside of these exceptions, restrooms are not intended to be provided in depots and code relief shall be sought from the municipality as required. Metra provides ADA compliant restrooms on its trains for passengers.

LOCATION:
Where provided, public restrooms shall be located adjacent to the waiting room with access doors that do not open directly into the main waiting room. Where space allows, consider a vestibule between the waiting room and restroom entrances.

3.3.11 ANCILLARY SPACES

Many of the station mechanical rooms and janitorial closets across Metra's system are maintained by local municipalities who may retain access to these spaces.

JANITOR'S CLOSET:
Depots are the only type of station structure that shall be provided with a room for janitorial functions. This closet shall have a service sink or mop receptor with hot and cold water and an eye wash station. Specify water-resistant drywall with water deflecting sheeting up to shoulder height. One quad GCFI, minimum of 18" above floor level to be provided for charging equipment. Dependent upon usage quantity, an instantaneous hot water heater may be considered. Finished floor level should be flush to the adjacent spaces. No power or data routing should be through this space. The recommended minimum size of the janitor's closet is 20 - 30 square feet. Access to the janitor's closet shall not be through the ticket agent's office.

MECHANICAL EQUIPMENT:
Provide a mechanical room at each depot. Double doors are recommended where space allows. Planned mechanical equipment shall fit through a standard doorway. Equipment rooms are not for storage purposes. Access to the room shall not be through the ticket agent's office.

RAILROAD OFFICES/WELFARE FACILITIES:
Railroad offices and welfare facilities may be located at downtown terminal stations, at outlying terminal stations or where required by union contracts. Criteria for these facilities are provided for in a separate document.

REUSE OF SURPLUS SPACE:
Spaces in existing depots not needed to serve commuter functions will be considered surplus spaces. Use for community or commercial purposes is desirable, but such reuses should be financed independently of Metra improvement programs. Metra will indicate requirements of the building for continued commuter use and rail operations, space available for reuse, and the controls and conditions under which use, or development may proceed. Metra may also deal directly with prospective developers regarding surplus spaces.

3.4 WARMING HOUSES

3.4.1 LOCATION

When platforms have only a single warming house, it should typically be located as close as practical to the one-third (1/3) location along the platform at the inbound end (closest to Chicago). At stations where peak train boardings shows a reverse commute, they should be located as close as practical to the third of the platform at the outbound end (furthest from Chicago). When platform or site constraints prohibit a single warming house to accommodate the required amount of waiting area, then a second warming house may be added. Locate two warming at approximately at one-third points along the length of the platform.

Warming houses can also be used to supplement a shortage of space in a depot waiting room. When this occurs, they should be located at the midpoint between the depot and the end of the platform that is furthest from the depot. Warming houses, including their door swings, shall not encroach on minimum platform clearances and should be at least 30 feet from platform access points. On center platforms, the platform is too narrow to accommodate Warming Houses and/or Shelters, and Windbreaks should be used instead (see Section 3.8 Windbreaks).

Warming house locations should be based on the diagrams shown below. These layouts do not represent specific stations and should be used for general guidance only as actual designs will vary due to unique site characteristics and/or special design requirements.

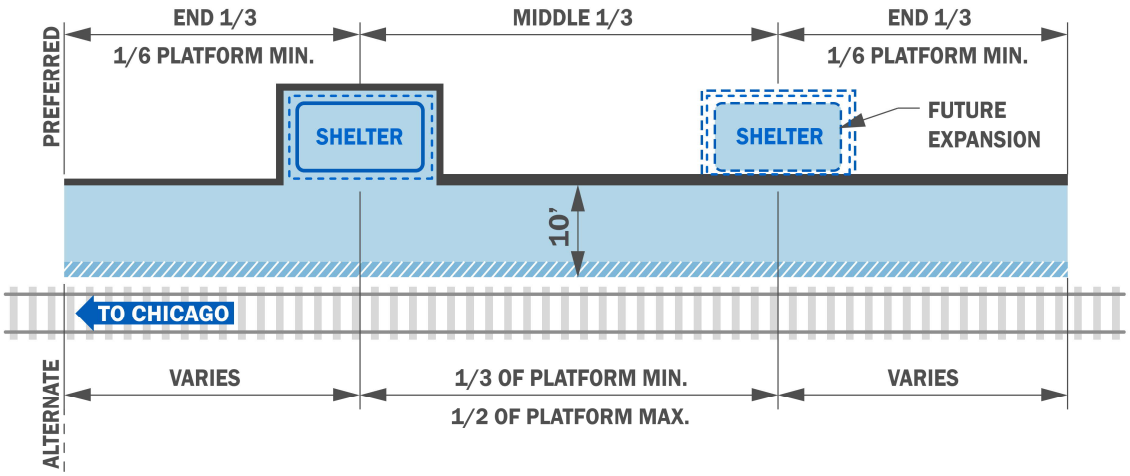


FIGURE 3-4: WARMING HOUSE / SHELTER LOCATIONS

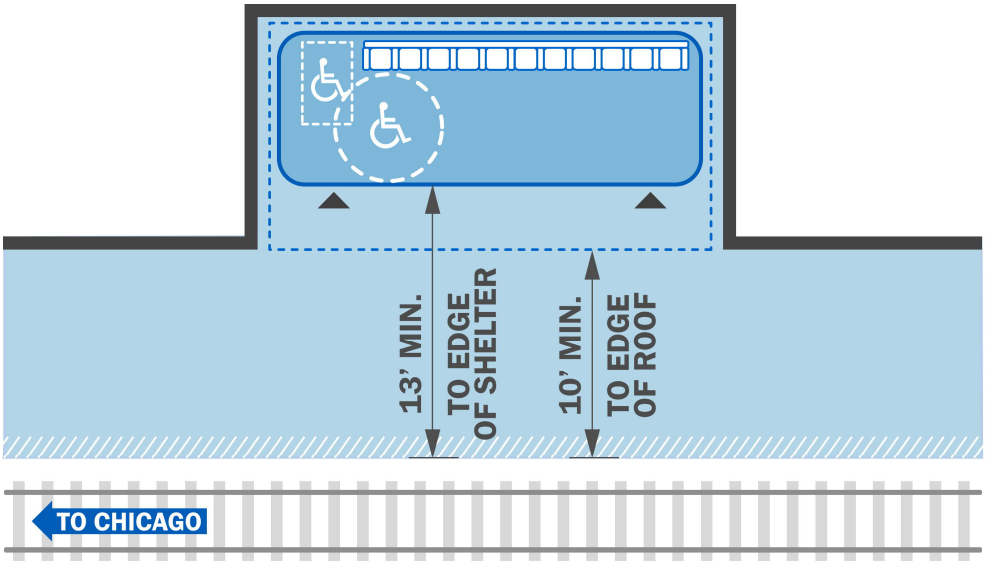


FIGURE 3-5: WARMING HOUSE / SHELTER CONFIGURATION

3.4.2 PLANNING

Existing warming houses in good condition should be retained and rehabilitated to provide suitable visibility, lighting, heating, ventilation, and access for individuals with disabilities. They should be brought into as close compliance with the *Guidelines* as feasible. Design new and replacement warming houses in full compliance with these *Guidelines*.

3.4.3 WAITING AREAS

VISIBILITY:
Design waiting areas to allow visibility of approaching trains with glazing between 2 feet and 7 feet above finished floor.

CEILING HEIGHT:
Minimum height of 9 feet above finished floor and preferably 10 feet at the center of for installation of lighting, heating units, and Voice of Metra speakers.

SEATING:
Provide bench seating along the perimeter. The benches shall be durable, vandal-resistant, and securely fastened to the floor or wall.

ENTRY/EXIT DOORS:
Provide two entry/exit doors, with one located at each end of the warming house.

3.4.4 MATERIALS

See Section 9 Materials, Products, & Performance Standards for further information.

DOORS AND HARDWARE:
Similar to depot doors with a hold-open device to keep the doors open for ventilation in warm weather. Provide magnetic time locks with emergency strike bars.

WINDOWS AND GLAZING:
Provide fixed storefront-type glazing, set on a concrete curb, preferably 1-foot, but in no case less than 8 inches above the platform to minimize the corrosion of the metal due to salts, snow, and standing water.

FLOORING:
Concrete is suitable because of high-volume traffic, heavy usage, and ease of maintenance. Concrete additives and toppings can be used to improve hardness, chemical resistance to salt, and slip resistance. Pitch floors to a drain to assist in keeping the surface clean and in the removal of melted snow. Quarry tile and porcelain tile with through-body color and appropriate slip resistance may also be used.

CEILINGS:
A below structure ceiling may be necessary if a forced air heating system is used. Ceilings should be placed at 10 feet above the finished floor, with 9 feet as the minimum allowable. In all other situations, an exposed roof structure in the warming house is acceptable.

EXTERIOR WALLS:
Primary considerations are weather resistance, protection, durability, resistance to salt corrosion, structural integrity, fire resistance, initial cost, and maintenance. Masonry, both brick and concrete block, steel columns and metal glazed curtainwall systems are optimal materials to consider.

3.5 SHELTERS

3.5.1 LOCATION

When platforms have only a single shelter, it should typically be located as close as practical to the third of the platform at the inbound end (closest to Chicago). At stations where peak train boardings shows a reverse commute, it should be located as close as practical to the third of the platform at the outbound end (furthest from Chicago). When more than one shelter is provided, at least one should be provided with a heater. When two shelters are required, the shelters should be located near the one third points along the length of the platform. When one or two shelters are used to supplement a shortage of space in a depot waiting room or warming house, they should be located equal distance from the structure they are supplementing and the end of the platform that is furthest from it.

On center platforms, the platform is too narrow to accommodate Warming Houses and/or Shelters, and Windbreaks should be used instead (see Section 3.8 Windbreaks). Shelters are located along side platforms in the same manner as Warming Houses.

3.5.2 PLANNING

Many existing shelters have architectural detailing matching the depots. Shelters should be retained and rehabilitated when in good condition and it is deemed cost efficient. New shelters should be a prefabricated design similar to those currently in use. Provide 3-1/2 sided or fully enclosed models.

Minimum ceiling height of 9 feet; 10 feet is the desirable minimum height to prevent vandalism and accommodate heating equipment. Design shelters to allow visibility of approaching trains with glazing between approximately 2 feet and 7 feet above finished floor.

3.5.3 MATERIALS

See Section 9 Materials, Products, & Performance Standards for further information.

EXTERIOR WALLS:
Typically consist of glazed metal frame systems, although existing shelter materials at a specific station may be used on other shelters at the same station for consistency. The latter approach should be kept to a minimum to reduce the cost of the shelters.

ROOFING:
The roofing system is dependent on shelter size, design of the station, site issues and community requirements. Insulated roofing systems are not necessary. Some prefabricated shelters are available with translucent acrylic domes.

GLAZING:
Use mar-resistant and non-yellowing polycarbonate with wrap-around neoprene gaskets (Note: refer to local ordinance for code compliance, especially fire codes on the use of polycarbonate walls and doors). Most shelters have panels on three sides. Coordinate glazing panels with wayfinding and customer information display frames. Frame shall be vinyl-clad wood or metal, and the frame should be of solid construction to minimize the effects of long-term abuse. “Stick-built” type storefront glazing systems are easily damaged and should be avoided. Glazing frames should have bottom edges a minimum of 8 inches (preferably 12 inches) above the platform surface. Framing posts should be anchored to raised curbs.

FLOORING:
Use either a concrete slab or the platform surface. No additional floor finish materials are required.

CEILINGS:
Shelter ceilings are exposed to the elements and need to be durable, easy to maintain, and vandal resistant. The ceiling may be the underside of the roof decking, tongue and groove bead board, or metal roofing panels.

SEATING:
Shelters providing seating shall be fitted with bench style backless seating such that one end of the enclosure is open and of sufficient width to accommodate a wheelchair and offset space per ADA standards. Accessible benches must be wall mounted or have backs. Where provided, benches shall extend approximately two-thirds of the shelter length. The shelter seating should include a separating arm rest between each seating position. Leaning rail style resting supports are not permitted.

3.6 HEADHOUSES

3.6.1 PLANNING

Headhouse locations typically occur at roadway viaducts or pedestrian tunnels and their configurations are dependent on the unique site-specific conditions where they are located. In addition to providing weather protection for platform access, headhouses may also perform a secondary function by accommodating waiting passengers in an enclosed space. Headhouses being used or designed for this function shall follow the *Guidelines* for the specific amenities provided in Warming Houses and Shelters. Any waiting areas and/or seating provided within a headhouse counts towards the minimums required.

The Headhouse platform level should be based on the diagram shown below. This layout does not represent any specific station and should be used for general guidance only as actual designs will vary due to unique site characteristics and/or special design requirements.

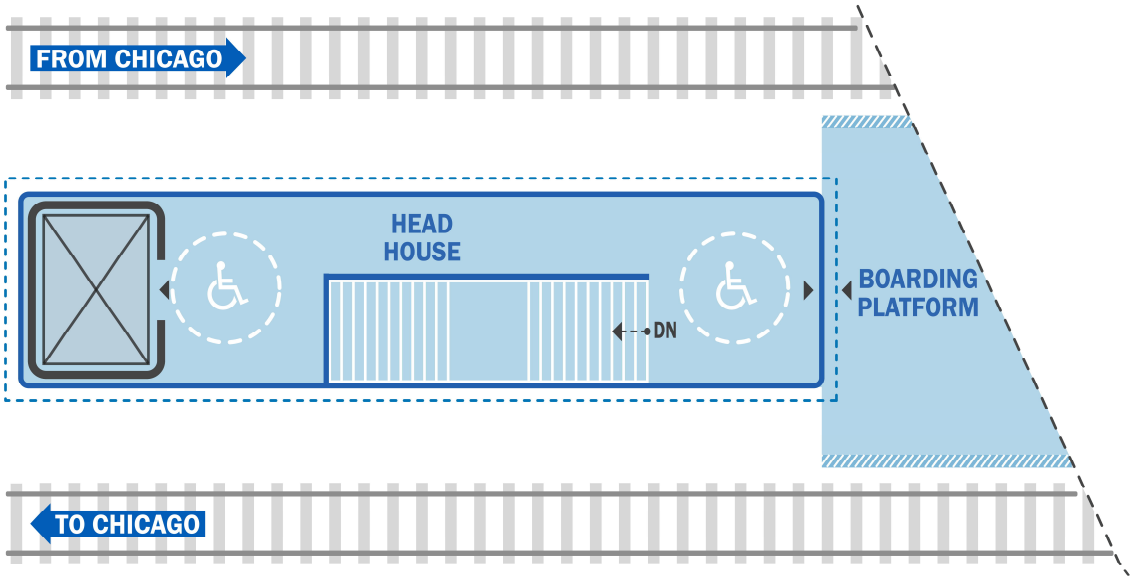


FIGURE 3-6: HEADHOUSE LAYOUT: PLATFORM LEVEL

3.6.2 MATERIALS

See Section 9 Materials, Products, & Performance Standards for further information.

EXTERIOR WALLS:
Considerations in the selection of exterior wall materials for headhouses are weather resistance, protection, durability, resistance to salt, structural integrity, fire resistance, initial cost, and lifecycle costs. Masonry, both brick and concrete block, and metal glazed curtain wall systems are optimal materials to consider. Metal glazed curtain walls, most commonly found in headhouses, are durable wall systems.

INSULATION:
Insulation is not typically needed at headhouses because the spaces are often open to the elements at street level.

DOORS AND HARDWARE:
Use doors and hardware similar to what is used at depot entries for maximum operational flexibility.

WINDOWS AND GLAZING:
The basic functions of headhouse windows are for natural light transmission and visibility between building interior and exterior. Fixed windows are preferable for headhouses.

INTERIOR PARTITIONS:
Use durable partition materials and finishes that can resist damage. Integrally colored materials are preferable to applied finishes for durability and ease of maintenance. Brick is suitable where it is also used as the exterior facing of the headhouse. Plaster walls are not suitable for headhouse interiors.

PARTITION FINISHES:
Paint or anti-graffiti coatings may be needed for concrete block masonry. Anti-graffiti coatings may be needed for brick. Concrete block may be used as a back-up material for brick or tile. Glazed face brick and block provide a decorative and easily maintained interior finish.

FLOORING:
Headhouse flooring materials shall be suitable for high volume of traffic and ease of maintenance. Hard surfaced flooring is preferable to resilient flooring for passenger areas of headhouses. Finished concrete floor is recommended. Quarry tile and terrazzo are alternate materials for the public areas of the headhouse.

CEILINGS:
Use products that maximize sound absorption and minimize sound transmission and reverberation. Suspended ceilings are desirable to hide mechanical systems. The height of the headhouse ceiling should be appropriate for the room dimensions, generally one-half the horizontal dimension. 10 feet height is preferred to prevent vandalism.

Lighting in headhouse ceilings may be ceiling mounted as well as wall mounted, but the mounting location needs to be where it can be easily maintained. Recess ceiling-mounted general lighting fixtures with lenses flush with the ceiling plane. Special decorative lighting fixtures may be surface mounted or suspended from the ceiling. Ceilings should be white or off-white for maximum light reflection.

3.7 CANOPIES

Platform canopies provide additional covered area for passengers. They are most common on ME platforms where they should connect the headhouse to the first Warming House or Shelter. On Diesel Lines, canopies are typically located on inbound platforms.

3.7.1 CANOPY LENGTH

The minimum canopy length on ME platforms is typically 80% to 100% of the platform length, and ranges from zero to 200 feet on Diesel Lines. Determine minimum canopy length as part of the required covered waiting area as calculated by peak train boardings (see Section 3.2.4 Waiting Area Requirements). Canopies on Diesel Lines can be short, or not used, if the depot and/or warming houses have enough enclosed waiting room space.

3.7.2 MATERIALS

See Section 9 Materials, Products, & Performance Standards for further information.

Provide frames of galvanized or painted A36 structural steel. Shop connections shall be welded, and field connections shall be bolted. Use pre-formed and pre-finished metal roofing panels. Canopies can also be an extension of the warming house or shelter roofing. The roofing underside should be a lighter color to maximize light reflection. Pitch roofs away from the trackside and drain to a metal gutter at the eaves. Connect gutters to metal downspouts that discharge into storm drains. Canopies at at-grade platforms may discharge into french-drains at the rear of the platform. Provide bird deterrent systems for exposed roof framing.

3.7.3 EXISTING CANOPIES

Existing canopies that are structurally sound can remain in use and be renovated as required. Canopies substantially longer than required may be reduced to minimize maintenance costs. Canopies significantly shorter than required should be extended. Depot loggias may serve the same function as canopies and count towards minimum waiting area requirements if their location, dimension, or geometry provide weather protection for waiting passengers.

3.8 WINDBREAKS

Windbreaks should be provided only where it is infeasible to provide a platform Warming House or Shelter. Windbreaks should be located under canopies wherever possible for maximum shelter. Windbreaks should be transparent for safety and security. Some opaque panels may be warranted where signage frames are being incorporated. Framing for windbreaks shall be of a metal resistant to premature deterioration from de-icing salts such as anodized aluminum or galvanized steel. The bottom edge of the windbreak walls shall be a minimum of 4" above the platform. Windbreaks must be located to accommodate a 6' minimum clear width as measured from the edge of platform to nearest obstruction. In locations where maintaining a 6' minimum clear width is infeasible due to existing conditions, windbreaks can be eliminated or strategically located along the platform so as to not prevent ADA lifts from deploying. Refer to Chapter 7 Accessibility for further information on ADA.

Windbreak locations should be based on the diagrams shown below. These layouts do not represent any specific station and should be used for general guidance only as actual designs will vary due to unique site characteristics and/or special design requirements.

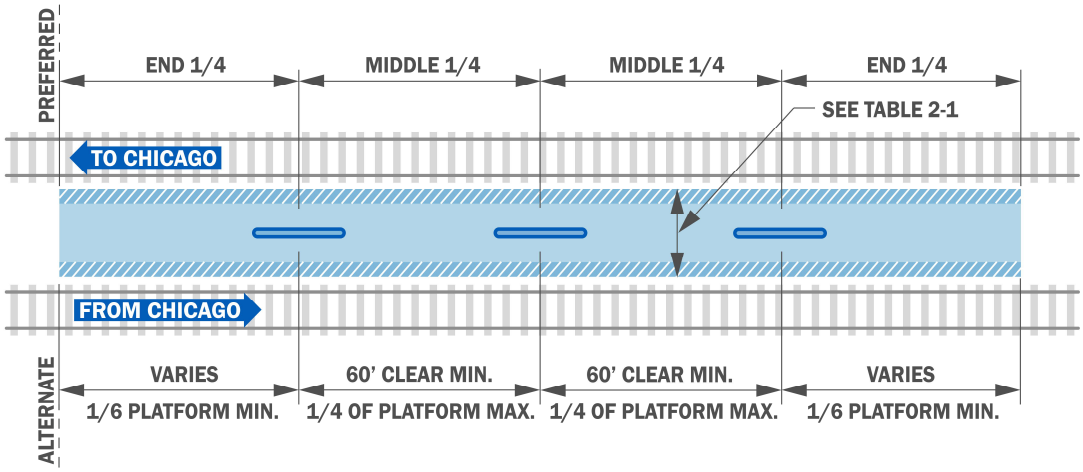
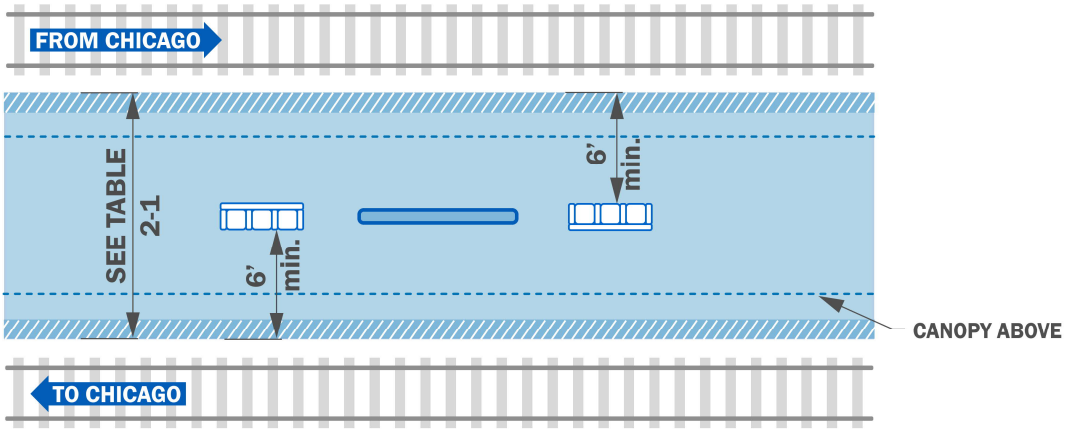


FIGURE 3-7: WINDBREAK LOCATIONS



NOTE:
MAINTAIN 6' MIN. CLEAR ON BOTH SIDES OF PLATFORM, ALONG ENTIRE LENGTH

FIGURE 3-8: MINIMUM CLEARANCE -CENTER PLATFORM

3.9 HISTORIC STATIONS

Originally designed and constructed by different independent railroads, Metra's historic stations display a rich variety of architectural styles. It is important to preserve the historic and architectural significance of these stations by applying measures to sustain their existing form, integrity, and materials. It is equally important to coordinate with the individual communities when planning the rehabilitation of a historic station. Metra may have original design documents available for reference in new design work. Metra PM will provide any available reference design documents as needed and available on a case-by-case basis.

Historic stations are those buildings that are listed in or eligible for inclusion in the National Register of Historic Places (NHRP), which is the official Federal list of districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology, engineering, and culture. NRHP-listed or eligible properties have significance to the history of their community, state, or the nation. Generally, properties eligible for listing in the NRHP are at least 40 years old. Properties less than 40 years of age should be exceptionally important to be considered for listing. A historic station may be individually listed or eligible for inclusion in the NRHP. A station may also be a contributing resource to a NRHP-listed or eligible historic district. Some stations are NRHP-listed or have been previously determined to be NRHP-eligible, while others have not been previously evaluated for listing on the NRHP. The designer may be required to evaluate the NRHP eligibility of the project station to make a formal determination of eligibility in consultation with Metra, SHPO, and/or FTA. If the station is determined NRHP-eligible, then the special considerations for historic stations will need to be implemented in the design.

3.9.1 REGULATORY REQUIREMENTS

Originally, most stations were designed to serve the needs of the long-distance rail traveler. In their current role as commuter facilities, historic stations may require modifications or replacements to continue operations, and some may now contain excess space that can be made available for adaptive reuse. The federal government and the State of Illinois have regulatory requirements for projects seeking funding for the preservation, rehabilitation, or restoration of historic properties. The source of funding will determine whether the jurisdictional agency is state or federal.

Federal review of historic and/or environmental resources is triggered when a project is federally funded or permitted. Initiation of this review should occur as early as possible to ensure that planning and design consider, avoid, or minimize impacts to historic and environmental resources, to avoid delays in the process, and to head off potential conflict. Two pertinent federal regulations to consider are Section 106 of the National Historic Preservation Act of 1966 (NHPA), as amended (16 USC 470 et seq.), and the National Environmental Policy Act (NEPA) (42 USC 4321).

Section 106 requires Federal agencies to consider the effects of their undertakings on historic properties and provide the State Historic Preservation Office (SHPO), consulting parties, and the public a reasonable opportunity to comment on such undertakings. Historic properties are those listed in or determined eligible for inclusion in the National Register of Historic Places (NRHP). NEPA requires that Federal agencies assess the environmental impact of their actions, which includes historic and cultural resources among other environmental resources. The NEPA review is documented in a Categorical Exclusion, Environmental Assessment, or Environmental Impact Statement, which can also be used to satisfy Section 106 regulations.

The Illinois State Agency Historic Resources Preservation Act ("Section 707") requires state agencies to follow preservation protocols for projects receiving state funds (grants or bonds) to preserve, restore, and/or maintain historic resources in the State of Illinois. Similar to Section 106, Section 707 requires the Illinois SHPO consider the effects of the project on historic properties listed in or eligible for inclusion in

the NRHP and avoid, minimize, or mitigate any adverse effects. Section 707 coordination should also be initiated early in the planning process and prior to the approval of final design.

FTA must have a clear idea of what a proposed project may do to the environment to determine the extent of environmental analysis that is required. This includes the natural environment (soil, water, air, flora/fauna) and the human environment (socioeconomics, land use, traffic, etc.). Additionally, FTA will determine whether any Federal funding is sought (now or in the future) for the proposal and if FTA is required to make a decision or approval (e.g., approval for incidental use of property). The more information FTA knows about a project, the more accurate they can be in assigning the most appropriate level of environmental analysis. See https://www.transit.dot.gov/sites/fta.dot.gov/files/2021-06/Information-Required-to-Initiate-NEPA-Checklist-04-05-2021.pdf for further information. Information required to be included on drawings and in specifications to start the NEPA process is included as a checklist within the Appendix. Any reports or assessments intended to support consultation at the federal or state levels shall be approved and submitted by Metra staff.

3.9.2 SPECIAL CONSIDERATIONS

Design of historic station preservation, rehabilitation, or restoration projects shall abide by *The Secretary of the Interior's Standards for the Treatment of Historic Properties* (the SOI Standards, available at https://www.nps.gov/tps/standards.htm). Wherever historic rail stations are no longer needed for rail operation or contain surplus space, consider making these stations and spaces available for re-use. When a historically significant structure is rehabilitated for a different use, its rail station identity should be preserved. If the rehabilitation is federally funded, it will have to go through the Section 106 process. In-kind replacement will be required for historic features and proposed designs should be reviewed and approved by an SOI-qualified architect or architectural historian. Metra has developed the following special design considerations for projects involving the preservation, rehabilitation, or reuse of historic stations based on the SOI Standards.

3.9.3 MATERIALS

See Section 9 Materials, Products, & Performance Standards for further information.

The historic character of an existing building shall be retained and preserved including distinctive features, finishes, construction techniques and examples of craftsmanship that characterize the historic property. Deteriorated historic features shall be repaired rather than replaced. Alterations and repairs to historic stations may have resulted in the introduction of historically inaccurate or inappropriate materials into a depot building. When these materials are replaced due to damage or deterioration, the designer shall consult Metra as to whether they will be replaced in kind, or with historically appropriate materials. Platforms, canopies, and shelters deserve the same attention to detail in rehabilitation as the depots, and anachronisms in design shall be avoided. Where platforms or canopies are to be lengthened, materials, finishes, and appearance shall be compatible with the existing work.

Many of the materials suitable for new construction are not appropriate for rehabilitating historic buildings. Research is required to assure compatibility of new and old material.

SIGNAGE:
Restoration or replacement of signs should consider materials, color, letter style, mounting methods, and locations. Where original signs exist, they may be restored with messaging that remains accurate in the current context, and accurate reproductions can be made through research of photographs and drawings for those stations.

ACCESSIBILITY:
Most historic rail stations were not designed for barrier-free access. Historic station rehabilitation shall provide access for disabled persons while respecting the historic significance of any impacted station structure.

SECURITY AND PROTECTION:
Security and protection systems for historic stations shall be integrated into station structures in an unobtrusive manner that is compatible with their architectural features. The planning of security and protective systems for historic stations shall be coordinated with Metra Police and the Communications Department to provide appropriate and functional systems which preserve the historic character of these stations.

The problem of graffiti at historic stations is not easily resolved. Many exterior materials used at these stations are unable to accept contemporary graffiti-resistant coatings and finishes and may be too fragile for frequent use of cleaning products. Protective fencing may be required at the station exterior to reduce antisocial incidents by preventing direct access to certain parts of the building exterior. Interior materials at historic stations may also be unsuitable for protective coatings and finishes.

LIGHTING:
Lighting at historic stations should make use of the original fixtures for station structures, platforms, and site illumination to the greatest possible extent. Where additional lighting is necessary, use new fixtures compatible with the existing in style, scale, and materials.

4 BUILDING & SITE SYSTEMS

4.1 CODES & STANDARDS

Designers are responsible for referring to the latest version of all applicable regulatory standards that govern, inform, and dictate the requirements of a project. The following list represents only some of the governing bodies and relevant standards that are required to be considered, reviewed and adhered to, unless otherwise directed by Metra:

- AASHTO Guide for the Development of Bicycle Facilities.
- American Gas Association (AGA).
- American Land Title Association (ALTA).
- American National Standards Institute (ANSI).
- American Public Transportation Association (APTA).
- American Railway Engineering and Maintenance-of-Way Association (AREMA).
- American Society of Testing & Materials (ASTM).
- American Water Works Association (AWWA).
- Americans with Disabilities Act (ADA).
- Association of American Railroads (AAR).
- Chicago Department of Transportation Complete Streets Design Guidelines.
- Chicago Electrical Code (CEC).
- Chicago Energy Code.
- Electronic Industries Alliance (EIA).
- Federal Communications Commission (FCC).
- Federal Transit Administration (FTA) Circular 4220.1F, and other FTA circulars as applicable.
- Illinois Commerce Commission (ICC) for at grade rail crossings (Illinois Administrative Code, Title 92 Transportation).
- Illinois Department of Transportation Complete Streets.
- Illuminating Engineering Society (IES).
- Institute of Electrical and Electronic Engineers (IEEE).
- Insulated Power Cable Engineers Association (IPCEA).
- International Building Codes all subcategories (IBC).
- International Dark-Sky Association.
- International Energy Conservation Code (IECC).
- International Telecommunication Union - Radio (ITU-R).
- International Telecommunication Union - Telecommunications (ITU-T).
- Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD).
- Military Standard 454C, Requirement 1.
- National Electric Safety Code (NESC).
- National Electrical Code (NEC).
- National Electrical Manufacturers Association (NEMA).
- National Environmental Policy Act (NEPA).
- National Fire Protection Association (NFPA).
- National Society of Professional Land Surveyors (NSPS).
- National Wetlands Inventory (NWI).
- National, State and Local Building and Energy Codes.
- Occupational Safety and Health Administration (OSHA).
- Railway Electrification, Association of American Railroads Manual.
- Sheet Metal and Air Conditioning Contractors National Association (SMACNA).
- State Historic Preservation Office (SHPO).
- State of Illinois Accessibility Standards.
- State of Illinois Plumbing Code.
- Telecommunications Industry Association (TIA).
- Underwriters Laboratories (UL).
- US Army Corps of Engineers (USACE).

4.2 HEATING, VENTILATION & AIR CONDITIONING (HVAC)

4.2.1 DESIGN CONSIDERATIONS

Use passive heating, cooling, ventilation, and daylighting strategies where feasible to reduce energy consumption. All heating equipment with exposed heating elements should be vandal-resistant and/or mounted out of reach. Provide vibration isolation as required to ensure comfort of passengers and staff in the building. All HVAC equipment located in areas accessed by the public shall be vandal resistant.

4.2.2 VISUAL AND FUNCTIONAL COORDINATION OF BUILDING INFRASTRUCTURE

The designer is responsible for coordinating all HVAC system components with all other design disciplines including, but not necessarily limited to, architectural, structural, electrical, lighting, communications, plumbing, and fire protection.

HVAC components (e.g., equipment and associated supports, ductwork, conduit, wall penetrations, and meters) shall be concealed from public view, and/or fully integrated with building architecture so as to present an orderly appearance. All such components that are visible to public view shall be depicted in the architectural drawings.

4.2.3 ENERGY CONSERVATION

Comply with the standards set forth by the ASHRAE Standard 90-75, *Energy Conservation in New Building Design,* while meeting safety and health requirements. In order to maintain system uniformity, these *Guidelines* require that a standard specification approach, rather than a performance approach, be taken for energy conservation measures.

4.2.4 HEATING

DEPOT WAITING ROOMS:
Maintain a minimum temperature of 55 degrees F for enclosed passenger waiting areas. Provide heating controls with a multiple set point clock thermostat and a manual on/off switch. Mount thermostat controls for the passenger areas in the ticket agent office with remote sensor in waiting room. If there is no ticket agent office, provide a vandal-resistant, lockable thermostat cover in the waiting area.

HEADHOUSES:
Headhouses are not typically heated, except when they contain designated passenger waiting areas. To prevent headhouse entries and bottoms of stairways from icing, surface-mounted heaters or slab heating should be considered. Options include small heating units (electric or gas) or on-demand infrared/quartz heaters.

SHELTER:
Shelters shall be provided with ceiling-mounted tamperproof electric quartz lamp infrared heaters with sturdy wire mesh vandal guards. Heaters shall be activated by a tamperproof push button with a five-minute timer shut-off.

TICKET AGENT OFFICES:
Ticket agent offices shall be provided with a secondary heating system with the BTU/hr capability to raise and maintain the temperature at 70 degrees F. Electric baseboard heating equipment is preferred for this application, however other means of heating the ticket agent's office may be considered if more economical. This equipment shall be UL and FM approved and designed for 120/240-volt operation. Wall mounted heating controls shall be located inside the ticket agent office. The heating controls should

include an on/off switch and thermostat. A safety interlock that resets the heater to a minimum of 55 degrees F setting each time the ticket office door is opened should be considered.

TOILET ROOMS:
Restrooms shall be heated. Temperatures shall be maintained at 70 degrees F. Heavy-duty electric wall or ceiling heaters with integral thermostats are also acceptable. This equipment should be UL and FM approved and designed for 120/240-volt operation.

MECHANICAL EQUIPMENT ROOMS:
No heating is required in mechanical rooms containing HVAC equipment. When gas- or oil-fired heating equipment is used, the mechanical room shall be furnished with a chimney vent stack and duct work. All mechanical equipment rooms housing gas-fired heating equipment shall be equipped with a sprinkler system and/or fire alarm system.

COMMUNICATION ROOMS:
All interior communication rooms are to be provided with heating. Use resistance electric heating equipment. The equipment shall be capable of keeping the room at a minimum temperature of 55 degrees F dry bulb when unoccupied, and at 72 degrees F dry bulb when occupied.

ALL SPACES ACCESSIBLE TO THE PUBLIC:
All heating equipment located in areas accessed by the public to be vandal resistant.

4.2.5 AIR CONDITIONING

GENERAL:
Due to limited occupancy hours, depots and other passenger waiting areas shall not be air conditioned, except as specifically noted in Section 4.2, or as otherwise directed by Metra. The following exceptions apply:

TICKET AGENT OFFICES:
Air conditioning shall be provided for all ticket agent offices. A single through-wall mounted unit or ductless split type equipment can be used. The equipment shall be capable of lowering and maintaining the ticket agent office temperature to 78 degrees F. Equipment sizing shall be based on cooling 25% fresh air and 75% recirculated air. Controls shall be mounted on the front of the unit for operation by the ticket agent. When ceilings are over 10 feet in height, ceiling fans should be provided.

COMMUNICATION ROOMS:
When indoor communications rooms are provided, they shall be provided with packaged type units for air conditioning. The equipment shall be capable of keeping the room at a maximum temperature of 75 degrees F dry bulb.

VENDOR SPACES:
When tenant vendor spaces are provided in depots, Metra will, on a case-by-case basis, determine whether such spaces are to be provided with air conditioning. Metra will also determine whether the cooling equipment will be provided in the base building construction scope, or master planned for future equipment installation by others. These tenant spaces shall have air transfer with the station/depot and be provided with an extension of existing HVAC serving another part of the station or if none are nearby or available a separate system would be provided.

WAITING AREAS:
Passenger waiting areas may be provided with AC if requested and funded by the local municipality or other stakeholder. This will be determined by Metra on a case-by-case basis.

4.2.6 VENTILATION

Air intake locations and designated smoking sections shall be coordinated within the site to maintain a minimum 15’ clear distance between them.

DEPOT WAITING ROOMS:
Mechanical ventilation is recommended for all interior passenger areas; however, Metra also encourages designers to reduce energy consumption via natural ventilation in depot waiting rooms. Waiting rooms shall not have air conditioning except as described in Section 4.2.5 above. Temperature sensors shall be located above the ceiling space to trigger the ventilation exhaust fans. Sensors shall be set at 80 degrees F. Ventilation fans shall be the induced draft type. The fan design capacity shall be determined based on the seated and standing capacity of the space, using the floor area allowances provided in Section 3.4.3 above. the facility’s peak passenger period. Air movement may be shared through parallel fan operation for passenger comfort. The depot should be furnished with sufficient air intake mechanical-dampered louvered vents to accommodate the necessary free air turnover requirements. Vent design should minimize infiltration during winter months.

TOILET ROOMS:
Provide with mechanical ventilation as required by code. Expel exhaust directly to the outdoors at roof level. Control of mechanical exhaust equipment should be integrated with the on/off light switch. Make-up air shall be provided through the door louvers and/or door undercutting.

ATTIC:
Buildings with pitched roof construction shall be furnished with a thermostat-controlled automatic attic ventilator. Ventilator controls shall be mounted in the mechanical room with a remote temperature sensor in attic. The attic shall be provided with the required number of intake louvers. The intake louvers shall be equipped with insect screens and motorized dampers. Dampers shall only be open when the fan is in operation.

ALL OTHER FULLY ENCLOSED SPACES/SHELTERS:
All enclosed spaces shall be ventilated per local codes or with passive ventilation as a minimum.

4.2.7 VENDOR SPACES

Vendor spaces should air conditioned only in locations as determined by Metra as described in Section 4.2.5 Air Conditioning.

Vendor spaces shall be provided with a secondary heating system with the BTU/hr capability to raise and maintain the temperature at 70 degrees F. Electric baseboard heating equipment is preferred for this application. This equipment shall be UL and FM approved and designed for 120/240-volt operation.

Vendor spaces may be provided with temporary HVAC prior to tenant move-in.

4.2.8 TESTING AND COMMISSIONING

All testing and balancing of equipment shall be documented on industry-approved forms and submitted to Metra to verify testing has demonstrated the applicable performance requirements. The contractor shall be required to submit testing and balancing report to Metra before completion/acceptance of the project by Metra. All testing shall be witnessed by Metra or Metra representatives.

Commissioning of all mechanical equipment is to be performed by certified personnel. This work is to be certified by the manufacturer's representative, and commissioning forms are to be submitted and added

to the maintenance submittals for the facility. All commissioning shall be witnessed by Metra or Metra representatives.

4.3 PLUMBING

4.3.1 VISUAL AND FUNCTIONAL COORDINATION OF PLUMBING INFRASTRUCTURE

The designer is responsible for coordinating plumbing system components with all other design disciplines including, but not necessarily limited to, architectural, structural, electrical, lighting, communications, HVAC, and fire protection. Plumbing and Civil drawings shall each cross-reference the specific sheet numbers that depict connection of plumbing lines to the water and sewer utilities design.

Plumbing components (e.g., equipment and associated supports, pipe runs) shall be concealed from public view. Equipment and fixtures that cannot be concealed (e.g., meters) shall be fully integrated with building architecture so as to present an orderly appearance. All such components that are visible to public view shall be depicted in the architectural drawings.

4.3.2 DEPOTS

Hot and cold water and waste systems shall be installed in all depots with toilets and janitor closets. Plumbing systems shall be stubbed to vendor areas. A drinking fountain shall be provided in depots with ticket agent offices. Floor drains shall be provided in toilet rooms, janitors closets, vendor spaces, and at recessed floor mats in vestibules. Domestic water requirements include a Reduced Pressure Zone (RPZ) backflow preventor outside of the city of Chicago jurisdiction. Vacuum breakers shall be installed where required by code. Provide Code compliant hose bibs on exterior wall for cleaning walkways etc.

4.3.3 PLATFORMS

Except where otherwise determined by Metra, no plumbing is required on platforms, in shelters, or in small warming houses. Large warming houses may need one or more floor drains or drain mats at the doorways.

4.3.4 FIXTURES

Location, type, and quantity of plumbing fixtures shall be shown on the plumbing drawings using defined abbreviations via plans, isometric details and schedules. Where required by local and state regulations and ADA accessibility guidelines, ADA accessible fixtures shall be provided. Where required by local state regulations, unisex toilet rooms shall be provided. All supply fixtures shall be commercial grade and meet the WaterSense requirements. Fixture supports to be heavy-duty type.

Wall-mounted lavatories and water closets shall be provided except as otherwise directed by Metra.

4.3.5 PIPING SYSTEMS

All piping systems shall meet local requirements for sizing and installations. If ferrous to non-ferrous metal piping is required, install dielectric unions or flanges between different types to avoid oxidation.

All plumbing pipes and fittings shall be shown on the construction drawings using plans, isometrics, riser diagrams and sectional views. Expansion loops, elbows, caps, tees, cleanout plugs, traps, vacuum breakers, etc., shall be labeled as needed to indicate the complete assemblage of the various piping lines including but not limited to the following plumbing components:

- Domestic hot- and cold-water piping systems.
- Soil, waste, and vent piping systems.
- Drainage piping (including stormwater and subsoil drainage piping).

The plumbing drawings shall indicate elevations of all significant sections of waste and storm pipes with an invert elevation note. All significant sections of hot and cold-water piping shall be indicated with a bottom-of-piping note. All piping shall be designed to run directly as possible and parallel, or at right angles to walls and partitions. Multiple pipes shall be grouped in parallel lines with an appropriate section showing how the pipes are hung together.

Label all pipes with permanent plastic pipe markers to identify the content of the pipe and the direction of the fluid flow. Provide markers at no greater than 10-foot centers.

CLEANOUTS:
Provide pipe-sized cleanouts at maximum 50-foot intervals in all drain or sanitary pipes and for each change in direction.

CORROSION CONTROL:
All piping passing from a track related structure into the ground or into a structure shall be non-metallic pipe. All metallic piping passing from a track related structure into the ground or into a structure that is grounded shall be fitted with two-stage dielectric isolation couplings to prevent possible stray currents. Any underground metallic piping shall have cathodic protection. All piping subject to corrosion shall be weatherproof epoxy coated.

4.3.6 DOMESTIC HOT AND COLD WATER

Hot water shall be supplied to all toilet rooms and janitor's closets. A hot water recirculation system shall be employed if the water heater is located at a greater than code required distance to the connected fixture(s). Minimum heater tank storage capacity shall be based on 100^{o}F recovery delta temperature and shall comfortably accommodate the size and use of fixtures served by the water heater.

Natural gas tankless water heaters are to be installed where the property/location has natural gas service. Electric tankless water heaters are to be installed where the property/location does not have any natural gas service. Minimum Temperature rise shall be 65^{o}F. The capacity of the tankless water heater shall be coordinated with the demand of the fixtures to be provided with hot water. In cases where the hot water demand is beyond capacities of the tankless heaters, conventional tank type water heaters can be installed.

Hot and cold-water piping shall be pitched to a low point to facilitate draining. Drain valves are to be provided. Avoid designs which have pipes embedded in the structure. However, all pipes which pass through structural walls and/or floors shall be sleeved. Make provisions to avoid water hammer.

4.3.7 SOIL, WASTE, AND VENT

All waste and vent piping shall be designed in an efficient manner. Redundant runs and risers shall not be employed. Piping shall be sized to meet code requirements.

DRAINAGE:
Whenever possible, drainage shall be by gravity flow. Where drainage sections are below points of gravity outfall, pumps shall be provided. All drainage piping shall be a minimum of 4 inches outlet size and shall be connected to laterals no less than that size. Underground drainage piping shall not be less than 4-inch diameter. Underground piping and joint materials shall be chemical and petroleum resistant.

FLOOR DRAINAGE:
Floor drainage shall be vented per applicable code and shall be provided in the following areas:

- Elevator pit and bottom of stairs and ramps. Sump pumps will be allowed.
- Mezzanines, passageways, and concourses.
- Mechanical equipment rooms.
- Janitor's rooms, toilet rooms and other such spaces.
- Under recessed entryway mats near exterior doorways for removal of tracked water from open spaces.

ROOF DRAINAGE:
Types of roof drainage include roof drains, gutters, downspouts, and scuppers. Downspout connections, discharges and cleanouts shall be configured to protect from accidental damage, vandalism, and salt damage. This may be accomplished by extending the downspout through a Schedule 80 C-PVC sleeve set into the platform slab. The sleeve shall extend not less than 8" above the platform walking surface. A line-size cleanout shall be provided 6-inches above the sleeve. Roof drainage shall be connected to cisterns for other uses in the facility (i.e., landscaping, toilets, etc.) where viable.

4.3.8 HEAT TRACING

Piping routes shall be designed in such a manner as to minimize requirements for heat tracing. Provide self-limiting type heat tracing tape with thermostatic control for freeze protection only where absolutely needed, with a complete system of heaters, components, and controls to prevent freezing of the water, sanitary drainpipes and gutters and downspouts. Also, protect any piping run intended to drain a location where blockage (complete or partial) could result in significant damage to the physical structure or equipment. Heat tracing shall not be used for drainable water lines under any platform. Heat tracing that passes over any roadways shall be installed in duplicate, with one energized, and the other a spare.

Design temperature conditions shall be -25^{o} F outside ambient. Liquid temperatures shall be maintained to prevent a change of phase in the liquid at any point in the pipe, under all foreseeable conditions of installations.

Provide two ambient sensing thermostats, one of which is for a parallel backup, such that either will alarm to indicate the failure of a thermostat. The air-temperature-sensing thermostat shall shut off the self-regulating heat trace cable circuit(s) when the ambient temperature rises to above 35°F.

Provide a heat trace control panel to show the non-functioning of the system. Devices on the panel are to include, but not necessarily be limited to, an on/off selector switch, push-to-test 120-volt LED lights, silence switch, current and voltage sensing relays.

Provide an alarm buzzer and indicating push-to-test LED light wired from the heat trace control panel (for depots, the light shall be in the ticket agent space if present, or in an electrical closet connected to an annunciator console). Provide wiring to the interface cabinet from the heat trace control panel, both of which are located in the Electrical Room. Alarms shall indicate actual operation of the heat trace cables, via current and voltage. Thermostats shall be placed in safe and accessible locations for maintenance.

All piping that requires freeze protection shall be insulated.

4.3.9 INSULATION

Provide jacketing at all above-grade insulated piping. All jacketing shall be permanently labeled with plastic pipe markers, no greater than 10-foot centers, which will indicate the content of the pipe and the direction of the fluid flow. The following shall be insulated:

- Domestic hot water supply and return piping.
- All domestic cold-water piping.
- All heat traced piping.
- Drainage, waste, and cold-water piping subject to sweating.
- Below grade sleeved piping.

4.3.10 SEWAGE EJECTOR PUMPS

Electric-driven duplex sewage ejector with electronic alternator and level control devices shall be provided for all facilities where gravity flow to a sanitary sewer is not possible. Consolidate waste pipes into a single sewage ejector, when possible, versus providing multiple sewage ejectors. Sewage ejector sizing shall be based on fixture unit data obtained from design calculations per the applicable plumbing Code/Illinois plumbing code, and in accordance with the manufacturer's recommendations. Account for discharge pipe volume and ejector cycle time.

Power available, motor overload, high-water and low-water indications shall be provided for with local audible alarm and remote indicating alarm in the ticket agent area and as otherwise directed by Metra. Corrosion control shall be incorporated in the design of sewage ejector systems. The sewage ejector basin shall be constructed of a non- corrosive material (i.e., fiberglass). Drainage pumps should be powered by a single A.C. dedicated power feed from a local power panel.

4.3.11 SUMP PUMPS

Electric-driven duplex sump pumps with electronic alternators and floats shall be provided for stormwater only (non-sanitary) for all facilities where gravity flow to a sewer main is not possible. Sump pump sizing shall be based on data obtained from the Applicable Building Code/Illinois Plumbing code and applied in conjunction with sound engineering judgment. Power available, motor overload, high-level and low-level water indications shall be provided with local audible alarm and remote indicating alarm.

If a settling basin is not used with sump pump system, a sewage ejector pump with the same rating may be used, to keep any foreign object in drain water from damaging sump pumps. Corrosion control shall be incorporated in the design of sump pump systems. The sump pump basin shall be constructed of a non-corrosive material such as fiberglass.

4.3.12 ELEVATOR SUMP PUMPS

Electric-driven simplex sump pump with oil sensor (if elevators are hydraulic type) and floats shall be provided for on-off-high alarm for all facilities where gravity flow to a sewer main is not possible. Sump pump sizing shall be based on applicable NFPA, Electrical, Fire, elevator or local building code whichever is most stringent. Power available, motor overload, high-level water indications shall be provided with local audible alarm and remote indicating alarm for high level alarm only.

4.3.13 FLOOD CONTROL PUMPS

Flood control pumps to be provided at projects that are located in areas which are under the water line or in flood plains.

Electric-driven duplex flood control pumps with electronic alternators and floats shall be provided for non-sanitary water only. Flood Control pump sizing shall be based on data obtained from the Applicable Building Code/Illinois Plumbing Code and applied in conjunction with sound engineering judgment. Power available, motor overload, high-level and low-level water indications shall be provided with local audible alarm and remote indicating alarm.

4.3.14 TESTING AND COMMISSIONING

All testing and balancing of equipment shall be documented on industry-approved forms and submitted to Metra to verify testing has demonstrated the applicable performance requirements. The contractor shall be required to submit testing and balancing report to Metra before completion/acceptance of the project by Metra. All testing shall be witnessed by Metra or Metra representatives.

Commissioning of all mechanical equipment is to be performed by certified personnel. This work is to be certified by the manufacturer's representative, and commissioning forms are to be submitted and added to the maintenance submittals for the facility. All commissioning shall be witnessed by Metra or Metra representatives.

4.4 ELECTRICAL

4.4.1 VISUAL AND FUNCTIONAL COORDINATION OF ELECTRICAL INFRASTRUCTURE

The designer is responsible for coordinating all electrical system components with all other design disciplines including, but not necessarily limited to, architectural, structural, HVAC, lighting, communications, plumbing, and fire protection.

Electrical infrastructure (e.g., equipment and associated supports, conduit, and wall penetrations) shall be concealed from public view. Components that cannot be concealed from view (e.g., lighting fixtures and meters) shall be fully integrated with building architecture to present an orderly appearance. All such components that are visible to public view shall be depicted in the architectural drawings.

4.4.2 CONDUIT AND WIRING METHODS

CONDUIT:
Minimum raceway size shall be 3/4 in. To limit the transmission of vibration, at least 18 inches of flexible metallic conduit shall be used for connections to motors as required by governing codes. The following are the types of conduits and where they should be used:

- Rigid Metal Conduits - Galvanized Steel (RGS):
    - In normally dry areas concealed work such as above dropped ceilings.
    - In walls which are normally dry.
    - Aboveground in wet locations or in contact with soil RGS with factory-applied PVC coating.
- Electrical Metallic Tubing (EMT): NOT ALLOWED.
- Rigid Non-Metallic Conduit.
    - For embedment in concrete platforms and structures.
- Reinforced Thermosetting Resin (fiberglass) (RTRC) Duct shall be used for:
    - Underground installations.
    - Encasements in duct banks for all applications.

ELECTRICAL BOXES AND FITTINGS:
Pull boxes, junction boxes and outlet boxes and associated fittings shall be fabricated of material

compatible with that used for the conduit terminating at the boxes. The boxes and extensions, if any, shall be furnished with gaskets. Boxes shall be cast iron or other material suitable for use in damp areas, such as stainless steel or sheet metal with fully welded seams, hot-dipped galvanized after fabrication. Where knockouts are provided, they shall be of the type which maintains a closed seal in the box.

Fittings for conduit shall be threaded type. The use of set screw or crimp type fittings is prohibited.

Branch conduits shall contain no more than one multi-wire branch circuit, or one 3-phase, 4-wire feeder, plus ground-messenger. Home runs shall contain a maximum of nine (9) load carrying wires.

Provide one empty raceway through any inaccessible area between panels, and an accessible area required for distribution. Provide two empty 1-inch conduits from the electrical room to a junction box on the platform level. Provide two empty 1-inch conduits from the communications room or cabinet to a junction box on the platform level. Provide an empty conduit and junction box rough-in for known future equipment, where applicable.

Provide two 4-inch PVC schedule 40 spare conduits on either side of the platform for future communication cables. Conduit for data and power cables shall be separate.

2 - 4" schedule 80 PVC pipes shall be embedded in the entirety of one platform for signal cable.

For new installations, conceal all conduit to the maximum extent feasible. Where exposed, mount the conduit in an orderly fashion and coordinate with adjacent architectural features, lighting, and other equipment. On existing installations, determine where and if the conduits can be concealed.

Complete conduit runs shall be shown on all plans and sections, and close coordination shall be done with the other engineering and architectural disciplines

A main feeder is to be supplied from the Electrical Room to the Communication Room or Cabinet, from which a distribution panel will supply power to all Communication Equipment as well as the lighting and HVAC inside such Communication spaces.

CABLE: Minimum size conductor shall be 12 AWG stranded copper cable. THHN/THWN type cable shall be used in dry locations. Aerial and underground cable shall be single-conductor copper. Conductor shall be insulated with abrasion, moisture, heat, and sunlight resistant black cross-linked polyethylene (XLP). Conductors shall be UL-listed Type RHH or RHW-2 or USE-2, suitable for operation at 600 volts or less in wet or dry locations, including direct burial in the earth.

Conductors shall have an overall jacket, resistant to ozone, sunlight, and weather. A.C. Wiring shall be installed in conduit.

CIRCUIT CONTROLS AND WIRING:
Electrical circuits for passenger functions shall be separate from circuits for other areas of the depot. Power, lighting, and smoke detector circuits shall be separate for all areas. Panels shall be located in the mechanical equipment room and accessible only to authorized personnel. Control switches for passenger areas shall be located in the ticket agent’s office; if there is no ticket agent office, the switches shall be secured from public access. Ticket agent office lighting shall be controlled by wall-mounted switches within the office, accessible only to the agent. VOM cabinet shall be located outside the depot for access. Panel and meter shall be provided with visual screens or enclosures.

Circuits shall be spliced only at the devices. The lighting shall be on alternating circuits so that if one circuit trips there is still lighting serving the area. Do not connect any devices other than lighting and associated equipment to lighting circuits.

POWER OUTLETS:
Grounded 120-volt, single phase, 15 and 20 ampere duplex convenience receptacles shall be provided throughout the depot as required by applicable codes. Each receptacle circuit in the public areas shall feed not more than eight duplex outlets. Outlet type in public areas shall be tamper proof. Outlets shall be circuited alternately. In non-public areas, no more than six duplex outlets shall be wired into each circuit. Outlets shall not be connected to lighting circuits. Outlets shall have a UL label for use in wet locations.

Dedicated grounded receptacles shall be provided for ticket agent office equipment and other specialized equipment. Individual power circuits shall be provided for all hard-wired equipment. Receptacles shall be spaced at 6-foot intervals in the ticket agent office, and additional required for housekeeping and maintenance purposes in other areas. Duplex outlets shall be wall mounted in the electrical, mechanical and communication equipment locations, spaced every 12 feet. At least one outlet shall be located on each wall. Outlets shall be readily accessible for use and mounted a minimum of 18 inches above floor.

Electric convenience outlets shall be distributed throughout the station so that all public areas of the depot and platform can be reached by a 50-foot cord. At least one convenience outlet shall be installed in each depot ancillary room, including janitorial and restrooms. Non-lockable, waterproof GFI receptable(s) shall be provided at depot exterior, but not at platforms or shelters.

Duplex outlets shall be wall-mounted in electrical, mechanical, train control and communication equipment locations, spaced every 12 feet. At least one outlet shall be located on each wall. Outlets shall be readily accessible for use and mounted a minimum of 18 inches above floor.

Power for electronic Point-of-Sale equipment shall be provided adjacent to the ticket window both in the public waiting area and in the agent office. Receptacles in public areas shall have hinged covers to protect children. Charging stations shall be provided within the public areas of the depot. Charging stations shall be a combination 120V power receptacle and a USB. Charging stations shall be provided only in spaces that can be secured from public access during off hours. Determine with Metra quantity and placement during design,

All convenience outlets shall be duplex units approved for use in wet locations. Convenience outlets shall be wall or otherwise vertically mounted at least 18 inches above the floor. Floor mounted outlets shall not be used. The placement of convenience outlets shall respect the modules of any wall panel systems. Where possible, outlets shall be centered horizontally on the respective wall panel or room wall. Convenience outlets for public access areas shall be recessed wall mounted with metal cover plates.

Exterior receptacles shall be provided as required for specific site usage, including locations within shelters and warming shelters. Power shall be provided to support landscape/site lighting and sign/messaging board locations.

GFI receptacles shall be installed at rest rooms and at outdoor locations.

Outlets shall be industrial grade and shall be screw-on type to connect the cable.

SWITCHES:
Light switches for unoccupied rooms such as electrical rooms shall be motion sensor type with a manual override. Light switches shall be industrial grade and shall be screw on type to connect the cable.

COVERS:
All covers for wiring devices shall be stainless steel. All covers for unused wiring devices in public areas shall be stainless steel.

4.4.3 ELECTRICAL SERVICE

DESIGN DOCUMENTATION:
Short-circuit coordination, voltage drop, and load calculations shall be prepared both according to the Authority Having Jurisdiction and the power utility. Calculations shall be provided in sufficient detail to permit evaluation of the basis of design for the electrical distribution system. Overcurrent protection coordination curves shall be prepared to demonstrate that the distribution system is fully coordinated for selective tripping and/or opening of overcurrent protective devices.

POWER SERVICE SYSTEM:
Each station shall be fed by two separate full-size power services (N1, N2) through an automatic transfer switch (with bypass, ATS). The ATS should feed a switchboard (MDP).

A generator tap box shall be fed from MDP and sized to handle the maximum demand load of the station. Locate the generator connection box where it is easily accessible for the portable generator. The generator connection box shall include a Kirk-keyed interlocked generator disconnect. The box shall be NEMA4, stainless steel.

Each incoming voltage service shall be 208Y/120V, 3-Phase, 4-wire, 60 Hertz for new installations. When a station is being rehabilitated, conduct a determination if a change of service type is needed.

Utilization voltage for both services shall not exceed 120 volts to ground.

For stations along Metra electric (ME) lines, N1 service shall be from the utility power and N2 service shall be derived from the ME system via an isolation transformer.

Services shall be sized to handle all projected station loads in accordance with the AHJ requirements.

Parking lots that are on the same property of the station and can be fed without accessing the public right of way shall be fed from the station. Otherwise (such as if the parking lot is across the street), parking lots shall have their own separate electrical service (120/208V, 3phase, 4 wire, 60 Hertz). Signalized cross walks shall have a separate 100A, 1-phase electrical feed from the Metra station service to feed the crossing warning.

For stations that have a vendor dedicated space not exceeding 200 sq-ft, provide a 60A/3P breaker to feed a panelboard to be mounted in that space. The panelboard, should have six 20A/1P, and one 30A/2P breaker.

METERING:
Design shall comply with requirements of the utility serving the station.

ISOLATION TRANSFORMERS:
On the ME, services shall be derived from the ME system via an isolation transformer(s). The transformer shall be dry type with copper windings. Insulation class shall be 220C (428F) and 80C (176F) temperature rise.

Sizing should be conservative, and the integrated demand shall not exceed 80% of the transformer full load rating. Transformer losses shall be minimal. Select impedance to minimize losses and keep the short

circuit interrupting duty of the secondary overcurrent devices to the range of readily available non-fused devices.

AUTOMATIC TRANSFER SWITCH:
For stations on the ME line, the “Normal” position of the transfer switch shall be on the ME power. The “Emergency” position of the transfer switch shall be connected to the power from the utility. . Designer shall indicate switch position labeling on the drawings and obtain concurrence from Metra.

Provide automatic return to normal position after an adjustable time delay upon restoration to 90% of rated value.

A minimum of one form “C” dry contact shall be provided for remote indications via SCADA, to monitor abnormal (emergency) position of the transfer switch.

The line to neutral voltage of both sources is nominally always the same, however, the line-to-line voltage can be significantly different. Where this is the case, it shall be prominently stated in the transfer switch specification.

The transfer switch shall have a manual test button/switch for maintenance purposes.

The Bypass/Isolation switch shall permit maintenance of the Automatic Transfer Switch and its respective control circuit when they are electrically dead, without interrupting service to the facility. The switch should prevent cross connecting the two sources of supply. Mechanical type interlocks operating on a fail-safe principle are preferred. Neutral switching is not required. All operations shall be accomplished without interruption of the load.

SERVICE AND DISTRIBUTION SWITCHBOARDS:
Switchboards shall comply with the following criteria. Service equipment and distribution breakers shall be molded case with a minimum of 65KAIC rating and shall be provided with TVSS protection.

Provide NEMA 1A enclosure for general purpose use in dry locations not exposed to combustible gases but gasketed against dust. Use NEMA 4X enclosures where exposure to the outdoors and in wet locations is likely.

Where ComEd metering transformers are installed in switchboards, ComEd shall review and approve the switchboard shop drawings before drawings are submitted for approval.

Main breakers shall be key interlocked with portable generator disconnect device.

PANELBOARDS:
Provide NEMA 1A enclosure for general purpose use in dry locations not exposed to combustible gases but gasketed against dust. Use NEMA 4X enclosures where exposure to outdoors and in wet locations is likely.

Panelboards shall be of the safety dead front type. Bus bars shall be hard drawn electrolytic copper, of 98% conductivity, and rated at a current density of 1000 amperes per 1 square inch. Gutters shall be 6-inch minimum clear and not less than the latest City Electrical code requires.

Overcurrent protective devices shall be industrial grade, molded case thermal magnetic, bolt on type circuit breakers.

Terminal lugs shall be capable of terminating the feeder or branch circuit wire required to be terminated thereon without modification to either.

After panels and circuit breakers have been installed, Contractor shall inspect and re-tighten all termination/connections (breaker to bus cable connection, and bus to mounting).

A separate panel shall be provided to feed communications equipment. Panelboards shall be provided with TVSS protection.

Panelboards shall be sized for 25% future increased capacity.

Panelboards shall be lockable with a CAT 60 lock.

Panelboards and breakers shall have a minimum of 22KAIC rating.

This expansion capacity shall include at least 20% spare single pole circuit breakers (4 min). Each panelboard shall be fully equipped with full buswork and terminations to readily accept the future breakers. Each panelboard shall be equipped with a ground bus.

Distribution branch circuit breakers shall be heavy duty, industrial type molded case, bolted type, front removable and rated to interrupt maximum available short circuit current at their load terminals, based on rated voltage. The frame size of these circuit breakers shall be as follows: 15 to 90 ampere trip rating - 100 ampere frame; 100 to 200 ampere trip rating - 225 ampere frame; 225 to 400 ampere trip rating - 400 ampere frame.

Designer shall strive to balance the loads on all panels and feeders.

Designer shall verify that proper equipment clearances are provided in accordance with governing codes, manufacturer requirements, and maintenance practice

4.4.4 GROUNDING

Grounding of stations shall consist of a main grounding junction box (GJB) which shall comprise a copper bus bar. To the GJB, connect a grounding cable in conduit connected to the incoming water line. A supplementary ground rod shall use an earth-driven electrode as their grounding electrode. Resistance to earth shall not exceed two ohms. Grounding rod shall be installed in a ground well. Soil testing shall be performed prior to purchase and installation of round rods. Ground the connection between each item of service equipment and the GJB. Connection to communication room ground bus. All grounding conductors connected to the ground rod and all joints associated with the grounding system shall be insulated. All feeders and branch circuits shall include equipment ground conductors. Each equipment feed shall include an equipment ground conductor.

Evaluate the buildings and surrounding area to determine if lightning protection needs to be provided.

4.4.5 EMERGENCY POWER BACKUP TESTING

Provide generators where required by code. Typically, emergency power backup should be provided by an industrial uninterruptable power supply (UPS).

In some locations, Metra may require the use of individual battery packs.

4.4.6 TESTING AND COMMISSIONING

All testing of equipment shall be documented on industry-approved forms and submitted to Metra to verify testing has demonstrated the applicable performance requirements. The contractor shall be required to submit testing report to Metra before completion/acceptance of the project by Metra. All testing shall be witnessed by Metra or Metra representatives.

4.5 LIGHTING

4.5.1 DESIGN CONSIDERATIONS

The lighting system should support the safety, security, and comfort of the transit patron. Station and Parking design shall provide the lighting levels and lighting types required by the functions of each individual area defined in these *Guidelines*. In the interest of reduced energy consumption, designers should employ passive daylighting strategies to the extent feasible.

Lighting equipment shall be UL listed for its intended use. The lighting system shall operate continuously, relying on automatic and manual controls to provide efficient energy use. Vandal-resistant fixtures and lenses should be used as required for their mounting locations.

Provide adequate lighting in parking lots and at access points to the depot entrances and platforms. Lighting shall not interfere with or blind train operators or cause a nuisance to neighboring property.

4.5.2 LIGHTING LEVELS AND CALCULATIONS

Lighting levels shall be calculated using the latest edition and methods in the “Illuminating Engineering Society Lighting Handbook”. Use nationally recognized lighting software to provide point by point photometric plans of the entire area of work to demonstrate compliance with these requirements for review and approval.

Lighting shall be designed over the entire site to provide at least the levels indicated in Table 4-1. Over-lighting shall be avoided by providing no more than 25% over targeted levels in the table.

Use LED luminaires throughout.

Lighting shall be performed using direct lighting. Indirect lighting shall not be factored into the calculations unless it is the primary system providing illumination, such as up-lighting under canopies..

Calculations shall be performed using the overall light loss factors (LLF) in bullets below. These values include lamp lumen depreciation (LLD) of 30% over 90,000 hours of use (approximately 20 years at 12 hours per day) down to the industry-defined L70 end of life (see LED Luminaire Requirements section). Dirt depreciation accounts for the additional reductions from 0.70 to the factors below.

- 0.55 for platforms, and interior of facilities including bus garages, rail shops, substations, etc.
- 0.65 for station facility and depot interiors.
- 0.60 for all exterior locations including wall mounted and pole mounted.
- 0.65 for general office areas.

The values of illuminance shall have a uniformity ratio of 3 to 1 average to minimum and not exceed the uniformity ratio of 5 to 1 maximum to minimum.

Emergency Lighting and Exit Signs:

Supply emergency lighting self-powered battery-operated units. In the event of a power failure, these units shall provide illumination to assist in safe and orderly evacuation to the nearest depot exit, emergency stairway or other area of safety. Provide illuminated exit signs. Meet requirements of NFPA 130.

4.5.3 PARKING LOTS

Prior to beginning the design of the lighting system, several considerations should be investigated. The maintaining agency should be contacted and the following issues considered:

- Standard luminaire or light pole required by the local jurisdiction
- If there is not a standard light pole, determine maximum mounting height the maintenance agency can reach with their equipment
- Types of circuits normally used in the community, ie, two- or three-wire, 120/240V or 240/480V, 20 amp or 30 amp, etc.. Metra prefers 120/208V, 3 phase, 4 wire.
- Local jurisdiction's maximum allowable level for spillage of light onto adjacent properties. If there are no such requirements, then light levels at the property boundary, measured 36" above ground level, shall be no greater than 0.5-foot candles above the ambient light level.

The power company should be contacted to verify the following:

- The nearest service location where the voltage being proposed for the lighting system is available.
- Any changes necessary for providing service (i.e., transformers, line extensions, etc.).
- Any meter requirements for installation.

Use LED lighting and consider the luminaire features in the design of the complete system. Consider also:

- Whether the standard luminaire should be a flat-bottom, sharp cut-off, shoe box style luminaire for control of the light distribution and glare.
- Cost per luminaire and efficiency of light distribution.
- Degree of light pollution onto adjacent properties and into the sky.
- Mounting height combined with light distribution to avoid blinding motorists and train engineers with glare.

The luminaire should not be directly visible to the locomotive's engineer (as the engineer may mistake it for a railroad signal). Designer should follow local requirements for major points of conflict (e.g., any intersections of driving lanes, exits and entrances, pedestrian crossings of traffic lanes and at any fare collection points). The uniformity ratio (average to minimum) should not be greater than 3 to 1. Whenever possible, lighting should be designed to avoid light pollution onto neighboring properties and into the sky. To avoid light pollution, the placement of luminaires is critical; sharp cut-off luminaires or side shielding may be needed.

The photocell is the preferred means of lighting control because it adapts to the seasonal daylight variations and to overcast skies. The designer should compare the cost of providing photocells at each luminaire to a single photocell operating multiple luminaires. The photocell is to have a built-in time delay to avoid oversensitive on/off cycling due to vibration, birds, etc. Photocells shall be located for easy access and to avoid/minimize the effects of adjacent structures.

For smaller parking lots, consider the use of small boxes mounted on the light poles to house controls rather than the more costly ground mounted control cabinets. If the lighting for on-street strip parking also

functions as street lighting, it should be controlled by a photocell and comply with the maintenance authority requirements for street lighting for the area in question.

A standard pole and luminaire have not been established in these *Guidelines* because each local municipality, rather than Metra, maintains most of the commuter lots and as such local requirements are to be followed. Also, the pole and luminaire selection should provide for color and design compatibility with adjacent lighting.

Grounding

- Each light pole shall be grounded using a ground rod. Ground rod shall be connected to ground lug at the inside base of the pole. Soil testing shall be performed prior to purchase and installation.
- Where a controller is provided, controller shall be grounded using a ground rod. Resistance to earth shall not exceed two ohms. Grounding rod shall be installed in a ground well. Soil testing shall be performed prior to purchase and installation.
- Consultant shall test soils for resistivity.
- Ground rods are not a replacement for equipment grounding conductors. Regardless of the presence of ground rods, equipment grounding conductors shall be installed with all circuits and feeders back to the source panels.

Poles should be mounted on concrete foundations. Depth and type of the foundation shall be as recommended by the manufacturer, as required by the maintaining authority, or as specified by the structural engineer. Extend piers 30” above pavement in parking lots or adjacent to driveways and 12” above grade when adjacent to platforms.

4.5.4 DEPOT EXTERIOR

The depot exterior shall be illuminated to promote safety and security near the station.

4.5.5 PLATFORM

In general, platform luminaires shall be full cut-off. Up-lighting considered for under canopy shall be designed so that no light escapes beyond the canopy above the horizontal plane. The circuitry should provide for alternating lights on different circuits so that if one circuit goes out, every other light remains on. There should be at least two different electrical circuits for each platform. Loss of one circuit shall not leave any area in darkness.

Platform and site lighting within 25 feet of centerline of track must be fully recessed. Luminaires at buildings, platform and under canopies should be designed to eliminate any glare to the train engineer.

Typical lighting should be maintained at minimum levels and provided with timers. Platforms shall be adequately illuminated over the entire length.

Photocells for lighting located within 50 feet of a railroad track shall be shielded so that the locomotive headlights do not "trick" a photocell into thinking it is daytime. Face the opening in the photocell away from the railroad tracks.

Platform luminaires shall be post-mounted; canopy luminaires shall be recessed or surface mounted. Wall-mounted luminaires shall be used on structures to maintain light level uniformity on the platform near structures. Lamps for platform and canopy luminaires shall be identical to maintain uniformity of

illumination distribution and color temperature throughout the platform area. Verify requirements of applicable railroads, including pole heights, luminaire spacing, and illumination levels.

Run wiring for platform luminaires underground. Run wiring for canopy luminaires above the soffit level of the canopy to hide conduit from sight.

Luminaire placement shall be coordinated with the platform appurtenances. Platform signage shall be Type 2A located under platform lights to illuminate signage. Additional spotlights to illuminate signs under canopies or located in landscaping to illuminate building signs may be required.

4.5.6 LED LUMINAIRE REQUIREMENTS

The lighting system shall use luminaires which are readily accessible for maintenance and are designed to provide for easy fixture, lamp and lens access, and replacement.

Luminaires shall be non-corroding, vandal resistant and U.L listed and rated for the environment in which they are installed.

Platform and outdoor luminaires shall be U.L. listed for use in wet locations with 20kV/15kA surge protection, IP66 or better enclosures, and ANSI C136.31 3g vibration tested.

Luminaires located indoors shall be U.L. listed for dry type, but up to the discretion of the designer.

Conduit layout and luminaire mountings shall be designed to minimize trapping condensate water in the fixture.

Outdoor luminaires shall be rated for operations at -20 degrees F.

Luminaires shall be constructed, hinged, and latched so that re-lamping, power supply replacement, and LED light source component replacement can be performed safely by one individual from a single ladder without requiring relocation of the ladder. Locate luminaires to facilitate maintenance and lamp replacement, including at stairs and ramps.

LED light sources installed indoors shall have a color temperature of 3000K. LED light installed outdoors source shall have a color temperature of 4000K.

LED Luminaires shall have a lamp lumen depreciation factor (LLD or lumen maintenance factor) of 0.7 (L70) at 90,000 hours of use as calculated per IES Technical Memorandum TM-21. Lighting systems with documented TM-21 LLD better than L70 at 90,000 hours of use are strongly encouraged as technologies advance. For such systems, designer shall submit manufacturer’s TM-21 lumen maintenance factor reports along with recommended overall LLF to be used.

Pole-mounted platform lighting poles and foundations shall be located no less than 9” clear from back of platform. Platform luminaires should have a means of opening without completely taking off the luminaire door (such as a hinge). The hinge side or attached side of the of luminaire door shall be nearest to the track.

Luminaires shall use high quality commercial-grade LED’s and high efficiency commercial-grade constant voltage power supplies that meet applicable energy codes. Door fasteners on luminaires shall be provided with captive steel rings.

Luminaires accessible to the public shall be designed to be vandal-resistant and shall have tamperproof fasteners.

Pole-mounted luminaires on the ME line platforms should be mounted 12 feet above the walking surface. Pole-mounted luminaires on the Diesel line platforms should be mounted at 25 feet. All luminaires accessible to the public shall have fixture lenses with smooth side down for ease of cleaning and graffiti removal. Where a canopy is present, lighting should be mounted to the underside of canopy.

The LED boards and drivers shall not be mounted directly to the fixture housing but shall be mounted with vibration-isolating hardware. Wire connections to the LED board shall be secured through heavy duty connectors capable of withstanding vibrations and movements during shipping, handling, and installations. The power supply shall be mounted on a removable tray and connected to the power thru quick disconnects. Removable tray shall be connected using fasteners that required no tools to remove

LEDs shall be installed at the nominal length as required to completely and uniformly fill the luminous openings of the luminaire. Gaps of LED strips within the luminaire shall not be visible through the lens.

4.5.7 WARRANTY

The LED luminaires shall be warranted by the manufacturer for a period of 45,000 hours of use (approximately 10 years at 12 hours per day) against defects in materials and workmanship that result in lamp lumen depreciation (LLD) of 30% or greater (L70). The maximum allowed annual LLD is 3%.

The power supply shall be long-life (100,000 hours) and carry a 10-year warranty. Manufacturer shall have a 5-year history of producing power supplies for the North American commercial/industrial grade LED luminaire market.

TABLE 4-1: LIGHTING ILLUMINANCE VALUES AND CONTROL CRITERIA

Area	Average Maintained Illuminance Levels at Grade or Floor Level (Foot Candles) *	Lighting Control Notes (see Key below)
Bus Loading/Unloading	2	3
Kiss-&-Ride Pick-Up/Drop-Off	2	3
Parking Area – Open	2	3
Parking Area – Covered	5	3
Pedestrian Ways	1	3
Elevator/Stair at point of transition	20	2
Passageways – Tunnel	20	1
Passageways – Overpass	5	2
Depot Loggia	5	3
Depot Entrance	10	2
Waiting Area	20	2
Ticket Agent Office	40	2
Ticket Window	50	4
Janitor Closets	20	4
Electrical & Mechanical Rooms	30	4
Storage Rooms	25	4
Toilets	20	4

Area	Average Maintained Illuminance Levels at Grade or Floor Level (Foot Candles) *	Lighting Control Notes (see Key below)
Vendor Areas (By Tenant)	2	4
Platforms - Under Canopy	20 min. *	3,5
Platforms at Track Edge	2 min. *	3,5
Outdoor Platforms 2 ft from Edge	2 min. *	3,5
Night Security Lighting	Match Adjacent Areas' Average Levels	1,2

Key:

* Except for platform lighting which is a minimum illumination requirement.

Note 1 To operate continuously.

Note 2 To operate during normal hours of operation. Night security lighting shall maintain a minimum of 2-foot candles in ticket agent offices, and depot and warming house waiting areas.

Note 3 To operate dusk to dawn with time clock and photo sensor override. Fifteen minutes after the last train leaves a station, time clocks shall turn off all lights except security lights and those required to maintain a minimum of 0.5-foot candles average at platforms, walkways, and parking areas.

Note 4 Local Switch

Note 5 All Photocells for lighting located within 50 feet of a railroad track shall be shielded so that the locomotive headlights do not "trick" a photocell into thinking it is daytime. Face the opening in the photocell away from railroad tracks.

4.5.8 TESTING AND COMMISSIONING

All testing of equipment shall be documented on industry-approved forms and submitted to Metra to verify testing has demonstrated the applicable performance requirements. The contractor shall be required to submit testing report to Metra before completion/acceptance of the project by Metra. All testing shall be witnessed by Metra or Metra representatives.

4.6 COMMUNICATIONS

The objective of the communications system is to provide state-of-the-art, efficient, and reliable communications and passenger information. The information is presented audibly and visually.

4.6.1 VISUAL AND FUNCTIONAL COORDINATION OF COMMUNICATIONS INFRASTRUCTURE

The designer is responsible for coordinating communications system components with all other design disciplines including, but not necessarily limited to, architectural, structural, HVAC, lighting, electrical, plumbing, and fire protection.

Communications infrastructure (e.g., equipment and associated supports, conduit, and wall penetrations) shall be concealed from public view, and/or fully integrated with building architecture to present an orderly appearance. All such components that are visible to public view shall be depicted in the architectural drawings.

4.6.2 COMMUNICATION EQUIPMENT SPACES

Main communications equipment shall be housed as described below:

- Metra Electric Line - Provide a lockable NEMA 4X stainless steel Main Communications Cabinet located inside the headhouse, or in a dedicated communications room as directed by Metra PM. Cabinet to be minimum 72" high by 30" wide by 24" deep (provide larger if needed for project). Provide two dedicated 120V, 20 Ampere circuits to the cabinet.

- Diesel Lines – Provide a lockable NEMA 4X stainless steel Main Communications Cabinet located near the platform and parking for easy access by Metra personnel. Cabinet to be minimum 62” high by 44” wide by 24” deep (provide larger as needed for project). Provide two dedicated 120V, 20 Ampere circuit to cabinet.

Show equipment sizes with front and rear access clearances. Show service conduit routing and conduit runs to cabinets.

Access to secure ticket offices and limited utility rooms is via Metra Master Key system. At Metra-owned stations, provided empty raceway and outlet boxes for future access control card reader system.

4.6.3 COMMUNICATION SYSTEM

Contact JULIE and DIGGER for non-ROW utility locates.

Contract with host railroad to locate utilities and other companies that have leases for utilities on railroad property.

The Communications system shall include the following equipment:

- Provide fiber-optic cabinet with termination panel and patch panel with connection to existing Metra fiber-optic backbone system. Coordinate with Metra the existing infrastructure and interface requirements.
- Main Distribution Frame (MDF) Communication Equipment to be NEMA Type 4X stainless steel cabinet and may be located in the Main Communication Room, if provided as determined by Metra. MDF shall contain CCTV system head end equipment, VOM equipment, VIS, Station display equipment, PIDS head end, Wi-Fi, telephone service equipment.
- Intermediate Distribution Frame (IDF) enclosures to be provided when cable lengths exceed 300 feet to main communications cabinet or IDF. IDF cabinet, when required, to be NEMA Type 4X stainless steel located no more than 260 feet between cabinets. IDF sizes varies and to be sized for switches for platform cameras and station displays. A 1” conduit with pull string to be provided back to Main Communication cabinet for fiber optic cabling and copper cable. 120-volt power (min on 20 ampere circuit) to be provided each IDF cabinet.
- Provide a handhole at each end of platform and at center of platform with two 2” conduits with inner ducts and a pull string each between each handhole and to main communication room or cabinet.
- CCTV system including empty conduits with pull strings to main communication cabinet and back boxes at each camera location.
- CCTV camera provided in each elevator cab and connected to main communications cabinet.
- Intrusion monitoring system to include empty conduit with pull strings at ticket agent offices and each back of house door of Metra owned stations to main communication cabinet.
- Empty 3/4” conduit with pull string back from Point-of-Sale ticket vending machines to main communication cabinet.
- Empty 3/4” conduit with pull string back from vending machines to main communication cabinet for telephone service, if required.
- Visual Information Sign (VIS) to include outlet box at each location and 3/4” conduit with pull string back to main communication cabinet. Note that Metra is transitioning from the VIS system, to the Station Display system. Metra will determine system selection on a location-by-location basis.
- Provide one (1) empty 3/4” conduit with pull string for communications cabling and one 3/4” conduit with 120-volt power to each station display sign location.

- PIDS where required, typically, downtown.
- Provide Wi-Fi for passengers where directed by Metra on a project-by-project basis.
- Voice of Metra public address system including empty conduits with pull strings to VOM cabinet (Main Communication Cabinet).
- Telephone service and device located in each elevator, at ticket agent and vendor space.
- Cell Phone Charging Station and/or USB convenience outlets shall be integrated with waiting room furniture.
- Pay Telephones are not required unless otherwise directed by Metra.
- Provide 2" conduit for telephone utility service from outside of the station to an interior dedicated comm room or cabinet as applicable. Coordinate with local telephone company for new service.

4.6.4 SECURITY SYSTEM

Provide an Intrusion Monitoring System on doors to ticket agent office and to back of house spaces; primarily electrical, communications, mechanical rooms at Metra owned stations. Motion detection system shall be installed in the ticket agent office.

4.6.5 CCTV

The purpose of the Closed-Circuit Television is to provide for monitoring by Metra Police or the local municipality.

- Existing CCTV cameras have primarily infrared fixed focal lens. Provide maximum 75-feet camera spacing fixed-focal-lens type cameras.
- Placement, spacing and mounting requirements of CCTV cameras shall provide full coverage of all areas of station and platform. This includes pedestrian tunnels, parking areas, and areas known to be susceptible to crime and/or vandalism.
- CCTV cameras should be located at each level of elevator lobbies in headhouses as well as in elevator cabs.
- CCTV camera near each Call for Aid pushbutton shall activate adjacent camera.
- CCTV camera at Ticket Vending machines.
- Provide empty conduit system to main communication cabinet.
- Pole-mounted cameras on light poles require poles with two chambers to separate comms wiring from electrical wiring. Exposed conduit will be allowed only as a retrofit on existing poles.

4.6.6 VOICE OF METRA (VOM)

VOM is a public address system required at all stations. At stations with a ticket agent office, the system should include a speaker to enable the agent to hear all announcements made from the central control point, and a microphone in the ticket agent office for direct announcements in emergency situations. VOM speakers shall also be installed in the ceilings of waiting rooms, late night vestibules, in the ticket agent office area (if remote from waiting room), warming houses, loggias and canopies.

Flush speakers shall be installed in areas with ceilings. Surface or pendant-mounted speakers shall be installed in covered areas without ceilings. Speakers installed outdoors shall be rated for damp/wet environments.

Speakers along platforms shall be installed on platform lighting poles a minimum of 9 feet, maximum 12 feet, above grade. The spacing and specific type of speakers shall be planned for uniform distribution and coordinated with the Metra Communications Department. The minimum speaker spacing shall be one speaker on each light pole.

Speakers will be furnished and installed by Metra Communications Department.

Empty metal conduits with pull string to be provided and to minimize accidents and vandalism. Conduit sizes for the VOM are outlined in Table 4-2 below.

TABLE 4-2: CONDUIT REQUIREMENTS AT PLATFORMS*

Conduit Type / Location	Size
From V.O.M. equipment room to all speakers and/or light poles with pull strings	one 3/4"Ø for power, two 3/4"Ø for low voltage
Stubbed into V.O.M. equipment room from the ticket agents' office.	one 3/4"Ø for power, two 3/4"Ø for low voltage
Inside depot to V.O.M. speakers and stubbed into V.O.M. equipment room.	one 3/4"Ø for power, one 3/4"Ø for low voltage
VOM equipment to Station Display sign	one 3/4"Ø for power, one 3/4"Ø for low voltage
VOM equipment to Ticket Vending Machine equipment	one 3/4"Ø for power, one 3/4"Ø for low voltage
Spare conduit under each platform (with two handholes per platform)	two 2"Ø conduits under each platform, extending to project or site limits **
Undertrack horizontal boring (with handholes behind each platform)	two 2"Ø conduits between platforms

* Coordinate CCTV / security camera locations and requirements at elevators and elsewhere with Metra's PM.
** Coordinate extents of spare conduit runs with Metra's PM.

4.6.7 POWER

The power to the main communications equipment shall include UPS backup. The UPS System shall be sized for 150% connected load for 30-minute backup power. Communication devices requiring power convertors shall be fed from redundant AC power supplies that are derived from different power sources.

4.6.8 GROUNDING

Provide Main Communication Ground Bus (MCGB) In Communication cabinet tied to the Main Building Ground Bus. All Communication equipment, including IDF cabinets, shall be connected at this MCGB. All power conduits shall be dedicated grounding conductor, shall be separate and isolated from the communications ground.

4.6.9 POINT OF SALE

If a depot has a ticket office, Point-of-Sale communications cables, cableways, grommets, and related hardware will need to be installed at the ticket window counter both in the public waiting area and in the ticket agent office.

5 SITE DESIGN

5.1 SITE DESIGN DATA

5.1.1 VISUAL AND FUNCTIONAL COORDINATION OF SITE INFRASTRUCTURE

The designer is responsible for coordinating sitework components with all other design disciplines including, but not necessarily limited to, architectural, structural, electrical, lighting, communications, HVAC, and fire protection.

Plumbing and Civil drawings shall each cross-reference the specific sheet numbers that depict connection of plumbing lines to the water and sewer utilities design.

Civil drawings shall include profiles, diagrams, and/or sections through depot buildings showing continuous slope and drainage relationships between trainways, platforms, depot interior floors and parking areas.

All site grading elevations and surface utility locations (manholes, electrical boxes, site lighting, etc.) shall be provided with a table with Northing and Easting Data with the third column being a numbered system for each spot elevation, curb elevations, etc. on the design plans.

5.2 SITE AND EASEMENTS INVESTIGATION

5.2.1 UTILITIES

There are many aboveground and underground utilities commonly located near railroad facilities that must be identified and addressed in the design of Metra stations and parking facilities. Examples of these utilities include:

- Railroad communication and signal lines;
- Telephone and communication cables;
- Fiber optic lines;
- Natural gas and petroleum pipelines;
- Water transmission lines;
- Sanitary sewer interceptors;
- Fiber optic cables;
- Electrical cables;
- Telecommunications conduits; and
- Railroad PTC towers.

Other types of utilities found in Metra's multi-jurisdictional service area are controlled by state, municipalities, state, or county highway departments; drainage districts, water districts; and sanitary districts. Examples of facilities operated by these agencies may include:

- Storm and sanitary sewers;
- Field tiles;
- Water mains;
- Street lighting; and
- Traffic signals.

Some municipalities, such as Glencoe and Naperville, operate their own electric utilities.

Identification, location, and collection of data about buried utilities is known as Subsurface Utility Engineering (SUE). SUE data collection and reporting is to be performed by design professionals who are familiar with local conditions and stakeholders. Metra places this responsibility on the designer, except for certain Metra-provided information as noted below.

To assist designers carrying out SUE, Metra offers the following recommendations:

- For information within Metra's right-of-way, contact Metra's Real Estate Department as J.U.L.I.E. (or D.I.G.G.E.R. in Chicago) will not be able to provide utility information within these areas.
- If the proposed site construction involves railroad property, contact the Real Estate/Lease Department of the host railroad, as well as the Metra Communication and Signal Department, and request that any information that Metra may have regarding utilities be provided.
- Coordinate with ComEd for electric service in Illinois. This should be done early in the design phase, preferably shortly after the survey has been done and potential locations for electrical control cabinets have been identified. Comprehensive electrical load calculations must be completed by the 60% milestone submission to support coordination with ComEd if power supply upgrades are required for the project.
- During the various design stages, transmit copies of the plans to all affected utilities and agencies. Keep records of all communications.
- Review available property documents such as previous plans and plats of survey to identify easements. Consult Metra about property documents they may be available. Conduct property research through county recorder or other public records offices if required.
- Contact all utilities suspected to be in the project area and request that information on their facilities be marked on a preliminary plan of the project. Atlases should be provided if available. Collection of this data corresponds to SUE Level D. Keep a schedule of all utilities onsite, which shall include any that need to be extended or upsized, agency coordination and permitting required, and timeframes for relocation if required.
- Conduct a walking site survey for visual identification of possible utilities. This will bring the utility information to SUE Level C. Topographic surveys should include buried utility markings. Determine the agency jurisdiction of adjacent roadways and contact accordingly. Permitting, bonding, insurance, and design requirements should be determined.
- Public utility location services in Kenosha County, WI are available at Diggers Hotline 811 (www.diggershotline.com). Note that it is not customary for utility marking services to excavate to precisely determine depth of bury. Topographic survey of utilities marked on the surface in the field brings the SUE to Level B.

In some areas, utility locations on private property will need to be provided by a private utility locating service. This should be clarified when ordering utility locates using the above services.

Where critical to the design, have pertinent utility companies expose (pothole) their underground facilities, or plan for private utility locate services to provide this detail, known as SUE Level A. Engineering judgement should be used regarding the level of horizontal and vertical detail necessary to ensure that a particular utility is potentially in conflict with construction proposed.

5.2.2 GEOTECHNICAL

Geotechnical analysis is to be performed by registered engineering professionals who are familiar with local conditions. Metra places this responsibility on the designer, except for certain Metra-provided information as noted below. Soil borings should be performed for most projects to obtain sufficient information about the existing subsurface conditions. The scope of such borings and other investigations

should be determined by the designer and be approved by Metra. For small projects without substantial earthwork or structural foundation requirements, it may be appropriate to use available soils information from previous projects, including Metra records. An investigation should normally be performed, and any decision to not perform a soils investigation should be based on the engineer's understanding of the site and the complexity of the project. Metra shall be consulted if it is determined that soil borings are unnecessary

BUILDINGS:
A new building will generally require at least four borings at the outline of the building and a building expansion will require at least two borings at the limits of the expansion.

PARKING:
The number of borings in relation to the size of the proposed parking lot can be estimated as follows:

TABLE 5-1: RECOMMENDED QUANTITY OF SOIL BORINGS

No. of Borings	Proposed No. of Parking Spaces
5	1 to 100
7	100 to 300
9	300 to 600
11	600 to 1,000
13	1,000 to 1,500
15	1,500 to 2,000

If erratic or highly variable soil conditions are expected, additional borings may become necessary. A minimum of four borings are recommended since the cost of mobilizing equipment and personnel to a site makes up a majority of the expense in performing soils investigations for smaller project sites. The prior use of the land may dictate the level of investigation.

The minimum depth of the soil borings should be 10 feet. The boring depth may need to be greater if unusual soil conditions or planned excavation depths dictate otherwise. Borings should not be terminated in organic materials.

The rate of soil sampling, based on boring depth, should be at 2.5-foot intervals to a depth of 10 feet below ground surface and at 5-foot intervals thereafter. Split barrel sampling procedures should be employed for non-cohesive, cohesive, and miscellaneous fill materials. Shelby tube sampling procedures should be used where soft cohesive or organic soils are encountered.

Tests should include (among others):

- Soil tests for non-cohesive soils, density, and water content.
- Unconfined compressive strength or penetrometer tests for cohesive soils.
- Illinois Bearing Ratio (IBR) tests should be performed when required by local regulations or when parking lot sizes exceed 200 spaces.
- Plasticity index.
- Sample size gradation.

A subsurface investigation report should be performed under the direction of a Registered Professional Engineer in that state and should include as a minimum the following:

- Boring logs with soil classification and laboratory test results.

- Earthwork or site grading/preparation recommendations.
- Groundwater condition and dewatering recommendations as necessary.
- Recommended pavement designs.
- Recommendations for treatment and disposal of any unusual soil conditions.

If land acquisition is involved in a project, or if soil and/or site contamination is a concern, then an Environmental Site Assessment (ESA) may be required. An ESA may include additional soil borings and specific soil tests to determine if the site is “clean” or “contaminated.” If a potential source of soil contamination is next to the site, such as a gas station, then additional soil borings may be necessary to verify the soil is not contaminated, or to generally establish the limits of contamination for cost estimating purposes. Specific laboratory testing will be required to classify soils for removal and disposal at an appropriate landfill during construction.

5.2.3 EXISTING/SURROUNDING PHYSICAL SITE FEATURES

Conduct a comprehensive site assessment to identify and document influencing conditions and factors which can inform the site design. The inventory should include but not be limited to the following:

- Determination of prevailing seasonal wind directions to inform placement of shelter wind/rain screens and identify/anticipate snow drifting potential.
- Solar exposure of the site, and specifically, exposure to potential locations for platforms, plazas and customer waiting and circulation pathways.
- The local context including surrounding development. Identify adjacent land uses that warrant pedestrian connection, as well as those that should be screened from view of the rail site.
- Existing conditions which could present future security concerns. It may be appropriate to conduct interviews with local law enforcement to obtain a better understanding of local issues.
- Local pedestrian and bicycle origination and destination patterns on either established and/or informal pathways and strive to incorporate or accommodate those movements within the site plan.
- View sheds which may be important to preserve and or which contribute to the historic context of the site.
- Mature valuable existing woody vegetation suitable for preservation in place and smaller vegetation which might be relocated for future use.
- Prominent surface pathways and subsurface drainage structures for potential reuse and or alteration to develop BMP solutions for the site.
- History of local and site flooding both infrequent large events and short duration high-intensity rain events.

5.3 STORMWATER DRAINAGE AND DETENTION

5.3.1 DRAINAGE DESIGN

Positive stormwater drainage is a major factor in a successful project design. Pavement slopes should range from a minimum slope of 0.5% (along concrete gutters) to a maximum slope of 5%, with a 1.8% slope being desirable. Concrete slabs should be minimum 1% slope only if necessary. Bituminous pavement may be 1.5% only if necessary. Deviating from these minimum slopes shall be approved by Metra. Slopes in parking areas and site walkways must also comply with ADA requirements.

Provide underdrains whenever aggregate base courses are proposed on relatively impervious (clay or silt) subgrades or whenever the water table is within 3 feet of subgrade. The draining water from the sub-grade and base course reduces the risk of damage from frost heave or loss of sub-grade support to the

pavement as result of saturation. Underdrains can be as simple as several short lengths (i.e., 5-10 feet) extended from drainage structures, or more complex if existing conditions warrant longer lengths.

Identify the existing drainage patterns during design to maintain them as much as possible. The topographic survey should extend a minimum of 20 feet beyond the proposed improvement area to document drainage patterns both to and from the area of work. Maintain drainage from adjacent higher properties by rerouting around, passing under, or passing across the proposed lot without creating erosion, flooding, or icing conditions on the proposed or adjacent sites.

Tunnels under tracks shall have a drainage collection system that discharges to the municipal system if possible. 100-yr High Water Levels (HWLs) for municipal drainage systems are generally within 12” of the street elevation, therefore a sump pump discharge should be provided for the tunnel to prevent back-up of floodwaters from the municipal system into the tunnel. The sump pump system shall be a duplex system, with each pump sized to adequately drain the tunnel. If the tunnel is the only way to cross the tracks, a second power supply should be considered. See Chapter 4 for additional information.

Size the storm sewer collection system for the storm frequency required by the local jurisdiction, typically a 10-year storm. Perform a calculation for the 100-year storm HWL to ensure it is no more than 10” deep, using an overflow route that will be accessed at the HWL to keep close to that level in the event that drains are plugged. This calculation is required even if stormwater detention is not needed on the project.

Provide stormwater detention only if required by local ordinance. Common methods include separate grassed or paved basins, underground oversized pipe(s) or chambers, subsurface drainage using bioswales or infiltration fields, and containment on the surface of the proposed parking lot. A combination of these methods can be considered to minimize costs. Restrictors under 6” in diameter are not desirable.

An underground stormwater storage system may maximize available space, but at a high cost. Permeable pavement may also be considered, though the cost and maintenance considerations shall also be included in the evaluation. Storage of stormwater on the surface of the parking lot is only recommended if no other storage area is available or the costs of the other alternatives are too high. For parking lot storage, use a maximum ponding depth of 10” and locate outside of the driving aisles.

Many stormwater management regulations require retention of runoff from the “first flush”, usually between 1/2” to 1” of runoff from a given portion of the site. These regulations often differentiate this requirement for the portion of a site that is being developed or redeveloped. Understand and evaluate the implications of this during the early design stages. See Appendix for design diagrams.

5.3.2 FLOODPLAIN AND WETLANDS

Indicate existing floodplains and/or wetlands impacted by the proposed parking lot and describe mitigation efforts in accordance with the local ordinance and coordinated with the drainage design. Since the 100-year HWL of the floodplain cannot be changed, this analysis is critical to the use of the site. Design to avoid, minimize or mitigate impacts to wetlands if they exist on the project site.

5.3.3 EROSION AND SEDIMENT CONTROL

Include provisions for the control of soil erosion and sedimentation, hereafter referred to as the ESC plans. The local agency will provide additional information for the local office that will conduct this review, which is often the county Soil and Water Conservation District (SWCD).

A Stormwater Pollution Prevention Plan (SWPPP) shall be supplied for projects that affect more than 1 acre to comply with IL R10 NPDES (National Pollution Discharge Elimination System) regulations.

A Notice of Intent (NOI) is submitted to the IEPA NPDES program offices, which includes the ESC plans and narrative regarding means of monitoring the ESC system.

In Wisconsin, the Department of Natural Resources regulates erosion and sediment control under Chapter NR 216, Storm Water Discharge Permits.

5.3.4 INTERTRACK DRAINAGE

Intertrack drainage under and across platforms is required at stations with two or more platforms since there are no drainage ditches when tracks pass between the platforms. The underdrains are typically 8-inch diameter perforated asphalt-coated corrugated pipe, though other materials are acceptable upon approval by Metra. All perforated underdrains shall be sleeved to prevent fines from entering the system. Catch basins, spaced approximately every 200 feet, are typically 36-inch diameter, asphalt-coated corrugated steel pipe with a poured in place concrete base and an open steel frame and grate. Any lateral or outfall pipe shall be asphalt-coated corrugated steel pipe of the appropriate size. Coordinate placement of drains and pipe with the intertrack fencing.

5.4 PLATFORM ACCESS

5.4.1 RAMPS

Ramps are required for ADA compliance and encouraged to make access easier for individuals with mobility issues. Existing non-conforming ramps should be considered for modification or reconstruction to meet ADA requirements. Curb ramps should be designed to a maximum slope of 1:13 to give the contractor a margin of error when building the ramp. Where possible, consider increasing the size of landings and length of ramps to provide construction tolerances.

Include trench drains to capture drainage. Trench drains may be needed where significant drainage areas are tributary to a long ramp. In those applications where switch back ramp configurations are used, placement of trench drains is preferred along the outside edges of the ramp or landing surfaces to avoid interrupting primary path of travel. Consider covered or heated ramps in lieu of elevators where possible to alleviate elevator service downtime and maintenance costs.

5.4.2 SIDEWALKS

Sidewalks shall be provided to allow direct access from the parking lots and adjoining ROWs to the platform. Metra stations are to be accessible by pedestrians primarily through an internal at-grade sidewalk network which meets ADA requirements for minimal width, cross and longitudinal slopes etc. as noted in Chapter 7 Accessibility. The use of stairs, ramps, and elevators to augment the at-grade sidewalk system are noted above.

Sidewalks at Metra station sites shall be a minimum of 6’ wide and preferably constructed of poured-in-place Portland cement concrete pavement with natural color and a broom surface finish. Walkway widths should be increased in size to 8’ or 10’ widths at major circulation points to accommodate peak hour pedestrian volumes. Widened sidewalks should be used at locations adjacent to depot entrances, warming houses, and track crossings. The widening of sidewalks should also be evaluated where they are adjacent to on-site intermodal transfer points, pay stations, bicycle racks and Kiss & Ride drop off plazas. At a minimum, the expanded sidewalk width should accommodate the free passage of two pedestrians’ shoulder-to-shoulder moving in the same direction without intersecting the waiting customers at intermodal or Kiss & Ride plaza, patrons in line at pay stations or patrons securing bicycles or scooters to bike racks. At some stations the sidewalk width might need to include the passage of two pedestrians’ shoulder-to-shoulder in both directions plus the reserve space for the waiting and or arriving intermodal or

Kiss & Ride customers. The width of sidewalk should be determined on a case- by-case basis using best practice criteria in discussion with Metra design staff and relevant successful sidewalk widths from other stations with similar customer volumes.

Alternative pavements such as stamped and colored concrete, brick and or concrete pavers may also be used for sidewalk surfaces if the cost differential for installation and ongoing maintenance is provided by a local partner. Asphalt pavement is not preferred for onsite sidewalk system use.

5.4.3 STAIRS

Existing wood stairways used as access to platforms may remain in use if in good condition but should be considered for replacement. Wood stairs at low ridership stations are acceptable.

New exterior stairs should be of concrete or concrete and steel construction and may be furnished with internal heat (electric or glycol systems), a canopy or other protective cover. Open risers are not permitted. Where visibility under the stair is desirable, a perforated riser with an open area not exceeding 50% is acceptable.

Consider including a narrow runnel or ramp for bicycles at the edge of stairways and beneath the handrail to allow cyclists to roll their bike along this ramp instead of carrying it up and down stairs. Where provided, locate these on both sides of a stairway.

5.4.4 ELEVATORS AND ESCALATORS

When platform access cannot reasonably be provided with ramps, include elevators. Locate adjacent to the platform's main access point. Existing elevators may remain in use if they are in serviceable conditions and meet the requirements for handicapped access. Elevator lobbies should be heated and enclosed from weather. Elevator control rooms must be conditioned in accordance with manufacturers recommendations. See Chapter **Error! Reference source not found. Error! Reference source not found.** and Section 9.13 Division 14 – Conveying Systems for more information on elevators.

Escalators, if any, shall be provided based on Metra PM guidance. In general, stairs are preferable to escalators except at locations with vertical rise greater than 25 feet, and/or high-volume stations.

5.5 TRACK CROSSINGS

5.5.1 REGULATORY REQUIREMENTS

The Illinois Commerce Commission (ICC) has regulatory approval over all railroad pedestrian and vehicular crossings. Any station project located within 500 feet of a grade crossing should include the ICC as a project stakeholder from the earliest stages of design.

At-grade street and highway crossings shall conform to the requirements contained in the US DOT's "Manual on Uniform Traffic Control Devices for Streets and Highways". All street or highway at-grade crossings are subject to the required DOT approval process for State Highways, Counties for County roads or municipality for local streets. Slopes to at-grade crossings shall comply with grades to curb ramps. For crossings within the city of Chicago consult CDOT "Complete Streets" regulations. Representative(s) of the Metra Signal Engineering staff should be included as a stakeholder in the earliest stages of the design process.

5.5.2 CROSSING CONSTRUCTION

Crossings shall be 12 to 16 feet wide and constructed of non-skid composite surfacing affixed to treated lumber. Where Metra employees need to use a pedestrian crossing to drive a snowplow pick-up truck across the tracks, a 16-foot-wide crosswalk shall be designed. Use ADA-compliant rail seal material at tracks to reduce the rail wheel flange gap distance. The crossing shall extend from the face of one platform to the face of the opposite platform at the same elevation as the top of rail. The platforms shall be ramped down to the crossing with slopes that are ADA compliant. Due to the sloped surfaces at pedestrian grade crossings, crossing locations must be coordinated with rolling stock so that they do not foul train access doors.

5.6 AT-GRADE PEDESTRIAN CROSSINGS

New and replacement stations shall be designed to minimize the need for track crossings. Crossings shall be planned to provide access between station structures, platforms, parking areas, access points, Kiss & Ride, and bus connections.

Pedestrian track crossings also connect platforms at stations. Where feasible, intertrack fencing as described in Section 5.7 should be provided to direct pedestrians to defined crossing areas. The layout of the pedestrian network must consider the path of travel to the platform from the adjacent site and or community connection points. Access paths to depots or parking areas must not lead directly to at-grade track crossings; rather, they should be staggered to discourage pedestrians from running across the tracks. The access route should be configured to force pedestrians to face oncoming train traffic (assuming normal direction of traffic) before crossing the tracks, and to look both ways before crossing the tracks. Additionally, the layout of pedestrian paths which provide direct access to platforms from adjacent parking and station site areas should be staggered to prevent errant use by vehicles or reduce the attraction for use by extreme sports such as skateboarding.

The quantity and locations of at-grade pedestrian crossings will be evaluated as part of any station improvement or rehabilitation program. Existing at-grade crossings in good condition may remain in use, and rehabilitation of such crossings shall be included in the project scope. If one at-grade crossing is provided, the crossing should be located near the depot, but not next to it. If two at-grade crossings are provided, one crossing shall be located near the depot and the other crossings shall be located at the furthest one-third point of the platform. Designers shall coordinate with Metra to ensure that host railroad requirements are addressed in design of at-grade crossings.

In most cases, at grade pedestrian crossings are constructed and/or removed by railroad employees.

5.7 GRADE-SEPARATED PEDESTRIAN CROSSINGS

Only one grade-separated crossing at a station is preferred. Grade-separated crossings should be central to the station building and platforms, to parking areas, streets, and other access points. Secondary grade-separated crossings may be provided where justified by ridership volume, platform length, and/or site conditions.

Site conditions and station design will determine whether grade-separated crossings are needed or desirable. Wherever possible, existing street tunnels and overpasses shall be used for grade-separated pedestrian crossings. Tunnels are preferred. The construction of a pedestrian tunnel at a station will be determined on a case-by-case basis. The location of crossings should not be lined up with depot doors or staircases. At grade pedestrian crossings also include those integrated with the adjacent street crossings and may have their own cross section as compared to the platform-to-platform crossings.

5.7.1 TUNNELS

PLANNING CONSIDERATIONS: Visibility into tunnels from adjacent streets or from ticket agent offices is desirable. Tunnel access points should be directly visible from the streets or ticket agent offices. Tunnels and approaches shall be straight runs without corners or curves. Waterproof tunnels against hydrostatic pressure. Joints at casing pipes or sheet piling shall be welded.

Existing Tunnels that do not meet the requirements for safety, security, and control or are avoided by pedestrians because of poor sanitation or drainage conditions should be modified, rehabilitated or restored. If these deficiencies cannot be properly addressed, the tunnel should be abandoned and securely sealed against access. Existing tunnels with corners or curves shall be equipped with vandal-resistant security mirrors at blind spots until as alternate method of crossing is implemented.

Drainage for tunnels is generally provided with a discharge to a municipal system. The high-water level (HWL) in the municipal system is oftentimes near the level of the street, necessitating a sump pump system that will isolate the tunnel from the HWL.

5.7.2 MATERIALS

See Section 9 Materials, Products, & Performance Standards for further information.

Under passes/tunnels shall be considered utilitarian areas with limited decorative finishes. Reinforced concrete shall be used for tunnels. Wall and ceiling surfaces should have a high performance, non-penetrable, anti-graffiti coating. Vandal resistant wall finishes such as tile or other decorative, yet cost-effective options are also acceptable. Consider panelized and removable finishes to allow for inspection of substrate.

DIMENSIONS:
Tunnels shall have a minimum clear width of 8 feet at the floor. While 10 feet is preferred, a minimum clear height of 9 feet is acceptable. No change to the cross-sections of existing underpasses is required, but all new designs shall conform to these minimum dimensions.

FLOORS & DRAINAGE:
Tunnel floors shall be sloped to drains; excessively steep slopes are to be avoided. An ADA compliant path shall be provided to and within the tunnel. Provide floor drains to eliminate running or standing water and to reduce excessive dampness. Provide trench drains along the side walls of the tunnel and tied into municipal storm drainage systems wherever possible.

VENTILATION:
Provide ventilation systems in tunnels to improve air circulation and reduce dampness.

ENTRANCES:
Underpasses entered from platforms or other exterior locations should have an enclosure or overhead protection at such entrances to prevent rain and surface water from infiltrating tunnels.

VERTICAL ACCESS:
Access to the tunnels should be carefully planned and include covered accessible stairs and/or ramps wherever possible. Covered ramps are preferable to elevators due to the advantages of continuous service (lack of downtime/maintenance) and user capacity.

5.7.3 OVERPASSES

PLANNING CONSIDERATIONS:
New overpasses should be considered for use only where the requirements for a pedestrian tunnel cannot be met, if a grade separated crossing is requested. Design of overpasses shall be carefully planned and coordinated between all railroads and stakeholders to ensure that operational requirements and regulations are met. Requirements of each host railroad including vertical clearances, signal redesign, service disruption, flagging, and work hours must be understood in the planning and design process.

Visibility into overpasses from adjacent streets is highly desirable. As a minimum, overpass access points should be directly visible from the streets, depot, or platforms. Overpasses shall be straight runs without corners or curves.

5.7.4 MATERIALS

See Section 9 Materials, Products, & Performance Standards for further information.

Steel framing is preferred for overpass superstructures in lieu of reinforced concrete. Overpasses should be covered for weather protection. Overpass roofing shall be pre-formed, prefinished metal roofing panels. Roofs shall be pitched for drainage. Overpass flooring can be reinforced concrete on metal deck, precast, composite systems or a different system if reviewed and approved by Metra. Sides and ends shall be enclosed with safety glazing material or metal screening. Overpass glazing should be designed so that the glazing can safely be removed and replaced from the overpass floor.

CLEARANCES:
Clearance from top of rail to the underside of overpasses shall exceed the minimum requirements as specified in writing by Metra Operations or by the owner railroad by 3 inches to allow for future track raises.

Existing overpasses that do not meet the requirements for security and control or are in poor condition should be rehabilitated or restored. If these overpasses cannot be restored, they should be demolished. It is recommended that overpasses with corners or curves shall be equipped with vandal-resistant security mirrors at blind spots.

DIMENSIONS:
Overpasses shall have a minimum clear width of 10 feet at the floor and a preferred minimum clear height of 9 feet. No change to the cross-sections of existing overpasses is required, but all new designs shall conform to these minimum dimensions.

PROTECTION, ENCLOSURES & VISIBILITY:
Overpasses and connecting vertical circulation should be furnished with a canopy or other protective cover for their entire length, unless otherwise directed by Metra. Enclosures should have large areas of clear glazing for direct surveillance. Glazing shall be designed for easy maintenance from the inside of the overpass walkway. Overpasses with open sides shall have protective railings and be equipped with fences with non-laddered pattern on both sides, minimum 4’ height that should be increased to 6’ high if the crossing is used as a bike path. Provide floors with a crown for drainage leading to trench drains along the sidewalls. Provide floor drains and connect to municipal storm drainage systems wherever possible.

OVERPASS ENTRANCES:
Overpasses entered from platforms or other exterior locations shall have an enclosure or overhead protection at such entrances to prevent rain and surface water from infiltrating lobbies/landings.

VERTICAL ACCESS:
Access to the overpasses should be carefully planned and include ramps or elevators for accessibility, and covered stairs wherever possible. Existing overpasses that are not accessible to individuals with disabilities shall be modified as required to provide ADA compliance.

OVERPASS LIGHTING:
Overpass lighting fixtures shall be similar to canopy fixtures in design and coordinated with the structural bays of the overpass roofing system. Fixture selections shall be vandal proof and rated for damp areas. Lamp types should be selected for durability and light quality. Fixtures should be wired alternately on multiple circuits to prevent complete loss of lighting overall or in one area.

5.7.5 REMOTE SURVEILLANCE

Remote surveillance of crossings, overpasses, and especially tunnels shall be provided and monitored on a case-by-case basis. Station elevators shall be monitored.

5.8 INTERTRACK FENCING

5.8.1 LOCATION

Provide an intertrack fence at stations served by two or more tracks to prevent track crossing except at controlled locations. Place fencing at the centerline between the two tracks. Fencing location takes priority over locations for intertrack drainage structures. Ability to locate fencing will depend on track conditions, track separation distance, grade crossings and curves. A minimum 13’-6” track separation is needed for intertrack fencing.

5.8.2 LENGTH

Except for stations served by Amtrak, intertrack fences should extend a minimum of 100 feet beyond each end of the platforms where feasible. Where platforms are staggered or are of unequal length, intertrack fencing shall extend a minimum of 50 feet beyond the longer platform. Intertrack fence requirements at Amtrak stations are similar, except those fences shall extend 200 feet.

5.8.3 HEIGHT

Except for stations served by Amtrak, intertrack fence height shall be 4’-6” above the top of rail. Lower fences may be installed only with written permission of the Metra PM. Intertrack fence height at Amtrak stations shall be 4’-0” above the top of rail.

5.8.4 MATERIAL

Intertrack fencing shall comprise four strands of tensile wire with galvanized steel posts, 10 feet on center. Signage shall be provided on both sides at ends of fence and end of platform. Refer to Metra Station Sign Program Specification for details.

5.8.5 EXISTING INTERTRACK FENCING

Existing intertrack fencing not in compliance with Section 5.8 Intertrack Fencing shall be replaced with Metra's standard intertrack fence as part of platform or station reconstruction projects.

5.9 STATION ACCESS AND SITE CIRCULATION

5.9.1 GENERAL

Rail stations have a variety of access modes including pedestrian, bicycle, bus, taxi, auto drop-off /pick-up and park/ride. Some stations may accommodate all of these access modes, while others have only one or two.

The success of a station and parking design is in large part achieved through thoughtful planning and layout of the site which establishes conflict-free circulation patterns and clear transitions between the various modes of access/transport on the site and to and from the waiting areas and platforms.

The internal vehicular roadway system should be developed with adequate lane sizes, turning radii and staging/drop-off areas for safe operation of the transportation modes, operations and maintenance vehicles anticipated on the site.

The pedestrian circulation network should be developed to safely provide conflict-free pathways from bus drops, parking, kiss & ride, bicycle parking, and the off-site public way to the depots and platform areas. Walk widths should be sized to accommodate the anticipated volumes of customers increasing in width adjacent to the station's drop areas and platforms. If dedicated bike routes are located adjacent to the site, consider continuing them to/from the on- site bicycle parking areas.

5.9.2 ON-SITE CIRCULATION HIERARCHY

The establishment of efficient and conflict-free site circulation systems is necessary for optimal and equitable operation. To accomplish this, the layout of a new station or rehabilitation of an existing site should respect a hierarchy of circulation among the various users. As a departure for the design, the site circulation network should accommodate access to the station entrances by the users listed below in the following order of importance. In addition, Origin/Destination data for the affected station may be available from Metra's Strategic Planning and Performance Department. The current use and future plans for a station could inform the circulation hierarchy.

1. Pedestrians.
2. Bicycles, bike share, e-scooters.
3. Transit Buses.
4. Kiss & Ride, Ride Share/Taxi (such as Lyft and Uber).
5. Commuter vehicle parking spaces.

5.9.3 EMERGENCY VEHICLE ACCESS

In addition to the day-to-day circulation noted above, it is essential that station access and interior roadways provide a clear and adequately sized pathway for emergency vehicles such as fire trucks, ambulance, law enforcement, and utility response vehicles. The pedestrian circulation system should also allow easy access to any locations for emergency response teams carrying light gear or mobile gurneys.

5.9.4 SITE DESIGN OBJECTIVES WITHIN THE PUBLIC REALM

Beyond the establishment of the circulation system described above, the primary objectives of the site design are to maximize commuter parking capacity, allocate sufficient space for the other necessary site elements, and facilitate customer convenience and user safety while keeping maintenance obligations as low as possible. Establishing a comprehensive wayfinding system on each site will aid in the efficient use of, and movement of both vehicles and pedestrians to and from and within the site. Use the Metra Station Sign Program Specification for planning and implementing wayfinding on Metra sites. An additional objective is to integrate the facility into the context of the local community in which it is located. The vehicle and pedestrian circulation systems described above provide the organizational infrastructure upon which all other site elements are supported and made available to the customer. These include but are not limited to the following:

ARRIVAL PLAZA:
The arrival plaza provides a paved pedestrian space for arrival, transfer and waiting of customers using various forms of transport proximate to the public, non-track side of the station site. Sites without a centralized access point to the track facilities may not need to provide the arrival plaza.

INTERMODAL TRANSFERS:
This may vary from a single stop and simple shelter, with shared access within the Metra site roadway, to stand-alone end of line bus platform/staging and waiting area with support facilities on an adjacent site. Where local/regional transit agencies desire to have a major presence within or adjacent to a Metra facility, a greater level of interaction and development may be warranted. This determination is to be made on a site-by-site basis at the earliest phases of planning and program development to ensure the transit functions are incorporated into the overall site planning and design of the station.

TAXI / RIDE SHARE / KISS & RIDE:
Dedicated drop areas for secondary non-mass transit to and from the facility.

CUSTOMER COMMUTER VEHICLE PARKING:
Dedicated fee parking areas.

MOTORCYCLE PARKING AREAS:
Provide with dedicated fee parking areas. The layout should create a flow pattern for patrons to easily search for and locate an available parking space.

BICYCLE, E-SCOOTER, BIKE SHARE PARKING:
Dedicated on-site parking areas for lightweight vehicles.

FEE COLLECTION:
Stand-alone shelters with 3 or 3 ½ sides which house and protect fee collection boxes from the weather. The shelters should have an LED light mounted to the ceiling. The location of the shelter openings and fee collection machine shall accommodate ADA requirements. The finished surface of the shelter slab should have minimum of 1% slope to provide positive drainage of water out of the shelter. The slab leading up the shelter should be sized to accommodate the anticipated number of queuing customers and not block through circulation on the adjacent sidewalk.

NEWS / ADVERTISEMENT BOXES:
Dedicated paved pads which allow for the organized vendor provided/placed and securement of boxes for newspaper and advertisements. See Appendix for design diagrams.

GREEN SPACE:
Unpaved spaces within and surrounding the site which provide the opportunity for plantings which may include turf, trees, shrubs, for screening, shade, softening of edges, erosion control and contribution to stormwater management systems. Plantings provided beyond those required by local ordinance should be limited.

ROADWAY CONNECTIONS:
The connection of parking facility and access to the depots from the adjacent roadway system needs to be coordinated with and incorporated into the site design for ease of access to and from adjacent roadway infrastructure.

CUSTOMER EXPERIENCE CONSIDERATIONS:
Providing touch free paths to trains where possible, phone charging stations, ledges to place beverages, reduce visual clutter by eliminating and consolidating signage, eliminate opportunities for birds to nest and roost over platform and or pedestrian areas and provide multiple types of indoor and outdoor waiting areas with seating, wind screens and overhead protection.

The purposeful layout of the site design and the consistent application of these standards will reinforce the Metra brand by providing a consistent customer experience. A consistent customer experience also lessens travel anxiety and encourages customers to use stations they may be less familiar with, thereby bolstering ridership. The use of aesthetically pleasing contextually appropriate and durable materials will ultimately result in higher-quality facilities and lower overall operations and maintenance costs.

5.9.5 PARKING PLANNING CRITERIA

The design of parking at new stations shall be based upon the number of parking stalls required on projected cumulative AM boarding counts for the next ten years. Replacement and existing stations shall base required number of parking stalls on ridership studies prepared by Metra's Division of Strategic Planning and Performance. Parking at both new and or existing sites must also consider the land ownership and or lease agreements at that location. At some stations expanded surface parking may not be possible. The parking areas should be configured to provide the most direct pedestrian access from the parking to the depot and or platform. Where adequate space is available, on long narrow sites provide parallel dedicated pedestrian walkways along the parking perimeter adjacent to the track side of the parking lot.

In locations where parking areas are larger, and parking is often configured in rows perpendicular (site dependent) to the track and platforms. Regardless of orientation, provide a dedicated pedestrian path through the parking area leading to the platform and or station at every 300 linear feet of parking lot length. The walk path may be combined with islands at the ends of drive lanes as appropriate. Pedestrian access paths connecting platforms and depots to parking areas should be offset from internal parking lot drive aisles. In an attempt to control commuter behavior when crossing tracks, Commuters shall NOT have a direct route to cross the tracks from the depot or access walkway from the parking lot or station sidewalks. This diversion of walk path is intended to make the track crossing a more deliberate movement on the part of the customer which will increase the likelihood they will look both ways before entering and crossing the tracks.

At stations where parking is provided in a location not adjacent to the depot and platforms, the parking ideally should be located within line of sight of the station and the path to the station include a comprehensive wayfinding system.

5.9.6 BICYCLE RACKS

Bicycle racks may be provided at rail stations. The number of rack spaces and reserve space for future use will be determined by Metra planning staff in close coordination with local municipalities and provided to the design team. At some stations, the demand for bicycle parking may exceed the space available. When this is the case, placement of bike racks along adjacent public sidewalks may be necessary. The design team will need to coordinate the placement of bicycle racks on municipal sidewalks with the local jurisdiction. Bike racks should be thoughtfully placed on-site such that when bicycles are parked in the rack(s)m they will not reduce the or obstruct the adjacent sidewalk path width.

It is preferred, but not required, that an overhead canopy structure be provided for bike rack areas located on Metra sites. The required bicycle rack is the CDOT inverted “U” style tubular metal rack. See Appendix for design diagrams.

Bicycle parking pads should be integrated into the overall site design providing a high level of public supervision to discourage theft and vandalism of bicycles and accessories while parked at the station. The bicycle parking areas should be located as close to the platforms as possible and placed to avoid conflicts with other nodes of transfer such as Kiss & Ride, local bus stops, and on-demand ride drop-off areas as well as on-site pedestrian circulation networks. Signage should be posted indicating the point on site where skating or riding is no longer allowed.

The AASHTO Guide for the Development of Bicycle Facilities may provide addition information relevant to the planning and design of bicycle circulation and facilities. See Section 9.4.4 Bicycle Racks for more information and the Appendix for design diagrams.

5.9.7 BICYCLE LOCKERS

Due to security concerns, bicycle lockers are not permitted on Metra sites.

5.10 PARTNER-FUNDED SITE ENHANCEMENTS

In some communities, local partners may request to fund design, construction, operation, and maintenance of enhanced site treatments at a new and/or renovated station. This may be of particular importance where a facility is an integral part of the community’s streetscape, business and/or retail center. In these locations, additional elements that may be included in station and parking site design may include but are not limited to the following:

- Enhanced Landscape Plantings (see Section 5.11).
- Flagpole(s) and night lighting.
- Memorial plaques and or local/regional historic monuments.
- Decorative landscape fountains.
- Streetscape scale clocks and pylon.
- Informational kiosks.
- Decorative light fixtures/poles.
- Site furnishings.
- Municipal sculpture.
- Wall mural(s).
- Decorative paving within the pedestrian walks and arrival plaza.
- Overhead parking canopy with or without solar collection devices.
- Recycling collection containers.

The inclusion of these elements may be made on a case-by-case basis as agreed upon by Metra and the local partners.

5.11 BENEFITS OF ENHANCED LANDSCAPE PLANTINGS

Well-planned, properly maintained landscaping of the station and parking sites will create an attractive atmosphere for passengers and the community. Planting and landscaping materials can be decorative and functional and used to provide visual screening from/to adjacent properties, shape, and define large parking areas, stabilize slopes and embankments, and provide shade and weather protection for parking and pedestrian walkway systems. Landscaping can soften the visual effect of a parking facility and help integrate and buffer this use with the surrounding land uses. It can also be used to control pedestrian movement.

5.12 EXISTING PLANT AND LANDSCAPE MATERIAL

Where existing trees, shrubs, ground cover, and other landscape materials are a part of a civic setting for a station, the landscaping and other materials shall be restored and maintained. Such landscaping may include existing lighting standards, signage, and walks. See applicable design standards for new lighting and sidewalk features.

On new and or sites to be renovated, prepare an inventory of the existing plant materials to assess and document the benefits and hazards of exiting planting. The inventory should identify:

- Woody plantings which are in good condition, do not or will not hinder views from and or to the track and are suitable of preservation, protection, and incorporation into the design in their current locations.
- Woody plantings which are in good condition and of appropriate size and suitable for transplantation and incorporation into the design.
- Woody plantings which are diseased, have limited remaining life span, are in poor condition, invasive, weak wooded and or present a hazard shall be identified for removal.
- Perennial plantings of hardy species in good health which may be preserved and or considered for incorporation into the design via transplantation

The landscape design should incorporate the findings from the above site investigation and to the extent possible into the site plans for the site.

5.13 PLANT SELECTION CONSIDERATIONS

Plantings shall be carefully selected for appropriateness for the function and location in which they are to be placed. For a summary of selection criteria and a list of acceptable plantings See Chapter 8.1.6. When selecting plantings, note that the ICC requires the Railroad Right-of-Way to be clear of brush, shrubbery, trees, and weeds for a distance of at least 500 feet each way from every vehicular or pedestrian grade crossing where such things would materially obscure the view of approaching trains to travelers on the grade crossing. For more information see:
https://www.ilga.gov/commission/jcar/admincode/092/092015350C02050R.html.

5.14 LANDSCAPE PLANTINGS

The use of both trees and shrubs shall be limited to the type, quantity and locations required to meet local zoning ordinance. If additional plantings of any type are requested by the local government beyond those

needed to meet zoning requirements, a maintenance agreement shall be in place with the local government for the future care of the additional plantings prior to bidding of the improvements.

Beyond the plantings required by local zoning, the use of landscape plantings is to be minimized for the following reasons:

- Metra does not have sufficient staff or resources to maintain extensive landscape plantings
- The vast amounts of deicing materials used for winter maintenance of pavements (primarily salt) cause damage and death to plantings creating additional landscape maintenance issues.
- Maintenance of open views to and from the rail corridor and between depot and parking facilities are essential to the efficient operations of the track and site.

5.15 EMBANKMENTS AND DRAINAGE SWALES

Embankments shall be stabilized with low maintenance planting materials that will prevent erosion and the growth of weeds and underbrush. The plantings at mature height shall not create unsafe sight distance issues for facility patrons or rail operations or inhibit normal maintenance activities such as snow removal. Within drainage swales select seed mixes which have demonstrated success in moist and intermittent flooded conditions.

5.16 TURF GRASS AND SEEDING

All areas not paved or otherwise developed with hardscape shall be seeded with salt tolerant turf type grass species.

In some locations it may be more economical and result in less disruption to facility operations to install sod in smaller lawn areas. When this is appropriate, prepare the seed bed in similar fashion and install a turf grass sod with similar turf grass species composition as the turf seed.

See Section 5.23 Site Preparation for Planting. See Chapter 8.1.6 for for Seed/Sod Mix.

5.17 PERENNIAL PLANTINGS

The use of perennial plantings shall be reserved for at grade or raised planter areas adjacent to the depot buildings and when used should provide a splash of seasonal color from flower and or leaf. Perennial plantings shall be salt tolerant and located a minimum of 3 feet away from the edge of a paved walk and or plaza.

Spacing of perennial plants within the planting bed shall be based upon the anticipated growth of four to five years or a minimum separation of 2 feet between plants whichever is greater. The objective is to provide adequate space for perennials plants to grow and expand for a minimum of four growing seasons before thinning and or division is required.

Landscape fabric should be installed beneath mulched perennial beds to reduce weed growth and maintenance. See Chapter 8.1.6 for acceptable perennial plantings.

5.18 SHRUB PLANTINGS

The use of shrubs shall be limited to areas adjacent to and proximate to depot buildings or along property perimeters as screening. Where deciduous shrubs are used, they shall be held away from a walkway and or plaza by a minimum of 6 feet.

The use of evergreen shrubs shall be very limited and located a minimum of 8 feet away from a paved walk and or plaza edge. Evergreen shrubs shall not be placed within or at the perimeter parking lot islands, access roadways or where snow storage may occur.

At a minimum, the center-to-center planting spacing between shrubs shall equal one half the diameter of the mature size of the plant so that crowding of plantings is avoided.

In locations where shrub plantings may be adjacent to walks, the planting area may be separated from the sidewalk with decorative pavers to protect the plantings from salt spray. The paver strip would ideally drain back to the sidewalk keeping salt intrusion in the planting bed.

In no instance shall the placement of shrub plantings block the view of motorists, bicyclists or pedestrians traveling to from or within the Metra site. Shrubs shall not overhang the platform envelope or obstruct the view to the rail corridor, digital or wayfinding signs or lighting.

Provide landscape fabric beneath mulched shrub beds to reduce weed growth and maintenance.

See Section 5.21 Screening. See Chapter 8.1.6 for acceptable shrub plantings.

5.19 TREE PLANTINGS

Deciduous shade and ornamental flowering trees may be used which have demonstrated success in urban and hostile environments and do not drop fruits or seeds.

All deciduous trees shall be located a minimum 10 feet away from a paved walkway or plaza and 15 feet from the edge of a parking and or access roadway.

The use of evergreen trees is to be very limited as they are easily susceptible to damage and death from the deicing materials used on Metra sites. All evergreen trees shall be located a minimum of 10 feet from a paved walkway or plaza and 15 feet from the edge of a parking and or access roadway.

All trees shall be placed a minimum of 25 feet away from buildings as well as parking lot lights.

Tree placement shall not obstruct the engineer’s view to and from the track or the motorists view of entrance egress or circulation pathways within the site. Tree shall not overhang the platform envelope or obstruct the view to the rail corridor, digital or wayfinding signs, or lighting.

See Section 5.21 Screening. See Chapter 8.1.6 for acceptable tree plantings.

5.20 UNPAVED GROUND SURFACES

Landscape materials such as brick pavers may be used to cover unpaved horizontal surfaces. Use of paving brick set in sand beds is preferred over grass for smaller non-parking areas as this provides a place for water to percolate into the soil. In areas where there is a likelihood a vehicle may cross over the

paver area; the paving subbase shall be increased in depth to provide adequate capacity to support the vehicle load to prevent damage to the pavement surface.

On unpaved surfaces subject to damage, the use of landscape material should be avoided. Turf with a combination of plantings, is considered desirable for moderate to large unpaved surfaces.

Low maintenance groundcovers used with shredded hardwood mulch is desirable for areas of smaller areas near the depot. Shredded hardwood and stone mulch can be used for areas next to platforms in lieu of planted spaces since plantings can be exposed to deicing salt and damaged.

5.21 SCREENING

Parking areas shall be screened from adjacent residential and civic areas. Plants selected for screening shall attain a sufficient mature height and density to block views and protect the privacy of neighboring parcels. Decorative screening material and fencing may be used where appropriate to supplement planting. Landscaping in ten-foot-wide buffer zones is desirable. Screening and buffer zones shall comply with applicable municipal requirements.

When placing screening plantings on the perimeter of the site, confirm that all sight distances to and from the train engineer are met and no visual obstruction will occur over the normal life expectance of the plantings. Screen plantings away from the track corridor shall be positioned to prevent blind and or unsafe conditions for pedestrians and connecting to local walkway systems and for locations where motorists view to on, or off site might roadway and pedestrian crossing be adversely affected.

Trees planted behind the platforms shall be located so that at maturity, the tree does not block the engineer's view of the platform. Landscape design shall reflect the requirements of the Illinois Commerce Commission of a 500-foot clear line of site at grade crossings, including pedestrian crosswalks.

Consider the use of ivy to soften large masonry or concrete walls and to provide a graffiti deterrent.

5.22 LANDSCAPE PLANTERS

At-grade native soil planter areas are preferred. Raised landscape planters and pots shall be reserved for conditions where other alternatives are not possible, or as a means to provide pedestrian control and protection from adjacent vehicle paths. If raised planters and pots are used, identify watering provisions in the maintenance plan.

5.23 SITE PREPARATION FOR PLANTING

Prior to final grading of the site, all areas to receive landscaping and planting shall be thoroughly cleaned of construction debris, naturally occurring rocks over 2-inches diameter, washout, waste or broken concrete, aggregate subbase material, dead plant materials and root systems to a depth of 24 inches. The existing site soil to remain in landscape areas shall be a friable moderately to well-drained soil suitable for plant growth. Imported topsoil shall be tested for texture, fertility and pH characteristics and modified with amendments as needed to provide optimal drainage and growing medium Areas to receive woody plantings shall have acceptable soil no less than 24 inches deep after placement of the 4 inches of "top-soil layer. Areas to receive woody plantings shall be tilled to a depth of 18 inches to loosen and thoroughly incorporate soils prior to planting. Areas with unacceptable soil shall be completely excavated to a depth of 24 inches and backfilled with imported top- soil or manufactured planting mix. The subgrade

below these areas shall be free draining and suitable for planting. Concrete and other fill materials and debris shall be completely excavated to a minimum depth of 4 feet and backfilled with acceptable soil.

Planting locations for small flowering and ornamental trees shall have a minimum of 600 cubic feet of arable soil volume per tree. Planting locations for medium and large shade trees shall provide a minimum of 800 cubic feet of arable soil volume per tree. Planting strips for medium and large size trees shall be a minimum of 8 feet wide unless underground structured soil systems are being employed to provide the necessary soil volume. Trees placed in a linear planting strip can share soil volume space with up to 25% overlap.

Areas to receive seeding or sodding shall be cleaned as described above and top dressed with a 4 inch lift of topsoil to achieve finished grade. The seed/sod bed shall be cultivated to a depth of 3 inches to 4 inches and then compacted to 80% standard proctor to provide a reasonable firm but friable seedbed.

5.24 PLANT ESTABLISHMENT AND MAINTENANCE

To ensure the best opportunity for the success of the plantings, the contract documents shall clearly specify acceptable planting techniques, describe installation supervision requirements, acceptance, and guarantee of plantings. Prepare a detailed post-planting maintenance guideline for the maintaining agency's use. The contract documents should also provide an establishment/maintenance schedule to detail the necessary maintenance activities, time of year and frequency at which they are to be conducted.

See Section 9.21.6 Plant Establishment and Maintenance. See the Appendix for plant installation details.

5.25 FENCING

Fencing is an alternative to plantings for screening and as a pedestrian barrier. The type of fence, material, height, and extent of use is determined on a site-specific basis. The decision to use fencing for a pedestrian barrier should be based on a need to protect or control pedestrian routes. A screening fence should not obscure the site to the extent that public safety is at risk by creating hidden and obscured areas.

Landscaping and fencing can be major expenditures, and the uses should be appropriate for the site. Low-maintenance materials used wisely will keep landscaping and fencing from becoming a detriment.

To reduce landscape maintenance along fence line a concrete mow strip may be installed beneath the fence centerline to reduce the need for trimming of turf. Mow strip may be adjusted in width to provide adequate surface for mowing equipment to mount and eliminate trimming at base of fence.

See Section 9.4 Division 05 – Metals for detailed information on acceptable fencing materials. See the Appendix for mow strip details.

5.26 CIGARETTE ASHTRAYS

For locations where smoking is permitted, freestanding ashtray urns may be provided. These should be placed a minimum of 25 feet away from entry and exit areas to shelters, depots and other customer and employee work areas, and 15 feet away from any air intake grilles or operable windows. The number and placement will be determined on a case-by-case basis by the Metra PM.

5.27 SITE RETAINING WALLS

The need for site retaining walls is a common requirement on Metra facilities. The following types of wall construction are preferred for site retaining walls:

- Cast in place concrete. Form liner surfaces may be included for aesthetic purposes and to reduce the occurrence of graffiti.
- High-strength, pre-manufactured, wet-cast modular block wall for heights up to 30” Blocks may be smooth or textured for visual compatibility with other site elements.

5.28 ANTI-GRAFITTI COATING

Anti-Graffiti protection should be applied on a case-by-case basis and shall be a clear, non-sacrificial product. Consider the final appearance and color of the surface with an anti-graffiti coating since the coating may alter surface appearance.

5.29 DUMPSTER SCREEN

Dumpsters are required only for facilities with vendors. Provide a screening enclosure with lockable access gates/doors to prevent access by unauthorized persons. The placement of and type of enclosure shall not provide a route for access to roofs. Dumpster enclosure placement shall accommodate access for trash collection vehicle. The access apron and dumpster pad shall be constructed of reinforced portland cement concrete for durability and ease of maintenance. On some sites the enclosure may also include other program elements such as electrical panels, meters, and other utility elements. Wherever feasible, a single enclosure should be provided to screen and protect these elements.

5.30 NEWS / ADVERTISEMENT BOXES

Where the demand exists for the provision of news and advertisement boxes, the site plan should identify locations where the boxes may be placed adjacent to main pedestrian pathways between the parking or site access points and the depot and or platforms. Dedicated paved pads should be provided in locations which will not impede, create bottlenecks or conflict with normal pedestrian flow on the site. Locations should also have sufficient open space available to store snow removed from these locations. See the Appendix for concept configurations.

6 PARKING

6.1 STALL DIMENSION

Metra's standard parking stall width is 8'-6". See Table 6-1 for stall lengths.

Where local requirements exceed these dimensions, consult with Metra about requesting a zoning variance, or other relief from the municipality to allow 8'-6" wide parking spaces.

Parking spaces that have a curb in the front of the space (and therefore the resulting module) can be shortened by one foot in length to allow for the car's front bumper to overhang the curb. While keeping the resulting 17'-0" stall length, the design can shorten the stall paint striping by 6 inches to encourage drivers to pull all the way up to the curb.

Regular users become highly familiar with lot layout and operation. Because of these conditions, give special consideration to providing spaces at or near the minimum dimensions to maximize the number of spaces that can be provided.

6.2 PARKING LAYOUT

The parking stall and module dimensions (the module is defined as the combined dimension of two parking stalls and the aisle between them) are related to the type of parking, the rate of turnover of parking spaces and the familiarity of users with a particular facility.

The preferred design layout is two-way aisles with 90º parking which maximizes the number of spaces.

Two-way aisles are used with a 90-degree parking and one-way aisles are used with angled parking. A combination of angled and 90º spaces can also be used to accommodate as many parking spaces as possible. One method of combining both 90-degree parking and angled parking is designing the outer perimeter of the lot as two-way with 90-degree parking stalls, and the interior as one-way with less than 90-degree stalls. Special attention should be given to points of intersection when using combined flow because the potential for conflicts is increased.

Turning radii between aisles should be wide enough to allow for fluid movement. The turning movements should be designed based on the size of the largest vehicle anticipated to use the facility. Consult with local life safety agencies to determine the maximum size of emergency vehicles. For internal circulation in the lot, turning templates should be used to check turning movements at the entrances, exits, and internal circulation paths.

The layout of the parking lot should consider snowplowing, sweeping and maintenance operations. Consider using depressed curbs in corners to allow snow to be pushed off the pavement.

See the Appendix for parking layouts with dimensions. These are regarded as minimum dimensions required for safe and efficient operation of a typical commuter parking lot.

TABLE 6-1: PARKING MODULE DIMENSIONS FOR 8'-6" STALLS

Parking angle	Stall Length Perpendicular to Driving Aisle	Width of Driving Aisle		Minimum Module Width	
		Minimum	Preferred	Minimum	Preferred
45 degrees (one way)	17'-3"	12'-6"	13'-6"	47'-0"	48'-0"
60 degrees (one way)	18'-6"	16'-0"	18'-0"	53'-0"	55'-0"
90degreese (two way)	18'-0"	22'-0"	24'-0"	58'-0"	60'-0"
0 degree (parallel)	22'-0"	24'-0"	24'-0"	N/A	N/A

Parking layouts are generally more efficient with the aisles running parallel to the longer dimension of a rectangular lot.

Another consideration for parking lot layouts is drainage. Stormwater quality can be improved with drainage into grassed bio-swales, which generally require a minimum greenspace width of approximately 8 feet. Refer to Section 5.3 Stormwater Drainage and Detention for more information.

6.3 VEHICULAR AND PEDESTRIAN ACCESS CONSIDERATIONS

The main function of a commuter station parking facility is to move people and vehicles safely and quickly. The location of access points to the parking lot and their effect on traffic and pedestrian flows needs careful consideration of the factors listed below.

6.3.1 PARKING ACCESS POINTS

Distance to nearest intersections (signalized or unsignalized). Locate parking access at least 150 feet from public intersections and other ingress and egress points if possible or align the access point to become the fourth leg of an intersection.,

Ingress and egress points of adjacent land uses, and existing curb cuts. Use existing curb cuts when possible. If there is a frequently used access point located opposite the proposed site, consider aligning the commuter lot access opposite that existing access point. This may be required by local or state agencies having jurisdiction of the roadway.

Physical features of the adjacent roadway, such as width and terrain, the operating speed on the adjacent roadway, and one-way streets. Allow for adequate vehicle turning movements onto adjacent roadways without forcing the vehicles into the adjacent traffic lane. Design criteria for adequate turning radii should be in accordance with standards from IDOT or the municipality of county which owns the roadway.

The condition of the adjoining roadways should be noted and where need for improvements are evident, that should be noted as part of coordination with the municipality.

The following recommendations for driveway dimensions are based on IDOT Standards. If a municipality or county owns the street it may have different standards and should be consulted to provide their standards, or to confirm the below standards are acceptable:

TABLE 6-2: DRIVEWAY DIMENSION RECOMMENDATIONS

Driveway Width at Property Line
14' Min. to 24' Max for 1-way operation
24' Min. to 35' Max for 2-way operation
Radii for Driveway Flares
20' to 50' for Rural locations
18' to 40' for Urban locations
Angle of Driveway Alignments
90 degrees to the connecting road is preferred
45 to 90 degrees for 1-Way operations are allowed
to 90 degrees for 2-Way operations are allowed

Provide for adequate acceleration distances. If the adjacent roadway carries high speed traffic, acceleration lanes, deceleration lanes and turning lanes may be necessary. Design criteria for projects in Illinois should be based on the IDOT Bureau of Design and Environment Manual and the Bureau of Local Roads Administrative Policies.

If two or more access points are needed, the additional access point should disperse traffic onto a second street. If any of the above criteria cannot be met, a traffic impact study should be considered.

Access for fire apparatus and other emergency vehicles should be provided to drop-off locations that access the depot and platform. Aisle widths and turning radii shall be based on the requirements of the local agencies, who shall provide approval for the site geometry.

6.3.2 TRAFFIC VOLUMES

Traffic counts can supply a great deal of the information needed to evaluate and design access to and from an existing roadway. Without this information, determining the number of access points needed and the best locations for those points is conjecture. Existing and projected traffic volumes can be obtained from several sources including Chicago Metropolitan Agency for Planning (CMAP), Illinois Department of Transportation, Wisconsin Department of Transportation, Counties, and Municipalities. Detailed daily traffic data may not be needed. However, at a minimum, peak morning commuter traffic patterns should be addressed. If the adjacent roadway has a high volume of traffic and fewer than two lanes in each direction, turning lanes may be needed to reduce traffic congestion. Avoid access from roadways which are operating at a level of service lower than ‘C’. (See Highway Capacity Manual for criteria relating to the determination of the level of service). Consult with local agency regarding existing traffic conditions on roadways adjoining the site, after confirming this is acceptable to Metra.

Commuter stations that are 16 miles or more from Chicago may have a slightly different peak travel hour in the morning and evening than the local roads. This should be considered during the analysis on traffic impacts on local roads for a parking lot because it will reduce the amount of traffic impact mitigation improvements needed on the local roads.

6.3.3 COMMUTER PARKING FACILITY SIZE, SHAPE AND USAGE

The number of access points needed to provide adequate ingress and egress into a commuter station parking facility is based on factors related to the number of parking spaces provided, shape of the facility, expected usage (peak commuting hours), intended transit services (taxi, bus, and similar operations), and adjacent roadway conditions.

To determine whether one or two access points are needed, consider time delays and queue lengths. The frequency of trains as well as the peak hour disembarking rate from each train will affect the design criteria.

The queuing of vehicles exiting the parking lot needs to be analyzed using Metra's individual train alighting counts in the evening rush hour to determine the number of vehicles that need to be accommodated in the exit lane(s) of the driveways. Traffic control methods such as a police or security officer flagging traffic, creating a stop sign intersection, or a signalized intersection may be needed to exit commuter vehicles from the lot in a timely manner.

The commuter parking facility shall be designed to keep queuing in the parking facility rather than on the adjacent roadway. Avoid conflicting movements near the access points. The locations of adjacent at-grade railroad crossings are a major factor when looking at possible queues, or the adequacy of storage space for right or left turn movements. Traffic generated by the parking facility will coincide with the arrival of one or more trains, so conflicting traffic movements at or near track crossings should be avoided. A minimum of 150 feet shall be provided between the access point and an at-grade crossing. Do not have vehicles queuing across railroad tracks while entering or leaving the proposed lot.

Provide adequate sight distance for at-grade railroad crossings and intersections in accordance with IDOT or CDOT standards, the *Railroad-Highway Grade Crossing Handbook* and, the *Manual on Uniform Traffic Control Devices*. No standard is all inclusive, and there will always be situations that are not covered by these manuals which are to be evaluated using good engineering judgment.

The access drive location will affect design decisions for the internal circulation pattern. If the location of the access point has some flexibility, the internal circulation pattern may determine the optimum location of the access point.

Consider pedestrian flow around the perimeter of the parking facility and within a station site to relevant site access points. If a parking facility is located adjacent to a neighboring residential development, Transit-Oriented Development, or walking path, consider providing, or connecting to, points of pedestrian access. Access from off-site bicycle paths should be continued on site to the bicycle parking areas.

Assess the ADA accessible path connecting to nearby intermodal transfers at public bus stops or stations. If improvements needed to create a connecting accessible route to bus stops or transfer stations would extend beyond the site, notify the applicable property owners and/or municipality in writing.

6.3.4 INTERNAL BUS CIRCULATION

If bus drop-offs are anticipated, the internal circulation should be designed to avoid routing of the bus through any of the parking aisles. Buses should be given a clear ingress and egress route which does not obstruct the flow of commuters on foot or in vehicles. Concrete pavement shall be installed where buses load and unload within the facility. Pace (https://www.pacebus.com/project/transit-supportive-guidelines) or CTA Guidelines should be used when designing a commuter lot with bus service in Illinois. Consult with local agencies for equivalent references to be used for locations in Wisconsin. Whenever possible, storage space for queuing near the entrance points should be planned. A minimum of 60 feet should be provided at each access drive for queuing.

6.3.5 PEDESTRIAN FLOW

Pedestrian movement is an important factor to consider when locating the access points and when the proposed parking lot is not located adjacent to the commuter rail station. The preferred maximum walking distance from a parking space to the platform access point is +/- 1,300 feet. Pedestrian flow between the

parking lot and the commuter station should be designed to avoid conflicts with vehicles turning in and out of the area. Other pedestrian-vehicular conflicts to consider include local pedestrian patterns (i.e., commuters who walk from nearby housing or apartment complexes), bicycle paths, bus stops, drop-offs areas and schools. Pedestrian crosswalks, signage, and the implementation of pedestrian manually activated or automated crosswalk signals also need to be considered in areas with heavy pedestrian traffic flow.

Pedestrian access from off-site locations should be consolidated once on site to provide a coherent and logical circulation network with the least number of conflicts between pedestrians and vehicles. The pedestrian walk system should efficiently move concentrated pedestrian volumes between off-site parking, walk/bicycle networks, tunnels, at grade track crossing locations, intermodal transfer points, depots, and accessory shelters in the most direct and safe manner possible.

Pedestrian circulation paths which cross vehicular traffic in parking lots should be designated by marked crosswalks. Additional provision for pedestrian circulation by means of designated walkways may be required where aisles exceed 300 feet in length and interfere with the direct path of pedestrians to and from the stations or train platform areas. Such a requirement will also serve to minimize the potential hazard of pedestrian traffic in aisles. Orientation of parking access aisles perpendicular to the platform will allow for pedestrians to move safely to and from the platforms in the access aisle while reducing ped/vehicle conflicts.

The lighting design and pedestrian flow patterns or designated pedestrian walkways should be coordinated to complement each other. This is especially important at points where pedestrian movements and vehicular movements are in conflict.

6.3.6 PAVING AND BOLLARDS

Sidewalks intended for use by the public shall have a minimum width of five feet, increased to six feet, if snow removal equipment requires it. Light poles shall not encroach on that six-foot width. The minimum width of a sidewalk adjacent to a bus or taxi loading zone should be 12 feet. The existing pedestrian routes between the parking lots, the depot, and the platforms should be investigated for needed improvements to their condition and widths. If many people (or people and bicyclists) will be using the connecting sidewalks, then sidewalks widths may be expanded in width using engineering judgement to facilitate enhanced access and movement. While permeable paving may provide some environmental and stormwater management advantages, the need for ongoing specialized maintenance makes it less desirable option for Metra sites. Refer to section 9.21.3 Pavement Design.

BARRIERS:
Pedestrian barriers should be provided whenever it is desirable to discourage or prevent pedestrians from entering locations where unusual hazards or unreasonable interference with vehicular traffic would otherwise result. Pedestrian barriers may consist of railings, fences, walls, landscaping. These barriers should be used with sight distances in mind for both pedestrian and vehicle movement.

BOLLARDS:
The use of bollards should be reserved for locations where separation of vehicles and pedestrians cannot be achieved using vertical barrier curbs (B6 curb preferred). When bollards are used, they should be of a simple metal pipe and or tube design which can be easily sourced and replaced in the event they are damaged by vehicle contact. Lighted bollards may be an option where requested and maintained by the local community. Locations where bollards may be considered for use include:

- Where there are depressed curbs along walkways to permit (ADA crossing or Kiss & Ride).

- Where separation between higher speed vehicle traffic lanes and buildings, and or pedestrians is limited making them vulnerable.
- Bollards shall be provided at the head end of each sawtooth bus loading and unloading bay to protect passengers from an accidental incursion of a bus onto the platform.

The minimum horizontal clearance between a bollard barrier and vehicle should be five feet to allow space to access a vehicle.

6.4 OTHER PARKING FACILITIES

Facilities to consider when developing parking lot plans include accessible parking and access, bus drop-off and loading, Kiss & Ride areas, motorcycle parking and bicycle parking as per table below:

TABLE 6-3: MODE OF ACCESS*

Access Mode	Riders (%)	Suggested Facilities (Mode of Access Data to be collected for each facility)
Drove & Parked Alone	1%	
Drove & Parked in Carpool	<1%	
Rode in Carpool	<1%	N/A (included in carpool percentage)
Kiss & Ride*	<1%	15% of the highest evening train's alighting passengers in 15-minute time period
Rode Bus	12%	Contact PACE or CTA
Walked	79%	N/A
Bicycle**	2%	1 to 3 multiple-bicycle bike racks installed near depot
Motorcycle	< 1%	zero to 10
Rapid Transit	3%	N/A
Taxi	2%	zero to 2, usually use Kiss & Ride spaces instead of a separate taxi queue
Other	1%	N/A

* Metra 2019 Origin and Destination Ridership Survey

** Designers should consult with Metra PM for bike use data to arrive at appropriate % for each station

Note that Table 6-3 provides system-wide averages and figures may vary from these values at a particular station. The designer shall contact Metra for the figures to be used for each mode of access at the station being designed.

The Scope of Work will address these requirements in detail. All parking areas, especially special use areas should be clearly defined through signage, pavement marking, location and configuration. The sign types can be found in Metra Station Sign Program Specification.

6.4.1 ACCESSIBLE PARKING

For new designs, additions to lots, or alterations to existing lots, accessible spaces shall be located in the parking lot closest to the inbound platform's and/or depot accessible access points. In instances where a parking lot is being restriped, enlarged or an additional parking lot is proposed, the restriping of existing regular spaces closest to the station's accessible access points shall be performed to provide the additional required accessible spaces nearest to their point of use. Minimize travel distance from accessible parking to the station and provide an accessible route that, where possible, eliminates drive aisle crossings. Pavement slopes and cross-slopes for the accessible route and accessible parking shall

not exceed 2%; Metra prefers to use 1.5% slopes and cross-slopes to allow a reasonable construction tolerance in the design.

When more than one parking facility (surface lot and/or structured deck) is provided at a station, the number of accessible spaces provided shall be calculated according to the minimum number of spaces required for the station's total number of parking spaces. The minimum number of required accessible parking spaces should not be the sum of the spaces required for each remote parking facility at a station. Existing parking space numbers are available on Metra's website: www.metra.com/maps-schedules. Numbers should be field verified.

Metra's standard for accessible parking stall and access aisle sizes is to follow the most stringent accessibility code. Metra's preference is to provide 8-foot-wide 90 degree accessible parking stalls which share an 8-foot-wide access aisle (aisle, stall, stall, aisle, stall, stall, etc.). Diagonal accessible parking stalls shall be 8-foot-wide with an unshared 8-foot-wide access aisle (stall, aisle, stall, aisle, etc.). See the Appendix for design diagrams.

TABLE 6-4: MINIMUM REQUIRED ACCESSIBLE PARKING SPACES

Total Number of Parking Spaces Provided	Accessible Parking Spaces Required
1 to 25	1
26 to 50	2
51 to 75	3
76 to 100	4
101 to 150	5
151 to 200	6
201 to 300	7
301 to 400	8
401 to 500	9
501 to 1000	2% of total
1001 and over	20 plus 1 for each 100, or fraction thereof, over 1000

* Consultant shall verify latest ADA Standards are used in calculating the number of spaces required.

6.4.2 KISS & RIDE / RIDE SHARE

Kiss & Ride provisions should be considered only for parking lots adjacent to commuter stations. The average number of spaces provided should be approximately 15% of highest evening train disembarking within a 15-minute period. The number of spaces needed may differ due to the different characteristics of the riders at each station and the station's location. Existing lots adjacent to the platforms which are to be expanded should be observed for the current demand for additional Kiss & Ride spaces. There are two designs normally used for Kiss & Ride facilities. The type of Kiss & Ride design to use depends on the size and shape of the site and area which is available. Kiss & Ride areas may have shelters with seating. Designer shall confirm the need for a shelter with Metra. Shelters or stand-alone benches shall be located to not conflict with site pedestrian circulation patterns. See the Appendix for design diagrams.

The first option is a drop-off lane, apart from the driving aisles, which parallels the platform or sidewalk leading to the platform. ADA standards shall be followed for transition from pavement to sidewalk. The direction of travel should allow the passenger side of the car to face the sidewalk or platform. This style is best for drop-offs but should be reviewed to allow for adequate storage of cars awaiting the arrival of trains on existing or estimated demand for this type of space. It is also very important that Kiss & Ride

drop off lanes follow the most stringent accessibility code requirements for number of accessible spaces, access aisle, loading zone and curb ramps. See the Appendix for design diagrams.

A second method is to provide a defined area of parking spaces for limited time parking. The Kiss & Ride spaces should be a minimum of 9 feet wide to facilitate frequent turnover. With this option, if parking demand increases or if the estimated volume of Kiss & Ride users is not attained, these spaces can be converted to all day parking. Therefore, designs should take this possible conversion into account. A combination of the two methods provides the most versatility allowing for quick drop offs and pick-ups as well as allowing for short term waits or driver/ passenger exchanges.

6.4.3 BUS DROP-OFF

At bus stands where buses will idle for any period, a Portland cement concrete surface should be used to prevent pavement degradation from oils. The most current PACE Development Guidelines should be reviewed for design factors which may affect the parking lot design. Pace or CTA must confirm power/data and concrete pad/ADA needs for bus stops or bus boarding areas. The pavement section and turning radii should be verified and a separate drawing containing the vehicle maneuver paths prepared for aisles used by buses. When buses share an aisle, adequate pavement shall be provided for parking aisle, through lane, and bus lane. Buses should not, as a rule, be required to travel through parking aisles or share pavement with Kiss & Ride loading and unloading areas. Coordinate with Bus providers to confirm size and amenities to be included in bud Bus drop-offs, i.e., Seating, overhead cover, windscreens etc. Shelter locations shall not conflict with on-site pedestrian circulation patterns. See the Appendix for design diagrams.

6.4.4 COMMUTER BICYCLE

Provide designated on-site parking for commuter bicycles located between the public way and the train platforms/depots and or shelters. Locations of bicycle parking areas should be connected with walking paths which provide direct access from the adjacent public way while reducing to the greatest extent possible conflicts with or crossing of on-site pedestrian or vehicular circulation routes. Where applicable, extend adjacent dedicated bicycle lanes and or paths through the site.

Space may be reserved adjacent to the bicycle parking area for the installation of a concrete pad and Air/Repair station to be provided by others. Signing shall be posted “No Biking or Skating Beyond this Point” where the access to the depot and platforms and bicycle parking areas intersect. Pavement shall be 6” concrete.

“No Riding or Skating” signage shall be posted where access to the site and parking areas intersect.

See Chapter 8.1.6 for detailed paving design. See the Appendix for design diagrams.

6.4.5 BIKE SHARE

As a part of the site programming phase, Metra planning staff will provide direction on the need/desire for a bike sharing program to be accommodated on the site. If a program is desired, then space will need to be assigned with sufficient footprint to accommodate the number of bicycles and supporting infrastructure per the bike share provider. The designated bike share area shall be located between the adjacent public way and the station and have direct pedestrian access to the internal site pedestrian circulation system. Preference should be given to locations on site which are adjacent to the public way enabling the public to easily access ride share bikes for other than commuter use. Signage shall be posted indicating “No Biking, Skating or Scootering Beyond This Point” between the platform, plaza, and on-site and bike share parking areas. Pavement for bike share parking to be 5” concrete similar to commuter bicycle parking

areas. When a station is undergoing a renovation and or repair, the design team should seek temporary locations for bike share facilities during the construction period.

6.4.6 E-SCOOTER PARKING

As a part of the site programming phase a determination should be made if an e-scooter program is needed/desired and if so, how best to accommodate it within the Metra site. If a program is desired, then appropriate space will need to be assigned with sufficient footprint to contain the number of anticipated e-scooters. This area shall be located between the public way and the depot along an internal pedestrian circulation route. Preference should be given to locations adjacent to the public way enabling the public to easily access E-scooters for other than commuter use. Where space is limited, parking for ESCOOTERS may be combined with bike share or commuter bicycle parking areas. “NO SKATING OR RIDING Beyond this Point” signage shall be posted where access to the site and parking areas intersect. Pavement for ESCOOTER parking to be 5” concrete similar to commuter bicycle parking areas. See the Appendix for design diagrams.

6.4.7 MOTORCYCLE PARKING

All dedicated Motorcycle Spaces within automobile parking areas are to be provided at 4’-3” width within the 18’ long spaces. A stand-alone motorcycle parking area shall provide minimum 5’-0” wide x 8’-0” long spaces, with a 5’-0” wide one-way access aisle to the spaces or an 8’-0” wide aisle for two-way traffic to the stalls. Provide tethering systems firmly anchored to the parking pad for designated motorcycle parking areas within each Metra site. Numbers of motorcycle parking spaces as stated in Table 6-3 shall be evaluated for suitability and adjusted in consultation with Metra staff to meet anticipated need for each site. Pavement shall be 6” concrete over 2” stone. Overhead cover of motorcycle parking areas is preferred but not required. See Section 9.4.5 Motorcycle Tethering for further information.

6.4.8 PAVEMENT STRUCTURE

The bituminous materials in a flexible pavement, specifically the binder and surface course, provide the riding and wearing surface. The binder and surface course shall be of a sufficient thickness to reduce the fatigue stresses at the base course interface layer. Examples of typical minimum pavement sections are either the Illinois Bearing Ratio (IBR) with a minimum of 3.0 or the California Bearing Ratio (CBR) with a minimum of 5.0. Note specialty coatings may be used to extend pavement life and reduce Heat Island Impacts. See Section 9.21 Division 32 – Exterior Improvements for further information and the Appendix for design diagrams.

6.4.9 SUSTAINABLE DESIGN STRATEGIES

Sustainable design strategies such as permeable pavement, under pavement stormwater storage, or bio-swales, may be required by local stormwater regulations. This typically requires retaining the “first-flush” runoff, ranging from 1/2” to 1” of runoff from impervious surfaces. See Section 5.3 Stormwater Drainage and Detention.

6.4.10 HEAT ISLAND MITIGATION

Large, paved surfaces such as parking drive and lots, train platforms and plazas open to full solar exposure absorb energy during the day light hours. This energy is then returned to the atmosphere in the evening and night- time hours increasing the air temperature its surroundings. In urban environments this effect is compounded by the concentration of paved infrastructure resulting in adverse micro climatic conditions. As an ongoing practice of the design of new and redevelopment of existing facilities, efforts should be undertaken to identify means and methods to reduce the absorption of solar energy with the

goal of reducing climate impacts of Metra developments. Innovative materials and surface coatings with high albedo and strategic placement of shade producing plantings along parking perimeter and in islands of sufficient size will all help to mitigate climate change. Tree placement shall be in accordance with local ordinances and coordinated with light poles, drainage structures, overhead and underground utilities, signage, snow storage areas and salt standoff distances to eliminate conflicts and detrimental conditions to tree growth and survival.

6.5 FEE COLLECTION SYSTEM

The optimal fee collection system is the one that is the most economical to install and maintain while also serving the type of user (i.e., monthly, or daily) efficiently. Metra prefers daily fee collection systems rather than monthly permit collection systems. A growing percentage of Metra customers ride the train two or three days a week, instead of five or more days a week. A daily fee collection system allows for the maximum use of a parking facility by all passengers.

Locate fee collection systems along the main pedestrian routes between the parking areas and the platform. Consolidate fee collection stations in one or at most two locations on a separate concrete pad adjacent to but offset from the main pedestrian walkway so that through traffic is not impeded by customers queuing to make payment. Locate them beneath a canopy and enclosed with transparent wind screens to protect equipment and customers from precipitation while providing visibility. If directed by Metra, provide empty communications conduit to support future surveillance systems.

Fee collection for ADA spaces shall be usable for people with disabilities. Signs indicating the stall # for ADA spaces shall be within the reach height from a wheelchair and include braille. Refer to ADA guidelines for further information.

Fee collection boxes for cash payments, where used, should be limited in size to a maximum of 100 spaces. Other electronic systems do not have a limit on number of spaces they may serve. The advent of digital payment systems via mobile applications or similar technology will likely continue to grow and has the potential to impact the need for and numbers of fee collection systems used on Metra facilities. The use of these digital systems should be considered when evaluating the need for physical fee collection in the future.

TABLE 6-5: PARKING CONTROL OPTIONS

Control Method		Enforcement	Comment
Monthly permit	a. Parking permit purchased monthly; valid for specific facility.	Ticket or Towing for vehicle without appropriate identification.	Simple low-cost method of control. However, not all spaces are occupied on a daily basis when some people are not taking the train one day.
Daily Fee (Preferred Method)	a. Parking meter	Meter enforcement personnel check meters; issue tickets for expired meters; use municipal enforcement personnel	Simple method of control; up to 12-hour time limit desirable. High initial cost and requires maintenance system and coin collection. Used sometimes for on-street parking, but not recommended for parking lots.
	b. Manual slot coin box	Enforcement personnel check for non-payment, usually one person in the late morning	Manual slot coin boxes should be under shelters to shield boxes from snow and freezing rain.
	c. Electronic payment collection machines/ boxes	Enforcement personnel check for non-payment, usually one person in the late morning	Locate under shelters for weather protection of equipment. Provide internal heaters for winter operations. **B**enefits include receipts as proof of payment.

For the size and operation of Metra surface commuter parking lots, a cashier or gate control should not be considered due to costs and length of time required to enter or exit. The fee system should be coordinated with the maintaining and enforcing agencies.

7 ACCESSIBILITY

The designer is responsible for identifying and following the most current version of all applicable accessibility standards for the design and alteration of facilities. These include standards published by the US Department of Justice and the Department of Transportation, the Illinois Accessibility Code, and any local municipality codes. Consultant shall review each to confirm that the strictest applicable guidelines are being followed.

Metra specific standards that exceed the ADA minimums are noted in this chapter. The intent of exceeding minimums is to provide construction tolerances that ensure ADA compliance in the final work. Any deviations from these *Guidelines* shall be approved by Metra.

7.1 REFERENCES

- ADA Standards: https://www.access-board.gov/files/ada/ADA-Standards.pdf.
- Illinois Accessibility Code: https://www2.illinois.gov/cdb/business/codes/IllinoisAccessibilityCode/Pages/default.aspx.
- US Access Board guide to ADA Standards: https://www.access-board.gov/ada/guides/.
- US Access Board guide on symbols: https://www.access-board.gov/ada/guides/guidance-on-the-isa/.

7.2 COMPONENTS

7.2.1 ACCESSIBLE ROUTES

The accessible route from station access points and ADA parking spaces to depots and platforms shall coincide with the general circulation path to provide an equivalent experience for those users who use the accessible route instead of stairs. Refer to ADA section 206.3. Also refer to the Metra Station Sign Program Specification for guidance on signage requirements along the accessible route.

7.2.2 DETECTABLE WARNINGS

If a walkway crosses or adjoins a vehicular way and the walking surface is not separated by curbs, railings or other elements, the boundary between the areas shall be defined by a continuous detectable warning strip 24 inches wide. Full-width detectable warnings are required at curb ramps as per ADA section 406.8. See Section 9.21 Division 32 – Exterior Improvements for further information.

7.2.3 GRATES

For grates located along accessible routes, consider all pedestrian flows to select grate covers that comply with ADA section 302.3. Be aware that the dominant direction of travel can be both perpendicular and parallel to the grate openings based on where the depot and platform egress points are located.

7.2.4 RAMPS

Ramps shall use a maximum slope of 1:13 to ensure compliance with the 1:12 ADA maximum slope. Locate ramps to minimize the distance between the platform and the access point. Where the circulation path differs from that of the general public, appropriate signage shall be provided to identify the accessible entrance and accessible route. When determining clear width dimensions, consider the width determined by egress calculations along with the size of railing post anchors, minimum distance from anchor to edge of concrete, and handrail offsets to determine the overall effective width of the ramp

surface. Where site conditions allow, the use of a sloped walkway is preferred to a ramp to eliminate the need for guardrails and handrails.

7.2.5 RAILS

Handrails and guardrails shall not encroach into railroad minimum clearances, shall not encroach into the platform minimum clearances (see Table 2-1: Platform Standard Dimensions), and shall be continuous and uninterrupted through the full length of rails. At a condition where a line post intersects a handrail, the line post diameter shall be reduced at the intersection so the ability to grasp the handrail is not interrupted.

Concrete walls with attached railing posts need to be of a sufficient width, typically 12” minimum, to provide adequate cover for railing anchors and sleeves. The standard anchorage detail is core-embedment with non-shrink grout. Slope top of infill and provide bead of sealant all around embedment. Different project conditions may require an alternate detail such as threaded stainless-steel rod, washer and nut set in epoxy. Discuss with Metra Project Manager.

Exceed the minimum handrail extension requirement by providing a 1-2” *horizontal* extension of the handrail measured from the termination of the ramp slope or from the leading edge of the top riser nosing. The radius of the rail return (in any direction) cannot be included in this minimum dimension. The only exception is the inside railing at switchback ramps where a horizontal extension is not required.

At the bottom of stairs, continue the handrail at the same slope of the stair flight for a horizontal distance at least equal to one tread depth beyond the last riser nosing. The radius of the rail return (in any direction) cannot be included in the minimum dimension. The only exception is the inside railing at switchback stairs where the 1’-0” min. horizontal extension is not required.

Return handrails to an adjacent wall or to the walking surface.

Consider thermal movement, provide a typical detail and ensure that shop drawings include thermal movement joints at all locations where required.

Include a requirement in the rail specifications for signed and sealed calculations from a licensed structural engineer meeting the structural performance requirements of 50 lb/ft for uniform loads applied in any direction and 200 lb/ft for concentrated loads applied in any direction.

7.2.6 RAMP AND RAIL DIMENSIONAL CRITERIA

Metra’s more stringent requirements exceeding code criteria for ramps and rails are listed in Table 7-:

TABLE 7-1: RAMP AND RAIL CRITERIA

Item	Criteria
Ramp Running Slope	7.5% max
Ramp Cross Slope	1.8% max
Top of Handrail above walking surface	36"
Top of Guardrail above walking surface	42”
Handrail Outside Diameter	2”
Space between pickets or between any rail component and adjacent structure	4” max
Clearance between side face of handrail and adjacent structure	1-1/2” min
Clearance between bottom face of handrail and bottom return bracket arm	1-1/2” min

7.2.7 ELEVATORS

Elevators provided for platform access shall be located adjacent to the main access point for the platform as per ADA 206.3. Elevator lobbies should be heated and enclosed from weather. Elevator control rooms must be conditioned in accordance with manufacturers recommendations. See Chapter **Error! Reference source not found. Error! Reference source not found.** and Section 9.13 Division 14 – Conveying Systems for more information on elevators. Projects including new shafts and elevators shall be designed in full compliance with the APTA elevator guidelines. Projects where elevators are being replaced in existing shafts shall be designed to come as close to compliance as feasibly possible.

7.2.8 BOARDING AND ALIGHTING

Platforms shall be designed to allow disabled persons to board and alight trains. Accessible boarding and alighting occurs at designated spots along a platform and from designated cars. Signage needs to identify these locations.

On ME lines with level boarding, the horizontal gap between the edge of platform and car is covered by a portable bridge plate on the train car that a conductor can deploy if needed.

On diesel line stations with low platforms, on-board wheelchair lifts provide accessible boarding and alighting on designated cars. See the Appendix for train envelope clearance diagrams.

7.2.9 TRACK CROSSINGS

Where it is necessary for pedestrians to cross tracks, the crossing surface shall be level with the top of rail. The pedestrian crossing can abut the outer edge of the rail to permit the passage of trains and use Rail Seal gap-filler material on the wheel flange side of the rail to minimize the flange gap distance. Refer to ADA 810.10 for further guidance.

7.3 STATION FACILITIES

7.3.1 CIRCULATION PATHS

Accessible entrances and accessible routes both inside and outside station facilities should coincide with the circulation paths for the general public, wherever possible.

Metra standard for the cross slope of circulation paths is a range from 1.5% min to 1.8% max.

Metra standard for the coefficient of friction of floor surfaces is 0.8.

7.3.2 ENTRY VESTIBULES

Depots which have entry vestibules with two separate sets of doors shall have the required minimum clear floor space between sets of doors. The minimum clear distance between doors is described and illustrated in ADA section 404.2.6.

7.3.3 DOORS

Pivoted (balanced) swing doors are preferred for all exterior uses at buildings accessed by the public. Hinged doors are used on exterior utility rooms accessed by Metra personnel. Hinged, single leaf doors are standard for interior use. Extra door size is required for a pivoted door to meet the 32-inch minimum clear width. Revolving doors are generally only installed at downtown terminals. Non-pivoted (balanced)

swing doors are allowed if they meet the pull force opening requirements in ADA 309.4 and 404.2.7 and are an established, reliable product with a positive performance history. Balanced doors at platform entrances to warming houses, headhouses and depots need to be designed to withstand high wind forces generated by passing trains. Some buildings have deep door jambs greater than 8 inches so be aware of the required floor/ground maneuvering clearances of recessed doors per ADA section 404.2.4.3. See Section 9.7.1 Doors and Hardware.

TABLE 7-2: DOOR CRITERIA

Item	Criteria
Door Surface	Exceed the minimum ADA requirement (404.2.10) by providing a 12” high smooth surface on push side at base of swinging doors and gates
Tactile Warnings	Textured contact surfaces on handles for doors and hazardous areas

7.3.4 TICKET WINDOWS

Standard ticket counters shall meet the accessible reach ranges of ADA section 308. An auxiliary transaction counter for check writing, 36 inches long and 36 inches maximum height, shall be provided near the main counter. The ticket window and the auxiliary counter shall be located on an accessible route and provide the minimum clear floor space and maneuvering clearances. If two ticket windows are provided, one can be at a higher height and one at a lower height. See Section 3.3.8 Ticket Agent Offices.

7.3.5 TICKET VENDING

Ticket vending machines should be located on an accessible route. If provided, at least one self-serve fare collecting device shall be accessible. The devices shall have a minimum clear opening width of 32 inches and permit passage of a wheelchair. Coin or card slots and controls necessary for operation shall be at compliant heights and reach ranges.

7.3.6 TOILETS

Public toilets, if provided, shall be located on an accessible route. Ticket agent toilets shall also be ADA accessible. Where possible, use a 42-inch-long rear grab bar (not the minimum 36-inch bar) and locate so that from the center line of the water closet, the grab bar exceeds the 12-inch minimum on one end and 24-inch minimum on the other end. Similarly, use a 48-long long side grab bar (not the minimum 42-inch bar), located so that the end closest to the rear wall does not exceed the 12-inch maximum from the rear wall and the far end exceeds the 54-inch minimum from the rear wall.

7.3.7 FURNISHINGS

Built-in counter or tables shall be 28 inches minimum and 34 inches maximum above finished floor. The furnishings in the ticket agent office need not be accessible at the time of construction, but the space provided should be planned with the proper maneuvering clearances. Fixed counters and tables that are provided in the ticket agent office should meet accessibility requirements to avoid modification in the future. Built-in bench seating is common in waiting areas and shall comply with ADA 903.

7.3.8 CHARACTER LEGIBILITY

Visual characters shall comply with ADA section 703.5. Where the host municipality requests a clock for the public, the clock face shall be uncluttered and clearly visible. Determine clock locations for ease of access to allow ongoing maintenance by the municipality or railroad.

7.3.9 CONTROLS

The accessibility standards apply to all controls on an accessible route or in accessible spaces, such as light switches, electrical outlets, and electric infrared heater push button timers. Clear floor space allowing either a forward or a parallel approach shall be provided as per ADA section 305.

8 SECURITY

Ease of passenger use, visibility and protection of property are critically important factors in the design or rehabilitation of a facility. Security design strategies for an individual station should be coordinated with Metra Police throughout the design process by the Metra PM to obtain useful feedback and agreement.

Prioritizing the integration of security principles during design helps to achieve certain goals that align with Metra's guiding principles outlined in Section 1.2 Guiding Principles:

- Promoting public confidence in the use of Metra facilities.
- Allowing for rapid response by emergency personnel.
- Integrating security principles with site and building design so that the strategies are coordinated and complementary.

A common method to achieve these goals is to understand and implement the industry-standard tools of Crime Prevention through Environmental Design (CPTED) which use urban, site and architectural design to deter crime, reduce opportunities for vandalism, encourage connections and reinforce territorial boundaries. The CPTED principles are described in this chapter and a CPTED checklist is included in the appendix to guide the designer in site assessments and design strategies.

8.1 CRIME PREVENTION THROUGH ENVIRONMENTAL DESIGN (CPTED) PRINCIPLES

A common method to achieve these goals is to understand and implement the industry-standard tools of CPTED which use urban, site, and architectural design to deter crime, reduce opportunities for vandalism, encourage connections, and reinforce territorial boundaries. The CPTED principles are described in this chapter and a CPTED checklist is included in the appendix to guide the designer in site assessments and design strategies.

8.1.1 TERRITORIAL REINFORCEMENT

This strategy uses physical elements to clearly distinguish limits of ownership and boundaries between public and restricted areas. The use of paving, fences, signage, and other elements help to reinforce property lines and private spaces. A clear distinction between public and private areas helps deter trespassers and reduce the perceived opportunity for crime or vandalism which often occurs in in-between spaces where ownership is ambiguous.

8.1.2 NATURAL SURVEILLANCE

Promote clear lines of sight and maximum visibility throughout the site and within depots. Create an environment that promotes and encourages continual observation. Encourage mixed use of sites with vendor spaces where possible. Consider the visibility of paths from site access points to and from parking, station facilities and platforms. Facilitate the surveillance of sites and buildings by local and Metra police. Use tools such as low vegetation, raised building entrances, adequate illumination and avoiding blind corners to promote natural surveillance. Maximizing glazing in shelters and vestibules improves the surveillance of used for after hours waiting. Vandal-resistant security mirrors for unavoidable blind corners also create an environment of continual observation. Security lighting to improve surveillance should be used in all waiting rooms and integrated into general lighting systems with appropriate controls to minimize operating costs. See Sections 4.5 Lighting and 4.6 Communications for specifics on lighting and cameras.

8.1.3 NATURAL ACCESS CONTROL

The design of streets, sidewalks, site entries and paths to buildings should clearly guide people to public routes and discourage access to restricted areas. The strategic use of paving, bollards, lighting, fences, signage, and landscaping communicate that access is limited to those with a legitimate purpose. Security of parking facilities, with elements such as fencing to limit exit options, also help prevent theft. Properly implemented, these design elements indicate where access is allowed and help create places where people feel safe to walk and approach. The effective result can be to deny opportunities for crime by creating a perception of risk in potential offenders.

8.1.4 MAINTENANCE

The “broken window” theory of crime prevention states that a deteriorated place will attract crime and a well-maintained place deters crime. Proper maintenance and upkeep demonstrate cleanliness and an intolerance for disorder. While on-going maintenance is not the responsibility of the designer, many decisions made during design can improve the appearance, durability, and maintainability of a facility. For example, reclaiming boarded-up, abandoned or unused areas by opening and re-glazing promotes natural surveillance. Remove unused auxiliary facilities such as freight houses, shelters, and sheds to provide natural access control. Select low-maintenance materials, colors and finishes that age well despite infrequent maintenance and cleaning. Create easy to maintain landscapes that eliminate hiding places allow light to penetrate. Specify durable and maintainable materials that are shatter resistant and shielded with protective screens to resist damage and facilitates upkeep. For example, shielding is most common for infrared heaters and light fixtures and represents a justifiable increased cost by reducing replacement costs.

8.1.5 COMMUNITY

Encouraging a sense of community at a station facility through a diversity of uses throughout the day helps to maintain natural surveillance through “eyes on the street”. Providing spaces adjacent to the station that can support complementary uses by the local community, such as markets or parks, increase the number of people that use or pass through a space to help link it to the community so that the facility is seen as a multi-use asset. Promoting activities that encourage local participation and attract occupancy during non-peak hours provide additional security and community connections.

8.1.6 REFERENCES

Review the various CPTED resource materials available in the links below and through other means:

- ISO Standard: https://www.iso.org/obp/ui/#iso:std:iso:22341:ed-1:v1:en.
- APTA White Paper: https://www.apta.com/wp-content/uploads/APTA-SS-SIS-RP-007-10_Rev1.pdf.
- DOT-FTA Report: https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/ftasesc.pdf.
- International CPTED Association: https://www.cpted.net/.

9 MATERIALS, PRODUCTS, & PERFORMANCE STANDARDS

This section provides material and performance standards that apply to multiple station elements and locations. For reference purposes the content is arranged using Construction Specifications Institute (CSI) division numbering. Listed products or manufacturers are examples only. Materials need to be specified to meet applicable federal procurement requirements.

9.1 FEDERAL PERFORMANCE SPECIFICATION WRITING REQUIREMENTS

Specifications must be written to be FTA compliant and include a clear and accurate description of the technical requirements for the property or services to be acquired in a manner that provides for full and open competition. When practicable, requirements should be described in terms of functions to be performed or level of performance required, including the range of acceptable characteristics or minimum acceptable standards. When it is impractical or uneconomical to provide a clear and accurate description of the technical requirements, a “brand name or equal” description may be used to define the performance or other salient characteristics of the property or services to be acquired. Under the “brand name or equal” approach, the specification must clearly identify the salient characteristics of the named brand that offerors must provide. FTA’s “Best Practices Procurement Manual” contains additional information on preparation of specifications including examples with specific language: www.transit.dot.gov/funding/procurement/third-party-procurement/ftas-best-practices-procurement-manual

9.2 DIVISION 03 – CONCRETE

Include crystalline waterproofing admixture in concrete mix design for any concrete wall, ceiling or floor that may be susceptible to water penetration.

Concrete additives and toppings can be used to improve hardness, chemical resistance to salt, and slip resistance.

Provide waterproofing on the exterior face of below-grade concrete construction.

9.3 DIVISION 04 – MASONRY

9.3.1 EXTERIOR MASONRY

Coordinate with Division 09 – Finishes for interior finishes.

Primary considerations in the selection of exterior wall materials for depots are weather resistance, protection, durability, structural integrity, fire resistance, initial cost, and maintenance. Consider premium high-performing, low-absorption stone, brick, and precast masonry. Graffiti-resistant measures include the use of textured surfaces, coatings, and applied finishes. Masonry offers the advantage of integral coloring and thus eliminating the need for periodic painting.

At new exterior walls, a concrete foundation wall, Class III limestone, or hard stone base with limited porosity shall extend a minimum of 18 inches above the platform surface to protect finished surfaces from standing water, salts, and snow. Extend the same masonry material up to the windowsills where glazing is at 24” above the adjacent hardscape. The finished hardscape elevation should be high enough to have water drain away from the building and meet running slope and cross slope requirements.

Brick may be used structurally or as a veneer surface over Concrete Masonry Unit (CMU), wood, or metal frame construction. The brick finish may be carried into the interior as a unifying design treatment. Brick is non-combustible, abrasion resistant, and available in a variety of colors and textures. A clear graffiti-resistant coating shall be applied to masonry surfaces within reach range of an adult.

Face Brick shall comply with ASTM C216. Minimum grade: SW. Minimum Type: FBS.

Brick for reinforced masonry construction shall comply with ASTM C62. Minimum Grade: SW

CONCRETE BLOCK:
Suitable for interior utility spaces. Textured decorative face treatments, such as split-faced or fluted may be considered. Load-bearing concrete block shall comply with ASTM C90. Minimum Grade: N. Minimum Type: Type I.

9.4 DIVISION 05 – METALS

9.4.1 FINISHES

Exposed metals shall be coated to prevent rusting. DL Downey 4-Step powder coat and Lumiflon FEVE finishes are preferred.

Specify shop priming and finishing of painted metals.

Finish systems shall be able to be field repaired.

9.4.2 FENCING

Site fencing should be constructed with woven wire fabric, chain link or metal tubing. The bottom of the fence should provide a gap no greater than 4” high for ease of snow removal.

Opaque fencing can serve as an alternate to landscape screening. Materials may include pressure treated pine, cedar and premanufactured screen and enclosure systems of vinyl and metal.

Fencing of metal tube and solid components providing an ornamental appearance may be used in highly visible areas in lieu of a chain link fence.

Ornamental metal fencing should have a factory applied painted steel finish with BL Downey 4-Step powder coating process to provide a high level of durability and corrosion resistance due to use of deicing materials at Metra facilities. The use of field-applied metal finishes is discouraged due to a lower level of service life and corrosion resistance.

Anodized aluminum ornamental metal fencing may be considered on a case-by-case basis to maintain consistency with an existing aesthetic or at the request of the local jurisdiction.

Chain link fencing should be PVC-coated and have a top rail and bottom tension wire.

9.4.3 GUARDRAILS

Guardrails shall be constructed of painted galvanized steel tubing with main posts spaced at a maximum of 48 inches horizontally. Guardrails should be continuous between expansion joints with a slip-joint internal sleeve extending 2 inches beyond the joint on either side and fastened securely to one side. Guardrail posts can be embedded into galvanized steel sleeves cast or drilled into concrete curbs or welded to base plates bolted into the curbs with appropriate anchors for the material. Raised curbs for

post anchoring are preferred to remove potential for salt corrosion. Paint coatings need to be high-quality and high-performance to withstand corrosion from de-icing salts. One such product to consider is the Lumiflon FEVE architectural coating.

9.4.4 BICYCLE RACKS

Bicycle racks should be fabricated of 4”x4”x.25” steel metal tubing with 0.25” thick steel mounting plates. All components to be shop welded and hot dip galvanized to CDOT standards prior to application of matte black powder coat finish. Depending upon the color palette and site design the natural hot dipped galvanized finish may also be acceptable.

When requested by local partners, Metra may consider other bicycle rack styles to maintain visual and maintenance consistency within those communities.

9.4.5 MOTORCYCLE TETHERING

Motorcycle tethering components should be fabricated of 6” dia. x 0.375” wall HSS tubing and plate with 0.375” thick mounting plates. All components to be shop welded and hot dip galvanized to CDOT standards prior to application of matte black powder coat finish. Depending upon the color palette and site design the natural hot dipped galvanized finish may also be acceptable.

9.5 DIVISION 06 – WOOD AND PLASTICS

No entry.

9.6 DIVISION 07 – THERMAL AND MOISTURE PROTECTION

9.6.1 ROOFING

All roofing systems shall have a minimum 20-year warranty.

Use ice shield on roof valleys and roof overhangs.

ASPHALT SHINGLES:
Suitable for moderate to steep roof pitches. Fiberglass cores are preferred over organic felt because of their greater strength and resistance to moisture.

STANDING SEAM METAL:
Suitable for improved aesthetics and slopes of 3 inches per foot or greater. Use a minimum of 24 gauge or 0.032-inch aluminum. Provide ice and snow guards on standing seam for at least the lower 3 feet of standing seam roofs.

SLATE, CLAY, WOOD:
Some municipalities may require wood shakes, slate shingles, or roofing tiles. Consider these options for historic depots and when the budget allows. Typically, the requesting municipality bears the costs of material enhancements.

BUILT-UP:
Fiberglass felt is preferred over organic. Bitumen shall be asphalt based. Coal tar pitch is unacceptable. Since the materials are flammable, a Class A system shall be used. Pitch shall be a minimum of 1/4 inch

per foot. If the slope exceeds 1 inch per foot, mechanically secure the felt plies to the roof substrate. For slopes greater than 2 inches per foot, use a mineral coated cap sheet in place of the gravel surface.

MODIFIED BITUMEN:
Suitable for low slope roofs. Can be fully adhered, mechanically fastened, mopped in, or torch applied.

SINGLE-PLY:
Can be adhered or mechanically fastened to the roof substrate or loose laid and ballasted. The adhered or mechanically fastened systems are preferred for retrofit buildings to avoid the additional structural support needed for the ballast weight. Joints are minimal due to the large membrane widths.

9.6.2 INSULATION

Follow the current American Society of Heating, Refrigerating, and Air Conditioning Engineers standards for insulation thickness and R-values unless local energy codes are more stringent.

Do not use fiberboard because of its tendency to decompose. Consider alternatives to fiberglass batts such as closed cell foamed plastics, spray foam, mineral wool, polyisocyanurate boards, polystyrene, and other products that achieve a high R-value per inch to meet current energy codes.

9.7 DIVISION 08 – OPENINGS

9.7.1 DOORS AND HARDWARE

Pivoted (balanced) single or double leaf swing doors shall be used for exterior doors excluding historical structures. These doors are typically aluminum, and a maximum two-thirds glazed. Hinged single leaf swing doors are recommended for interior use. The doors may be solid core wood or hollow metal. Doors shall be fire-rated, and UL labeled where required. All exterior doors shall be weather stripped for energy conservation and equipped with an electric strike. Automatic door operators are not recommended because of the high initial cost and the need for frequent maintenance services. Use electronic push button or touch-free systems to operate doors. Panic hardware shall be installed on the exterior doors required by code for emergency exiting.

ALUMINUM ENTRANCE DOORS:
Metra standard for exterior doors is Ellison Balanced Doors manufactured by Ellison Bronze Co., Inc., with two-thirds glazing. These doors may be supplied with transoms and sidelights. The number and location of entrance doors at a new depot shall be in accordance with the planning criteria. Aluminum entrance doors shall comply with ASTM Standards B209-86, B221-85A, C1048-85, as well as CPSC-16 CFR PART 1201 – Safety Standard for Architectural Glazing Materials.

SOLID CORE FLUSH WOOD DOORS:
Suitable for the interior of depots. Do not use hollow core flush doors. Face veneers may either be painted or stained. Wood door thickness shall be 1-3/4”.

WOOD DOORS:
Shall comply with AWI standards:

- DOOR GRADE: .....Custom
- VENEER FACE GRADE: II
- CORE: .....
- RATED DOOR: .....Dependent on code requirements

- NON-RATED DOOR: .....FLC-7 or better

FIBERGLASS DOORS:
Fiberglass doors and frames are the standard for all other exterior doors, and interior storage, janitor closet, and mechanical spaces due to their resistance to salt, chemicals, and graffiti. Install with fiberglass frames and thresholds. Frames shall be grout filled. Use 1-3/4" insulated doors. "Chempruf" is an example of an acceptable product.

PRESSED STEEL DOOR FRAMES:
Recommended for both wood and steel doors. All frames shall have anchors suitable for the adjacent wall or partition material.

HARDWARE:
Heavy-duty commercial type strong enough to resist hinge racking from the suction forces of passing express train.

PUBLIC ENTRY DOORS:

- Offset pull handle
- Horizontal panic /push bar
- Continuous geared hinge
- Automatic door operator with actuator push buttons
- Mortise locksets with deadbolts and cylinders by Best Lock Corporation
- Time lock mounted in door frame
- Master keying system with grandmaster key
- Weather-stripping
- Kickplate on push side
- Corrosion resistant, heavy-duty rabbeted threshold

INTERIOR DOORS:

- Overhead closers with hold-open to facilitate cleaning
- Privacy lock for single-use restrooms
- Mortise key locks for ticket agent, storage, janitor, and mechanical rooms
- Deadbolt and wide-angle peep hole for ticket agent doors
- Kickplate on push side
- Doorstops or bumpers
- Silencers

KEYING:
Coordinate keying requirements with the appropriate Metra department, or local jurisdiction.

9.7.2 ROLLING DOORS

Overhead rolling doors may be steel or aluminum. Steel shutters shall be minimum 22-gauge and hoods 24-gauge. Aluminum shutters shall be minimum 0.050 inches thick and hoods 0.040 inches.

ROLLING OVERHEAD SECURITY SHUTTERS:
Solid roll-up screens shall be used at the ticket agent window and at the vendor window pass-through. The ticket agent shutter shall be a lockable, rolling counter shutter. The vendor shutter shall be a roll-up aluminum security shutter with a mortise locking option. Basis of Design is Apton Counter Shutter by

Apton Door, a Gichner Systems Group, Inc. Company. The maximum shutter size is 6 feet wide by 4 feet high.

ALUMINUM OVERHEAD ROLLING GRILL:
Use to separate a portion of the waiting area vestibule designated as a 24-hour waiting area so that it can be heated by the same system as the waiting room.

9.7.3 STOREFRONT

Commercial grade, anodized aluminum storefront systems sized to accommodate specified glazing. Exterior systems to be thermally broken and sized to accommodate insulated and laminated safety glazing. System to include all accessories such as sill flashing with end dams, gasketing, steel clips for anchoring to rough opening, setting blocks, etc. Color finishes to be high-performance, two-coat PVDF. For durability reasons avoid specifying stick glazing systems.

9.7.4 WINDOWS

Operable windows are preferred when depots have ticket agents to provide natural ventilation. All operable windows shall be lockable. Aluminum or aluminum-clad wood frames are acceptable.

In waiting spaces, interior ledges that allow customers to set down a travel mug are one small detail that enhance the customer experience.

For aluminum windows, provide a protective finish of either alumite for a natural finish or an anodized paint for color.

Aluminum windows shall comply with ANSI/AAMA 101:

- Grade: Commercial
- Performance Class/ Design Pressure: 20 PSF minimum both inward and outward

Operable windows that are double-hung or sliding are preferred since they do not project beyond the wall plane when opened. Hinged or awning windows may be appropriate depending on the context and if they do not obstruct circulation routes when opened.

9.7.5 GLAZING

Incorporate compliance with energy codes into the design of the complete glazing system by accounting for items such as shading, percent glazed area, adjacent wall construction, etc.

Glazing should be clear or tinted. Textured or patterned material should be avoided except at toilet room windows. Reflective coatings are not recommended because visibility is diminished. To maximize safety and minimize replacement cost, resistance to breakage is an important factor in the selection of glazing material. Options include:

LAMINATED SAFETY GLASS:
Preferable to tempered glass since the lamination holds shattered glazing in place. Dividing into smaller panes reduces the potential for breakage and facilitates replacement. Laminated safety glass is usually reserved for use in skylights and when required by building code.

FLOAT GLASS:
Minimum thickness of 3/16 inches. The maximum length or width shall be 36 inches.

POLYCARBONATE GLAZING:
Consider in high vandalism areas. Surface film treatments should be used to improve resistance to scratching and UV weathering. Polycarbonate glazing shall be 3/16 inches thick, and the maximum pane dimension shall be 36 inches.

FRAMING:
Design framing to allow for ease of re-glazing. Polycarbonate glazing expands up to four times as much as glass so detail the frames and rabbet depths accordingly to allow the glazing to expand and contract without constraint. Through bolting or use of other inflexible fasteners for polycarbonate glazing should be avoided.

SECURITY BARS OR SCREENS:
May be necessary for shielding of windows.

TICKET AGENT WINDOW:
Level 3 bullet-resistance assembly including the glazing, framing and any transaction trays or speak-thru devices.

9.8 DIVISION 09 – FINISHES

Integrally colored materials are preferable to applied finishes for durability and ease of maintenance. Partitions enclosing ticket agent office facilities shall be masonry and shall extend to the structure above for security. Applied finishes are necessary for both plaster and drywall construction and may be needed for concrete block masonry. Finishes should be limited to paint and similar coatings, and to ceramic tile. Vinyl fabric wall coverings and wood and plastic paneling should not be used in passenger areas.

9.8.1 PARTITIONS

BRICK:
Is suitable for interior partitions where it is also used as the exterior material.

CMU:
A rough-textured decorative face treatment can discourage graffiti. Painted concrete block may be used where exposed in non-public areas such as storage and mechanical rooms.

GLAZED BRICK AND CMU:
Can be a decorative and maintainable finish suitable for passenger areas.

PLASTER:
On metal lath is suitable for renovation work where there is a need to match existing plaster finishes.

GLASS BLOCK:
May be used as a partition material where appropriate to increase daylight penetration.

GLAZED CERAMIC OR PORCELAIN TILE:
With through-body color is recommended for toilet room walls and may be considered for decorative use in other locations.

DRYWALL:
Can be mounted to CMU. Do not use drywall as the public-facing finish of interior partitions. Drywall is suitable for closets, storage rooms and similar back-of house spaces.

PAINT:
Prime as per substrate and finish with two coats of a semi-gloss alkyd enamel for ease of cleaning and durability.

9.8.2 FLOORING

Must be suitable for high-volume traffic, heavy usage, ease of maintenance and meet requirements for slip resistance. Hard-surfaced flooring is preferable to resilient flooring for passenger areas. Some options include:

QUARRY TILE:
Good for waiting rooms and passenger traffic areas. Minimum of 3/4" thick.

TERRAZZO:
Suitable for high traffic areas. Should be a "sand-cushion" cast-in-place system.

PORCELAIN TILE:
Suitable for toilet rooms. Specify through-body color.

CONCRETE:
Suitable for non-public areas such as storage rooms, mechanical equipment rooms and unfinished vendor areas. Consider additives and toppings to improve hardness, chemical resistance, and slip-resistance.

RESILIENT RUBBER:
Easily cleaned and low maintenance. Minimum base thickness of 3/16" and a raised stud pattern with minimum stud height of 0.05".

9.8.3 FLOOR MATS

RECESSED FLOOR MATS:
At entry vestibules should be abrasive vinyl instead of carpet. Allow for the replacement of single tread rails without dismantling the entire grid system. At some depots, the slab thickness may only accommodate a level base or a shallow pit mat. At high traffic locations where a thick slab can be provided, provide a deep pit mat with a drain attachment.

ANTI-FATIGUE FLOOR MATS:
Locate in each ticket agent's office.

9.8.4 CEILINGS

Ceilings shall maximize sound absorption and minimize sound transmission and reverberation. Ceilings should be at least 9 feet high. Ceilings should be white or off-white for light reflection.

METAL ACOUSTIC PANELS:
May be used in waiting rooms and other public areas when ceiling heights are less than 10 feet as it is less susceptible to damage and non-combustible.

MINERAL FIBER PANELS:
May be used in ticket agent offices and employee utility areas.

GYPSUM BOARD:
Suitable for sloped ceilings and restrooms in public areas.

9.8.5 COATINGS

Anti-graffiti coatings should be non-sacrificial where possible and shall not stain or darken the color of the material it is protecting.

9.9 DIVISION 10 – SPECIALTIES

This division reserved for future use.

9.10 DIVISION 11 – EQUIPMENT

This division reserved for future use.

9.11 DIVISION 12 – FURNISHINGS

9.11.1 PLATFORM SEATING

Bench seating for platforms may be hardwood, concrete, powder-coated metal, or a different material as approved by Metra. Armrests and skateboard deterrent elements are required.

9.11.2 WAITING AREA SEATING

Interior seating should be anchored to the floor or wall mounted. Wall mounted benches are preferred to facilitate floor cleaning. Provide comfort through contoured designs with regularly spaced armrests. Do not use molded plastic seating.

9.12 DIVISION 13 – SPECIAL CONSTRUCTION

This division reserved for future use.

9.13 DIVISION 14 – CONVEYING SYSTEMS

9.13.1 ELEVATOR EQUIPMENT

Provide direct-plunger hydraulic elevators. Hydraulic operation eliminates the need for an overhead machine room and requires only a small enclosure to house the pumping equipment. A speed of 100 feet per minute is adequate for elevators. The oil shall be heated to remain at the required operating temperature.

Elevators and elevator lobbies should be sized to accommodate a stretcher. Elevator lobbies should be heated and enclosed from weather. Elevator control rooms must be conditioned in accordance with manufacturers recommendations. The lower floor position shall be the resting position of the elevator. Call buttons should be labeled S for Station and P for Platform with corresponding braille.

Consider maximizing glazing at hoist ways, cabs and doors for increased visibility and security. Elevator and lobby finish materials should be resistant to platform salt, weather conditions, and vandalism.

9.14 DIVISION 21 – FIRE SUPPRESSION

This division reserved for future use.

9.15 DIVISION 22 – PLUMBING

This division reserved for future use.

9.16 DIVISION 23 - HVAC

This division reserved for future use.

9.17 DIVISION 26 – ELECTRICAL

This division reserved for future use.

9.18 DIVISION 27 - COMMUNICATIONS

This division reserved for future use.

9.19 DIVISION 28 – ELECTRONIC SAFETY AND SECURITY

This division reserved for future use.

9.20 DIVISION 31 - EARTHWORK

This division reserved for future use.

9.21 DIVISION 32 – EXTERIOR IMPROVEMENTS

9.21.1 ASPHALT SEALERS

Asphalt platforms should be seal coated at the time of construction. Consideration may be given to the use of sealers with low albedo to enhance customer comfort, prolong asphalt pavement life and reduce heat absorption and the resulting heat island effect. The following manufacturers provide heat reduction surface applied sealers.

- https://neyra.com/products/sealers/sunshield/
- https://guardtop.com/coolseal/

9.21.2 DETECTABLE WARNINGS

Detectable warning panels shall be installed on all new projects. The joints between the panels and adjacent materials shall be sealed with exterior grade sealants. For detectable warning surfaces at platform edges, note that there are no exceptions in ADA section 705 for the dome to dome spacing across expansion joints. Provide details dictating the maximum dome spacing to comply with ADA and to avoid cuts through domes in polymer warning tiles. Types:

- Cast iron by Neenah Foundry at curb ramps
- Polyethylene composite by Armor Deck at platforms

9.21.3 PAVEMENT DESIGN

The following minimum thicknesses shall be verified for adequacy with the Geotechnical Engineer considering bus routes, trash collection and other service vehicle uses. The material designations below refer only to IDOT standards for brevity. Similar materials shall be specified in Indiana and Wisconsin.

- Main Parking Lot Pavement:
  - 1-1/2 inches Hot-Mix Asphalt Surface Course, Mix “D”, IL-9.5, N50.
  - 2-1/4 inches Hot-Mix Asphalt Binder Course, IL-19.0, N50.
  - 10 inches Aggregate Base Course (*), Type B.
  - 4-1/2 inches Bituminous Base Course (as an alternative to aggregate) with a freely draining subgrade of existing soils or an open-graded aggregate subgrade.

  (*) The ten inches of aggregate base course can be reduced in depth by one or two inches, depending on the condition of the subgrade based on the geotechnical analysis.

- Bus Bay or Loading Area:
  - 8 inches jointed, reinforced P.C.C. Pavement (PACE Standard).
  - 4 inches Aggregate Sub-Base, Type B.
- Motorcycles (See the Appendix for design diagrams):
  - 6 inches jointed, reinforced P.C.C. Pavement (PACE Standard).
  - 4 inches Aggregate Sub-Base, Type B.
- Commuter Bicycle, Bike Share and E Scooter (See the Appendix for design diagrams):
  - 5 inches jointed, reinforced P.C.C. Pavement.
  - 2 inches Aggregate Sub-Base, Type B.

Pavement sections and materials other than those listed above may be used, considering factors such as actual bearing capacity of subgrade, availability and cost of materials, and experience with other lots in the area. Major pavement typical sections are composites based on sections previously used on Metra or IDOT/FTA commuter lots and sections specified in local municipal codes. Geotechnical Fabric should be used whenever the subgrade silt content exceeds 10% or the IBR is less than 3.5. Paving for motorcycle or scooter parking should be concrete slab instead of asphalt to withstand punctures from kickstands.

Pavement materials and construction methods shall be in accordance with the requirements of the Illinois Department of Transportation (IDOT) which are contained in the latest addition of the Standard Specifications for Road and Bridge Construction. Refer to equivalent references available in Indiana or Wisconsin as appropriate. Portland Cement Concrete should have a 5% to 8% air entrainment and a 3500-psi minimum 14-day compressive strength.

9.21.4 PLANT SELECTION CONSIDERATIONS

When selecting plants and determining their placement on Metra owned sites, adhere to the following characteristics:

- Salt tolerance.
- Tolerance to auto exhaust and reflected heat from parking surfaces.
- Hardiness to climate of locale where they will be installed.
- Disease and insect resistance.
- Adaptability to wet or drought conditions.
- Tolerance to wind, ice, and frost damage.
- Adaptable to soil pH effects from pavement limestone base course, and possible runoff of oil and pollutants from the pavement surface.

- Restricted root zones in islands.
- Physical damage from piling of plowed snow on or against plants or placement over critical root zones.
- Not toxic to people and pets.
- Low maintenance.
- Thorn-less and non-fruiting are desirable characteristics.
- Ornamental characteristics such as flowering and good fall color.
- Year-round screening.
- Leaf type and size to avoid clogged inlets.
- Shallow rooted plants should be avoided.
- Local availability and low cost.
- Flowers should be perennial plants and spaced when first planted to provide for a minimum of 3 years of growth.
- Shrubs and hedges should not exceed 30" height at maturity or be maintained at that height.
- Shade trees should be branched no lower than 7' at time of installation.
- All plantings shall be provided in accordance with criteria as outlined for each plant type as stipulated in ANSI Z60.1 latest edition used Including specie, type, size, condition, and allowable container size and type.
- Plant materials shall be certified nursery stock grown under climatic conditions similar to the site locality in which they are to be planted.
- All trees shall be balled and burlapped and shrubs shall be balled and burlapped or delivered in appropriately sized containers.

9.21.5 PLANT LIST

The following plant lists are provided for general information and are representative of the plants deemed appropriate for use on Metra sites. The design team shall prepare a proposed list of plants for use on the site and submit to Metra for approval prior to advancing the plans beyond 30%:

TABLE 9-1: RECOMMENDED PLANTINGS

Species	Description
Trees- Large (>40 ft)	
Red Maple (Acer Rubrum)	Mature Height - 60 Feet Spread - 60 Feet Broad-leaved deciduous tree Good for street planting and summer shade Chicago/Illinois Native: yes
White Oak (Quercus alba)	Mature Height - 90 Feet Spread - 60 Feet Broad-leaved deciduous tree Good for street and specimen planting Chicago/Illinois Native: ?
Hackberry (Celtis occidentalis)	Mature Height – 40 to 60 Feet Spread – 40 to 60 Feet Broad-leaved deciduous tree Specimen Chicago/Illinois Native: Yes
Black Tupelo (Nyssa sylvatica)	Mature Height – 30 to 50 Feet Spread – 20 to 30 Feet Broad-leaved deciduous tree Good for Specimen and shade tree Chicago/Illinois Native: Yes

Species	Description
Shawnee Brave Bald Cypress (Taxodium distichum 'Mickelson')	Mature Height – 50 to 75 Feet Spread – 15 to 20 Feet Deciduous conifer tree Good for street and urban uses Chicago/Illinois Native: Yes
Blue Spruce (Picea pungens)	Mature Height – 30 to 60 Feet Spread – 10 to 20 Feet Evergreen tree Good as specimen and screening Chicago/Illinois Native: No
Tree- Medium (30-40 ft)	
China Snow Peking Lilac (Syringa pekinensis 'Morton')	Mature Height (ft): 20-30 Mature Spread (ft): 15-25 Broad-leaved deciduous tree Good for parking lots, streets and under utility lines Chicago/Illinois Native: no
Japanese Tree Lilac (Syringa reticulata 'Ivory Silk')	Mature Height (ft): 20-25 Mature Spread (ft): 15-20 Broad-leaved deciduous tree Specimen, street, screen, borders in mass, Native: no
Limber Pine (Pinus flexilis)	Mature Height (ft): 30-50 Mature Spread (ft): 15-35 Evergreen tree Good for landscape and winter interest Native: no
Tree- Small (up to 30 ft)	
Downy Serviceberry (Amelanchier arborea)	Mature Height (ft): 15-25 Mature Spread (ft): 15-25 Broad-leaved deciduous tree Good under utility lines and as specimen all year Native: yes
Apple Serviceberry (Amelanchier xgrandiflora)	Mature Height (ft): 20-25 Mature Spread (ft): 20-25 Broad-leaved deciduous tree Good under utility lines, as specimen all year, disease resistance Native: Nativar (hybrid of 2 natives)
Fringe Tree (Chionanthus viginicus)	Mature Height (ft): 12-20 Mature Spread (ft): 12-20 Multi-stemmed deciduous small tree or large shrub Good as specimen and under utility lines Native: yes
Nannyberry Viburnum (Viburnum lentago)	Mature Height (ft): 14-16 Mature Spread (ft): 6-12 Deciduous tree or large shrub Tall Hedge, screen, background Native: yes
Shrubs- Large (> 6 ft)	
Chokeberry (Aronia arbutifolia)	Mature Height (ft): 6-10 Mature Spread (ft): 3-6 Deciduous multistemmed shrub group or mass shrub border, Native: no
Spicebush (Lindera benzoin)	Mature Height (ft): 5-8 Mature Spread (ft): 5-8 Deciduous multi-stemmed shrub Naturalized shrub, showy flower, hedge, rain gardens Native: yes

Species	Description
Black Elderberry (Sambucus canadensis or Sambucus nigra var. Canandensis)	Mature Height (ft): 5-12 Mature Spread (ft): 5-12 Deciduous multi-stemmed shrub Naturalized, back of border hedge, Low spots, specimen Native: yes
Japanese Yew (Taxus cuspidata)	Mature Height - 6 to 10 Feet Spread - 5 to 7 Feet Evergreen shrub Withstands urban conditions
Southern Arrowwood (Viburnum dentatum)	Mature Height (ft): 6-10 Mature Spread (ft): 6-10 Deciduous shrub Durable, Screen, informal hedge, massing, border Native: yes
Doublefile Viburnum (Viburnum tomentosum)	Mature Height - 6 to 10 Feet Spread - 8 to 10 Feet Deciduous shrub Withstands urban conditions
Shrubs- Medium (3 to 6 ft)	
Taylor Juniper/ Eastern Red Cedar (Juniperus virginiana 'Taylor')	Mature Height (ft): 15—20 Mature Spread (ft): 3—4 Narrow evergreen shrub Specimen, street, screen, borders in mass, vertical accent Native: yes
Summersweet clethra (Clethera alnifolia)	Mature Height (ft): 3—8 Mature Spread (ft): 4—6 Deciduous shrub Good in full sun to shade, mass planting, foundation, hedge Native: no
Wild Hydrangea (Hydrangea arborescens)	Mature Height (ft): 3-5 Mature Spread (ft): 3-5 Deciduous mounded shrub Good in mass, background, border, and specimens Native: yes
Winterberry (ilex verticillata)	Mature Height (ft): 3-12 Mature Spread (ft): 3-12 Deciduous-multi-stemmed shrub Adaptable shrub, good hedge, foundation Native: yes
Tiger Eyes Sumac (Rhus typhina 'Bailtiger')	Mature Height (ft): 3-6 Mature Spread (ft): 3-6 Deciduous shrub Good for urban and road conditions, specimen, accent or massed, borders and foundations Native: yes
Indian Currant/ Coralberry (Symphoricarpos orbiculatus)	Mature Height (ft): 2-5 Mature Spread (ft): 4-8 Deciduous shrub Good for erosion control, Informal hedge, slope stabilizer Native: yes
Highbush Blueberry (Vaccinium corymbosum 'Northland')	Mature Height (ft): 3-4 Mature Spread (ft): 4-5 Deciduous round, spreading shrub Good on roadside, informal shrub, and hedge Native: yes
Shrubs-Small (up to 3 ft)	

Species	Description
Bearberry (Arctosaphylos uva-ursi)	Mature Height (ft): .5-1 Mature Spread (ft): 3-6 Creeping, broadleaf evergreen Good as ground cover, erosion control, over wall Native: yes
Cranberry Cotoneaster (Cotoneaster apiculatus)	Mature Height (ft): 2-3 Mature Spread (ft): 3-6 arching, mounded deciduous shrub Good as mass, banks, or slopes, foundation, and low informal hedge Native: no
Kalm's St John's wort (Hypericum kalmianum)	Mature Height (ft): 2-3 Mature Spread (ft): 2-3 Deciduous shrub Good as low hedge, border, and rocky slopes Native: yes
Fragrant Sumac (Rhus aromatica 'Gro-Low')	Mature Height (ft): 1.5-3 Mature Spread (ft): 6-8 Creeping, multi-stemmed deciduous shrub Good as ground cover and slope stabilizer Native: yes
Japanese Spirea (Spiraea japonica 'Froebelii')	Mature Height (ft): 3-4 Mature Spread (ft): 4-5 Deciduous shrub Good as hedge, specimen, mass, and near walkways Native: no
Creeping Juniper/ Trailing Juniper (Juniperus horizontalis)	Mature Height (ft): .5-1.5 Mature Spread (ft): 5-8 Creeping evergreen shrub Good for sprawling ground cover, rock gardens, retaining wall edges, mass, and slope erosion control Native: yes
Grey Owl Juniper (Juniperus virginiana 'Grey owl')	Mature Height (ft): 2-3 Mature Spread (ft): 4-6 Evergreen shrub Good for low hedge, border, windbreak, and screen Native: yes
Perennials	
Yarrow (Achillea spp.)	Mature Height (ft): 1-3 Mature Spread (ft): 1-3 Form: multi-stemmed, upright Native: no
Butterfly Weed (Asclepias tuberosa)	Mature Height (ft): 1-2.5 Mature Spread (ft): 1-1.5 Form: mounded Native: yes
Bushy Aster (Aster dumosus)	Mature Height (ft): 1-1.5 Mature Spread (ft): 1-1.5 Form: bushy Native: no
Coneflower (Echinacea spp.)	Mature Height (ft): 1-5 Mature Spread (ft): 1.5-2.5 Form: upright Native: yes

Species	Description
Blanketflower (Gaillardia spp.)	Mature Height (ft): .5-1 Mature Spread (ft): 1-1.5 Form: upright Native: no
Blazing Star (Liatris squarrosa)	Mature Height (ft): 2-4 Mature Spread (ft): .75-1.5 Form: upright, mounded Native: no
Black-eyed Susan (Rudbeckia hirta)	Mature Height (ft): 2-3 Mature Spread (ft): 1-2 Form: bushy upright Native: no
GRASSES	
Feather Reed Grass (Calamagrostis × acutiflora 'Karl Foerster')	Mature Height (ft): 3-5 Mature Spread (ft): 1.5-2.5 Form: Narrow, Upright Grass Use: Mass, group or specimen, narrow spaces, vertical accents Native: no
Rush or Sedge (Juncus 'Blue Dart'or Juncus tenuis, Juncus inflexus)	Mature Height (ft): 1-2 Mature Spread (ft): .75-1 Form: Low clump Grass Use: Ground Cover, Naturalize, water plant, rock garden Native: no
Switch Grass (Panicum virgatum)	Mature Height (ft): 3-6 Mature Spread (ft): 2-3 Form: Upright Grass Use: Accent, group or mass, screen, native gardens, naturalized, 07 Perennial border Native: yes
Little Blue Stem (Schizachyrium scoparium)	Mature Height (ft): 2-4 Mature Spread (ft): 1.5-2 Form: Upright Grass Use: Ornamental for borders, prairie, accent, mass, group Native: yes
Vines	
American Bittersweet (Celastrus scandens)	Mature Height (ft): 15-20 Mature Spread (ft): 3-6 Use: Quick cover for fences, arbors, trellises, posts. Ground cover Native: yes
Boston Ivy (Parthenocissus tricuspidata)	Mature Height (ft): Mature Spread (ft): 5-10 Use: Cover walls, trellises, arbors, or fences. Can also be used as Ground cover or erosion control Native: no
Trumpet Vine (Campsis radicans)	Mature Height (ft): Mature Spread (ft): 5-10 Use: Climb walls, trellis, fence, arbor, posts, stationary structures, ground cover Native: yes
Mulch	Bark chips 1/4 inch to 1 inch in diameter. Spread 2 inches deep over planting beds

The seed mix proposed below is comprised of species from the IDOT Class 4A - Low Profile Native Grass, Class 4B - Wetland Grass and Sedge, Class 5 - Forb and Annuals, & Class 5B - Wetland Forb

Mixtures. Not all species found in the referenced IDOT seed mixes have been included in the proposed mix. The proposed seed mix is intended to be applied at a rate of 12 lb/acre. 70% (8.4 lb/acre) of the mix shall be annual & perennial forbs and 30% (7.65 lb/acre) shall be grasses, sedges, and rushes. An additional 25 lb/acre of Annual Ryegrass and 25 lb/acre of Spring Oats shall also be included for every 12 lb/acre of the proposed seed mix. Biodegradable erosion control blankets are to be applied over seeded areas immediately following seeding.

TABLE 9-2: RECOMMENDED SEEDING

Forbs (Annuals)

Botanical Name	Common Name	lb/acre
Coreopsis lanceolata	Sand Coreopsis	0.15
Chrysanthemum maximum	Shasta Daisy	0.15
Gaillardia pulchella	Blanket Flower	0.15
Ratibida columnifera	Long Headed Coneflower	0.15
Rudbeckia hirta	Black-Eyed Susan	0.15
	Total	0.75

Forbs (Perennials)

Botanical Name	Common Name	lb/acre
Amorpha canescens	Lead Plant	0.425
Anemone cylindrica	Thimble Weed	0.425
Asclepias tuberosa	Butterfly Weed	0.425
Aster azureus	Sky Blue Aster	0.425
Aster laevis	Smooth Aster	0.425
Aster novae-angliae	New England Aster	0.425
Baptisia leucantha	White Wild Indigo	0.425
Coreopsis palmata	Prairie Coreopsis	0.425
Echinacea pallida	Pale Purple Coneflower	0.425
Liatris aspera	Rough Blazing Star	0.425
Lobelia silphilitica	Great Blue Lobelia	0.425
Parthenium integrifolium	Wild Quinine	0.425
Petalostemum candidum	White Prairie Clover	0.425
Petalostemum purpureum	Purple Prairie Clover	0.425
Physostegia virginiana	False Dragonhead	0.425
Potentilla arguta	Prairie Cinquefoil	0.425
Pychanthemum virginianum	Mountain Mint	0.425
Tradescantia ohiensis	Spiderwort	0.425
	Total	7.65

Grasses, Sedges & Rushes

Botanical Name	Common Name	lb/acre
Andropogon scoparius	Little Blue Stem	1.3
Bouteloua curtipendula	Side-Oats Grama	1.3
Carex stipata	Awl-Fruited Sedge	0.2
Carex vulpinoidea	Fox Sedge	0.2
Elymus canadensis	Canada Wild Rye	0.2
Juncus effusus	Common Rush	0.2
Sporobolus heterolepsis	Prairie Dropseed	0.2
	Total	3.6

Vegetative Cover & Stabilization

Common Name	lb/acre
Annual Ryegrass	25
Oats, Spring	25

9.21.6 PLANT ESTABLISHMENT AND MAINTENANCE

The following items shall be included in the establishment and maintenance schedule prepared for all proposed plantings. Plant establishment and maintenance activities shall include but not be limited to the following:

- Supplemental watering provided through temporary or permanent irrigation systems.
- Fertilization types for each plant type.
- Pruning (remove dead or damaged materials).
- Removal and replacement of dead plantings.
- Inspection and treatment of plantings for insect and diseases frequency.
- Refreshment of mulch materials within perennial planting beds and beneath specimen trees and shrub groupings.
- Adjustment and replacement as necessary of rodent and sun scald protection system during establishment period.
- Evaluation of overall plant growth and adjustments to soil, drainage, or other conditions to alleviate the adverse condition.
- Removal of perennial end of season vegetation and trimming of ornamental grasses straws Dividing and thinning of perennial plantings as required to maintain vigor and health.
- Litter removal.

9.22 TURF GRASS MOWING HEIGHT AND FREQUENCY.

Regular inspection for insect and or other pathogens such as Emerald Ash Borer. Ash Species remove and replaced. Likewise, plants which have been determined to be invasive over time (Bradford Pear, etc.) should also be removed from Metra sites and replaced with suitable alternatives from Metra plant lists. The following sites provide lists of invasive and or undesirable plants found in the Illinois landscape which should be removed if found on Metra property:

- https://www.invasive.org/illinois/speciesofconcern.html
- https://ipm.illinois.edu/first_detector/Exotic_Weed_Guide.pdf
- https://www.chicagobotanic.org/plantinfo/common_invasive_plants
- https://www.chicagobotanic.org/plantinfo/common_invasive_plants

9.23 DIVISION 33 – UTILITIES

This division reserved for future use.

END OF DOCUMENT

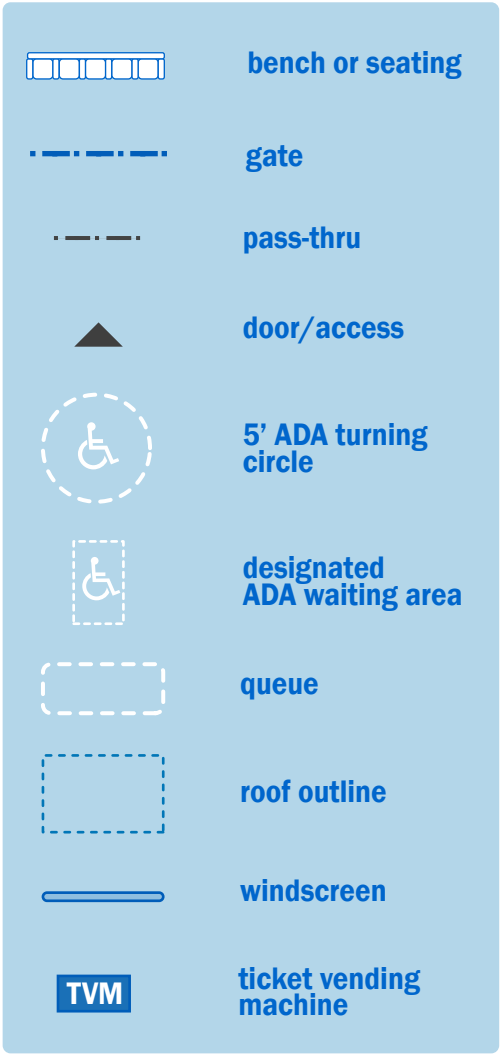
APPENDIX 1: FIGURES

APPENDIX 1 - FIGURE ABBREVIATIONS AND SYMBOLS

ABBREVIATIONS

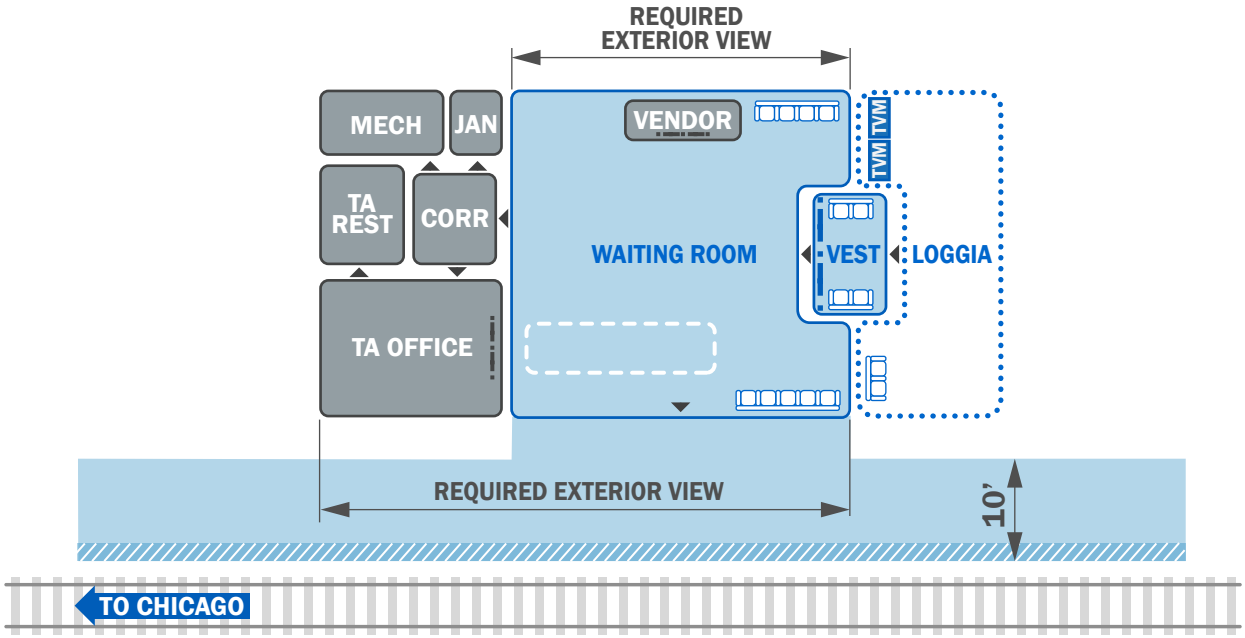
CORR	corridor
EMR	elevator machine room
JAN	janitor
MECH	mechanical
MIN	minimum
REST	restroom
TA	ticket agent
VEST	vestibule

SYMBOLS

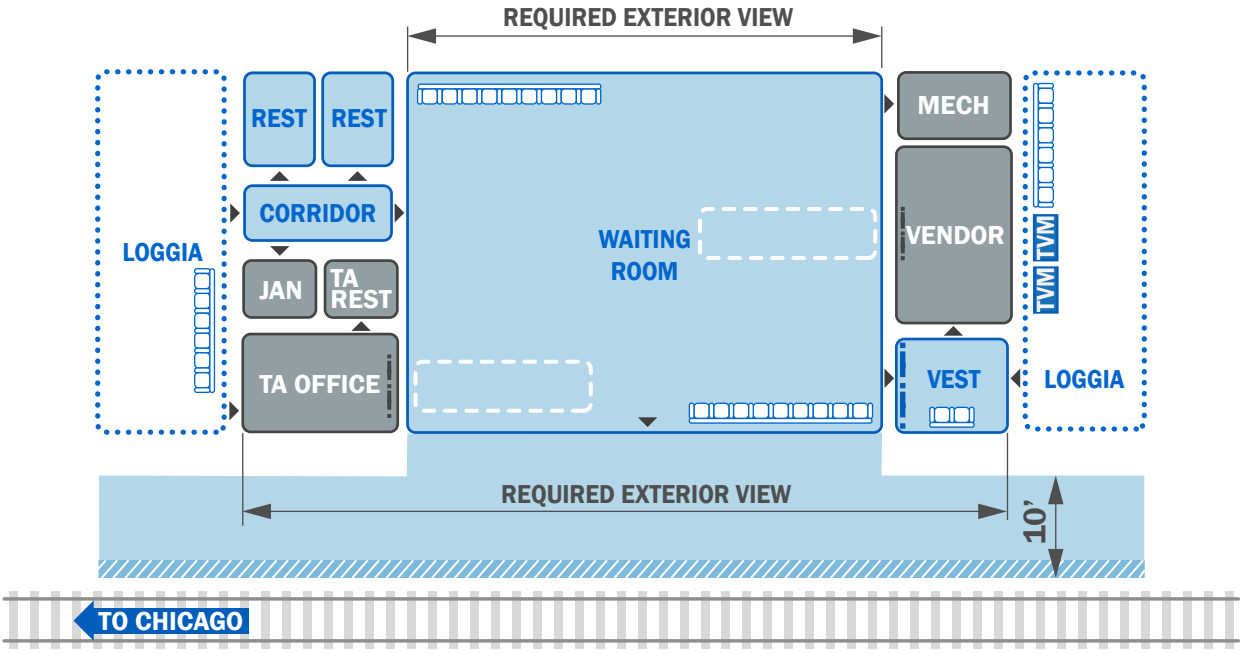


APPENDIX 2 - FIGURES

FIGURE 3A: DEPOT LAYOUTS

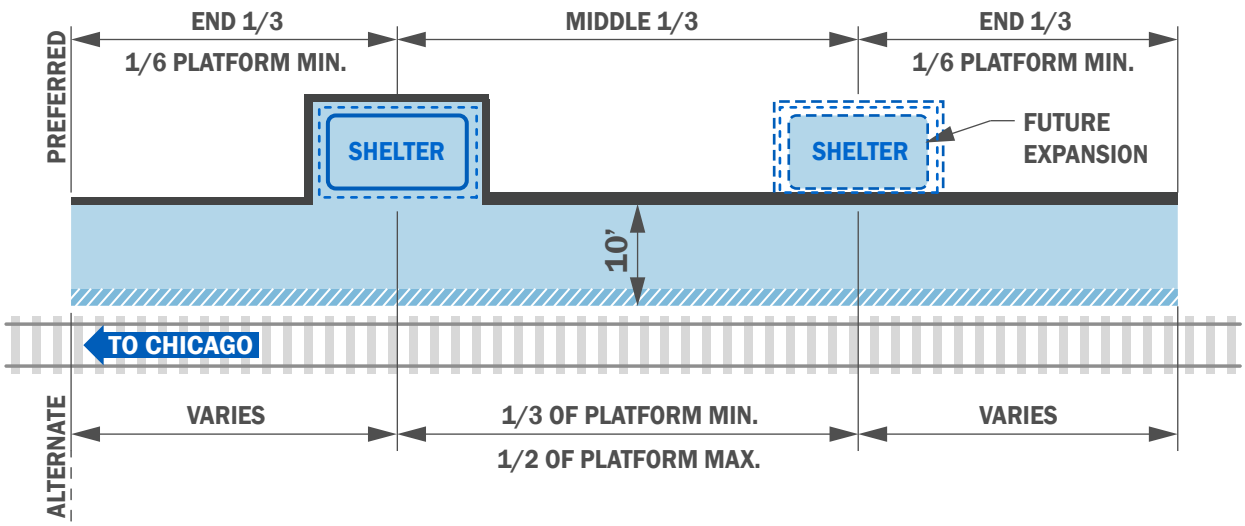


SMALL DEPOT

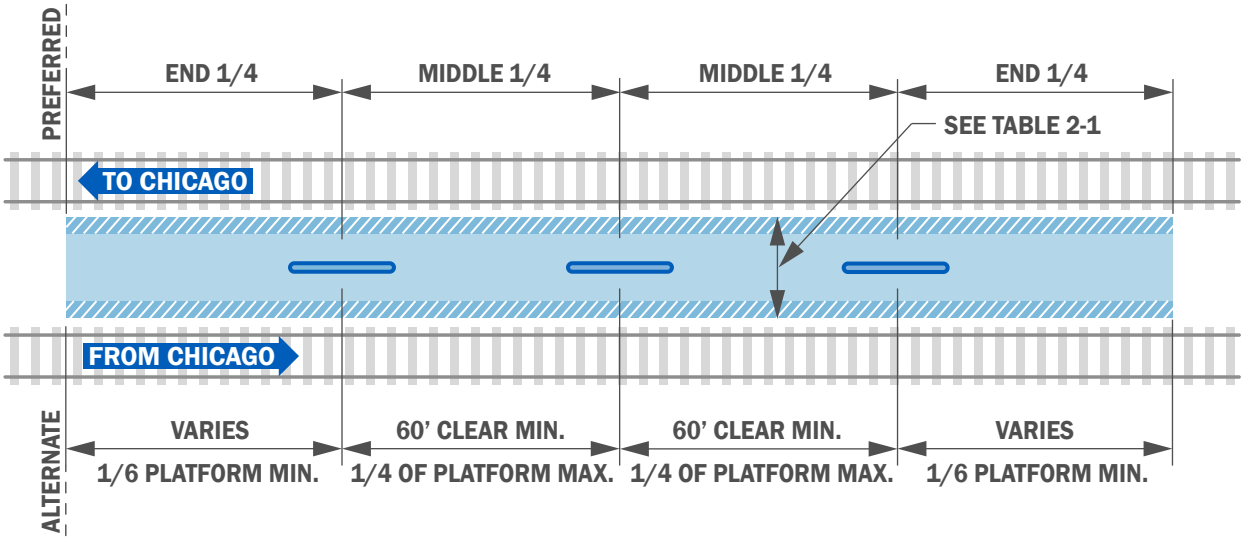


LARGE DEPOT

FIGURE 3B: SHELTER LOCATIONS

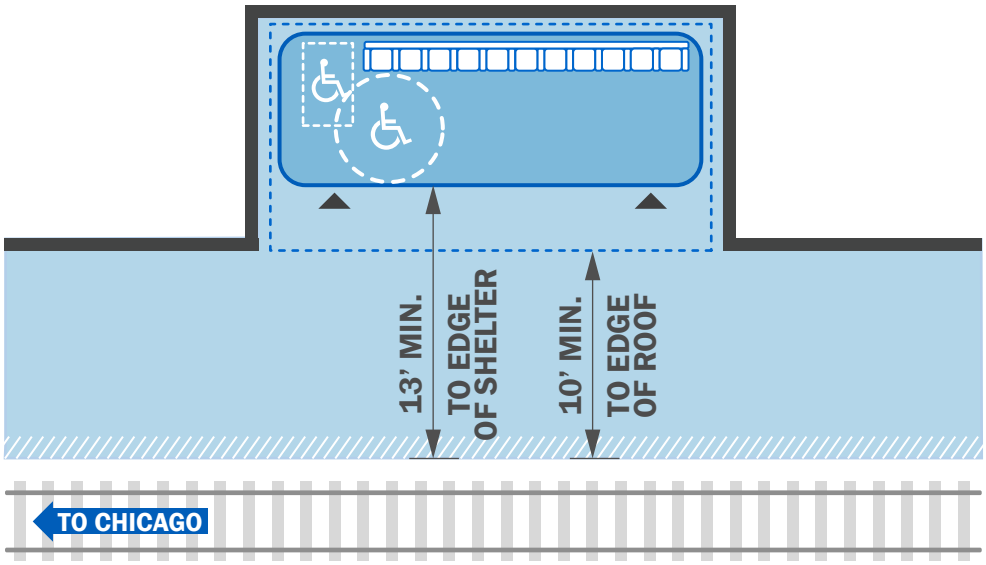


SIDE PLATFORM

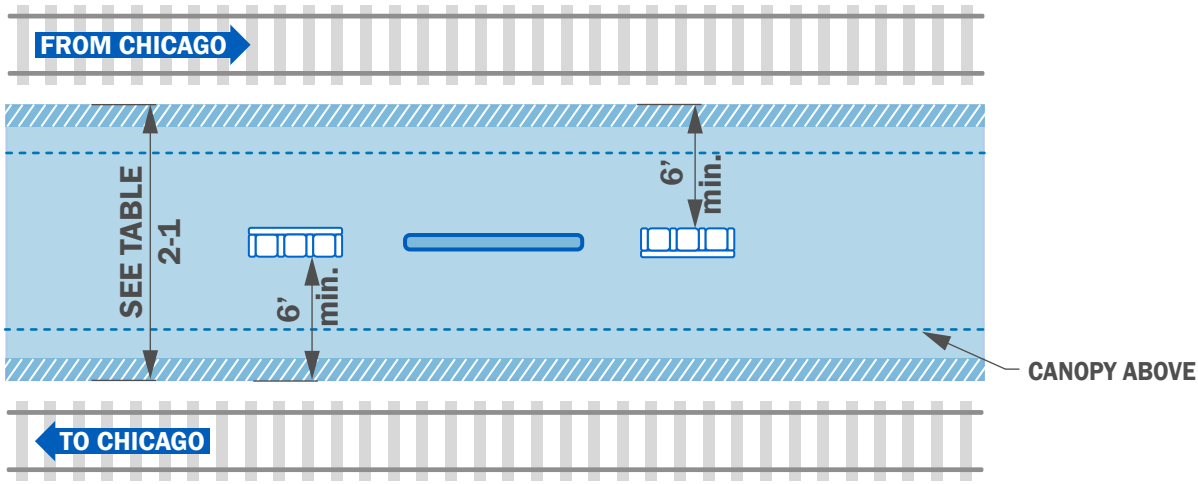


CENTER PLATFORM
WINDSCREEN

FIGURE 3C: SHELTER LAYOUTS



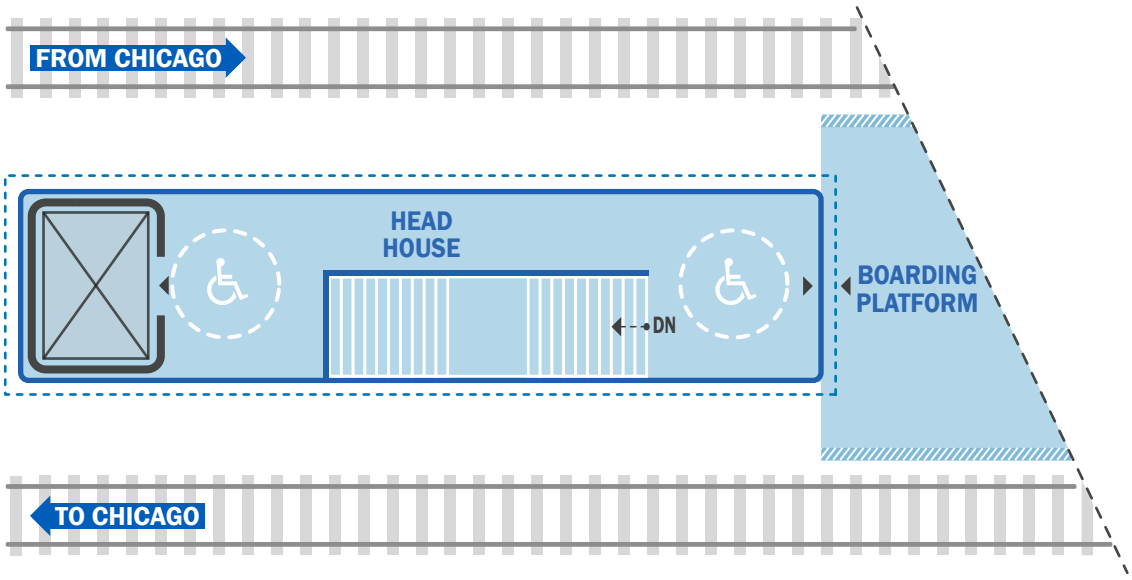
SIDE PLATFORM



NOTE:
MAINTAIN 6' MIN. CLEAR ON BOTH SIDES OF PLATFORM, ALONG ENTIRE LENGTH

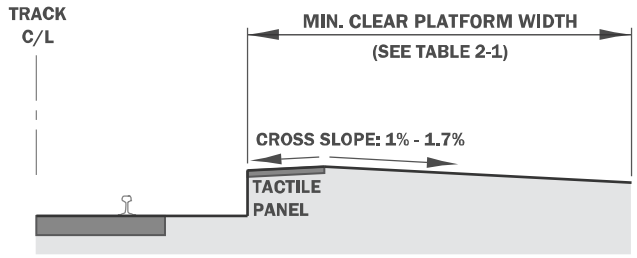
CENTER PLATFORM

FIGURE 3D: HEADHOUSE LAYOUT



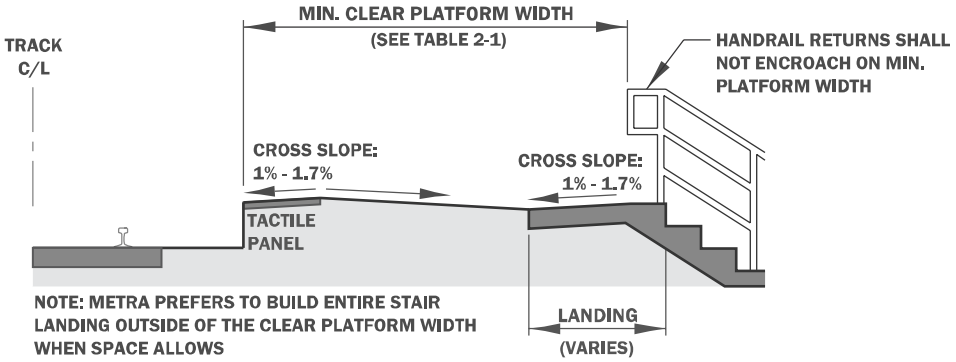
PLATFORM LEVEL

FIGURE XX: TYPICAL SIDE PLATFORM

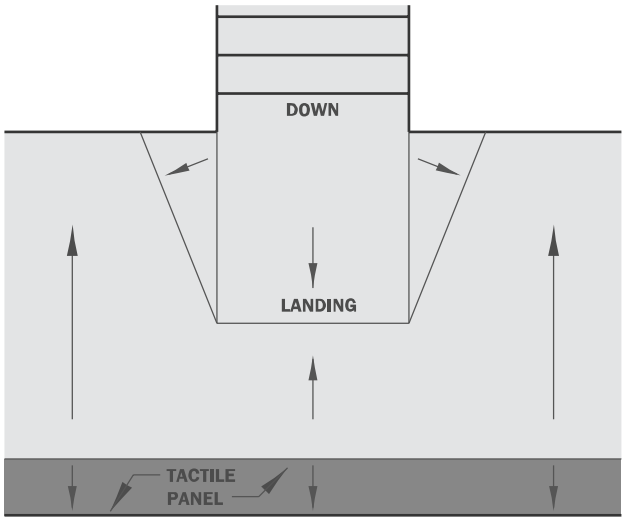


SECTION

FIGURE XX: TYPICAL SIDE PLATFORM AT STAIR

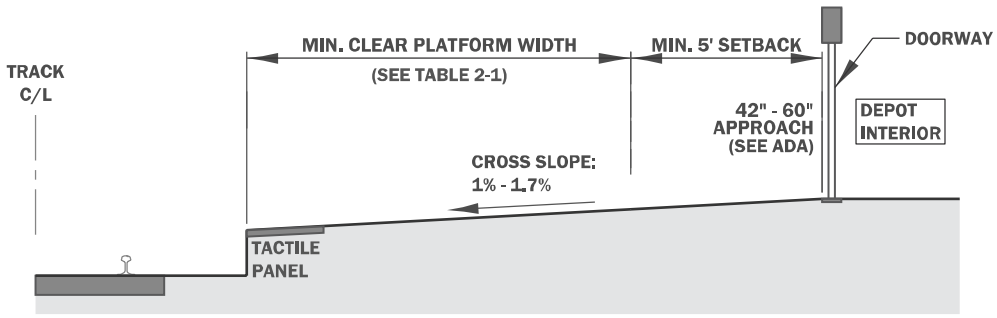


SECTION



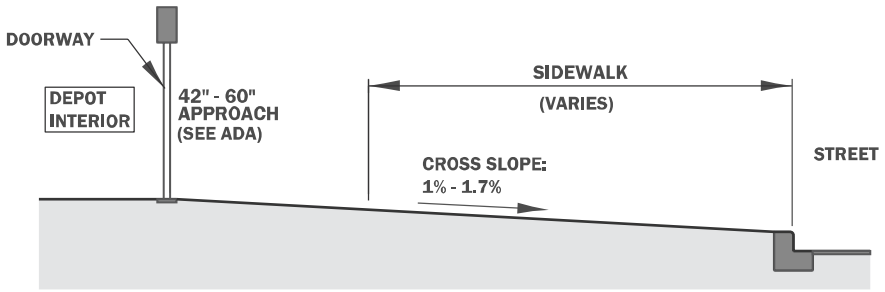
PLAN

FIGURE XX: TYPICAL SIDE PLATFORM AT DEPOT DOOR: TRACK SIDE



SECTION

FIGURE XX: TYPICAL SIDE PLATFORM AT DEPOT DOOR: NON-TRACK SIDE



SECTION

FIGURE XX: TYPICAL TICKET OFFICE LAYOUT

AWAITING METRA
DESIGN DRAWINGS

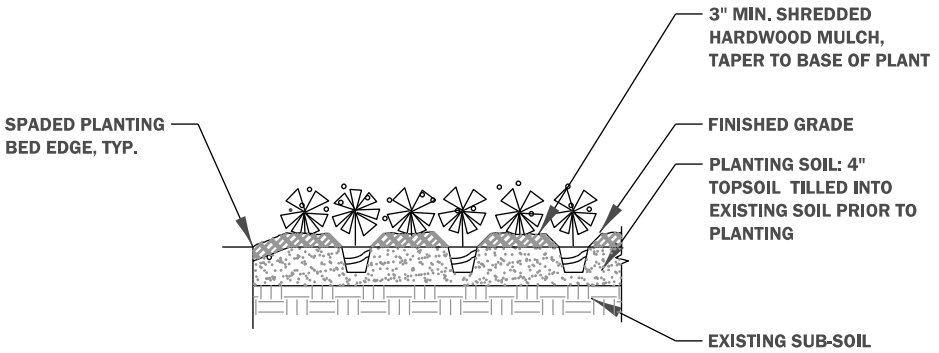
FIGURE XX: TYPICAL TICKET WINDOW PLAN/SECTION

AWAITING METRA
DESIGN DRAWINGS

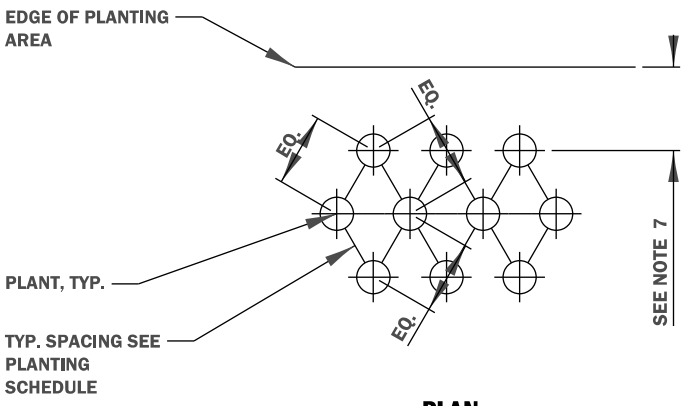
FIGURE XX: METRA ELECTRIC TRAIN ENVELOPE

FIGURE XX: METRA DIESEL TRAIN ENVELOPE

FIGURE XX: STANDARD PERNNIAL PLANTING



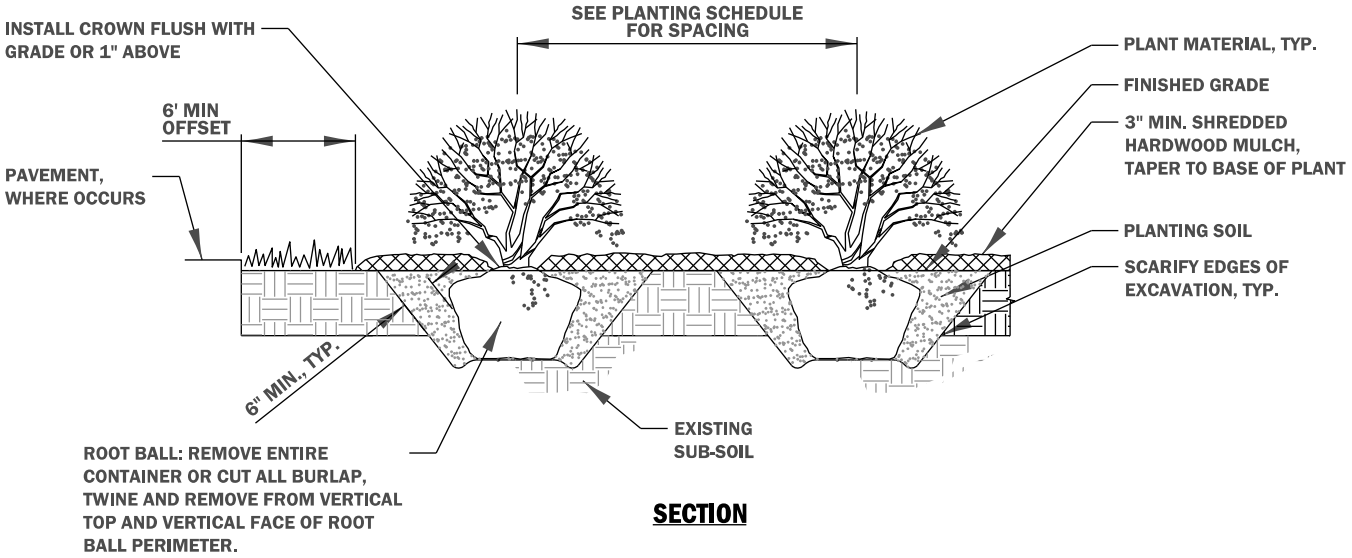
SECTION



PLAN

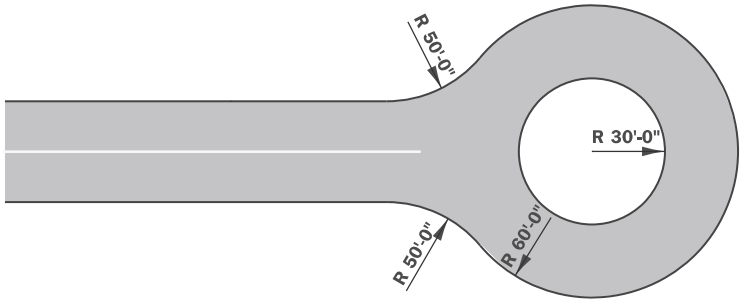
NOTES:
1. PERENNIAL SPACING AT PLANTING SHALL ALLOW FOR 4 YEARS OF AVERAGE GROWTH BEFORE PLANTINGS TOUCH ONE-ANOTHER.
2. DO NOT ALLOW AIR POCKETS TO FORM WHEN BACKFILLING.
3. WATER THOROUGHLY FOLLOWING PLANTING.
4. SET PLANT MATERIAL AT ORIGINAL DEPTH.
5. REMOVE CONTAINER PRIOR TO PLANTING.
6. MULCH ENTIRE AREA OF PLANTING BEDS TO DEPTH INDICATED.
7. OFFSET OF PLANTINGS FROM EDGE OF PLANTING AREA SHALL BE EQUAL TO ONE HALF OF THE PLANT SPACING REQUIREMENT FOR EACH PLANT SPECIES AS INDICATED IN THE PLANTING SCHEDULE, UNLESS OTHERWISE SHOWN.

FIGURE XX: STANDARD SHRUB PLANTING

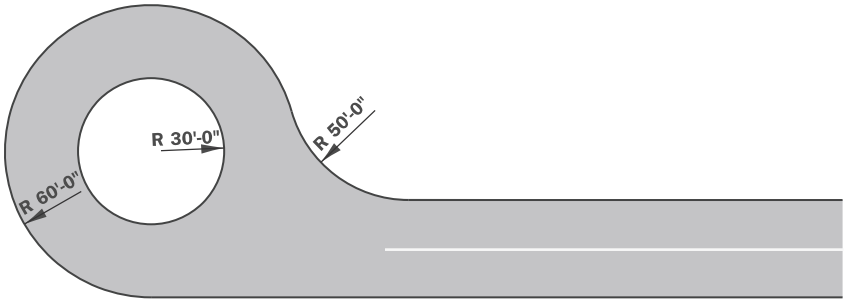


NOTES:
1. SHRUB SCREEN PLANTINGS SHALL BE LOCATED SUCH THAT AT MATURITY THE PLANT DOES NOT OVERHANG THE PROPERTY LINE.
2. SCARIFY EDGES OF EXCAVATION WHERE SMOOTHED DURING EXCAVATION.
3. SET SHRUB PLUMB IN PLANTING PIT.
4. REMOVE DEBRIS FROM AROUND ROOT COLLAR/FLARE PRIOR TO INSTALLATION.
5. SHRUBS SHALL BE PLANTED SO ROOT COLLAR/FLARE IS SLIGHTLY ABOVE (1" MAX.) ADJACENT GRADE.
6. DO NOT DISTURB ROOT BALL WHEN PLANTING. CRACKED OR OTHERWISE DAMAGED ROOT BALLS SHALL BE REJECTED.
7. DO NOT ALLOW AIR POCKETS TO FORM WHILE BACK FILLING. WHEN HOLE IS 1/2 FULL, LIGHTLY TAMP AND WATER THOROUGHLY. ADD REMAINING SOIL AND THEN WATER UNTIL NO MORE WATER IS ABSORBED BY THE SOIL.
8. ADD MULCH TO ENTIRE AREA OF PLANTING BEDS TO DEPTH INDICATED.
9. EXCAVATE PLANTING PIT WITH SIDES SLOPING AT 45-DEGREES MIN. FROM VERTICAL. VERTICAL SIDES ARE NOT ACCEPTABLE.

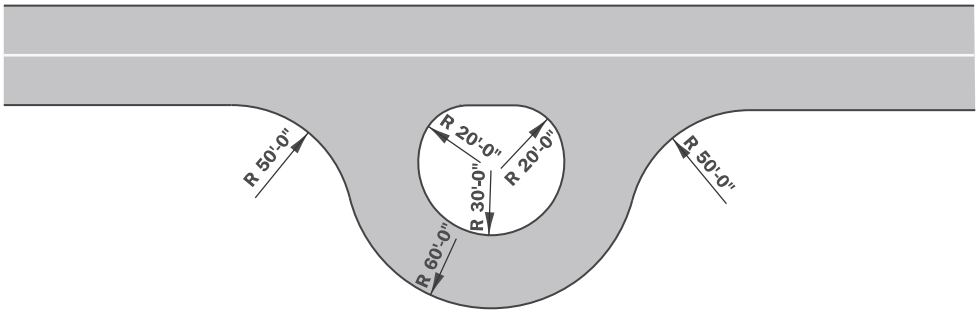
FIGURE XX: BUS TURNING



CUL-DE-SAC



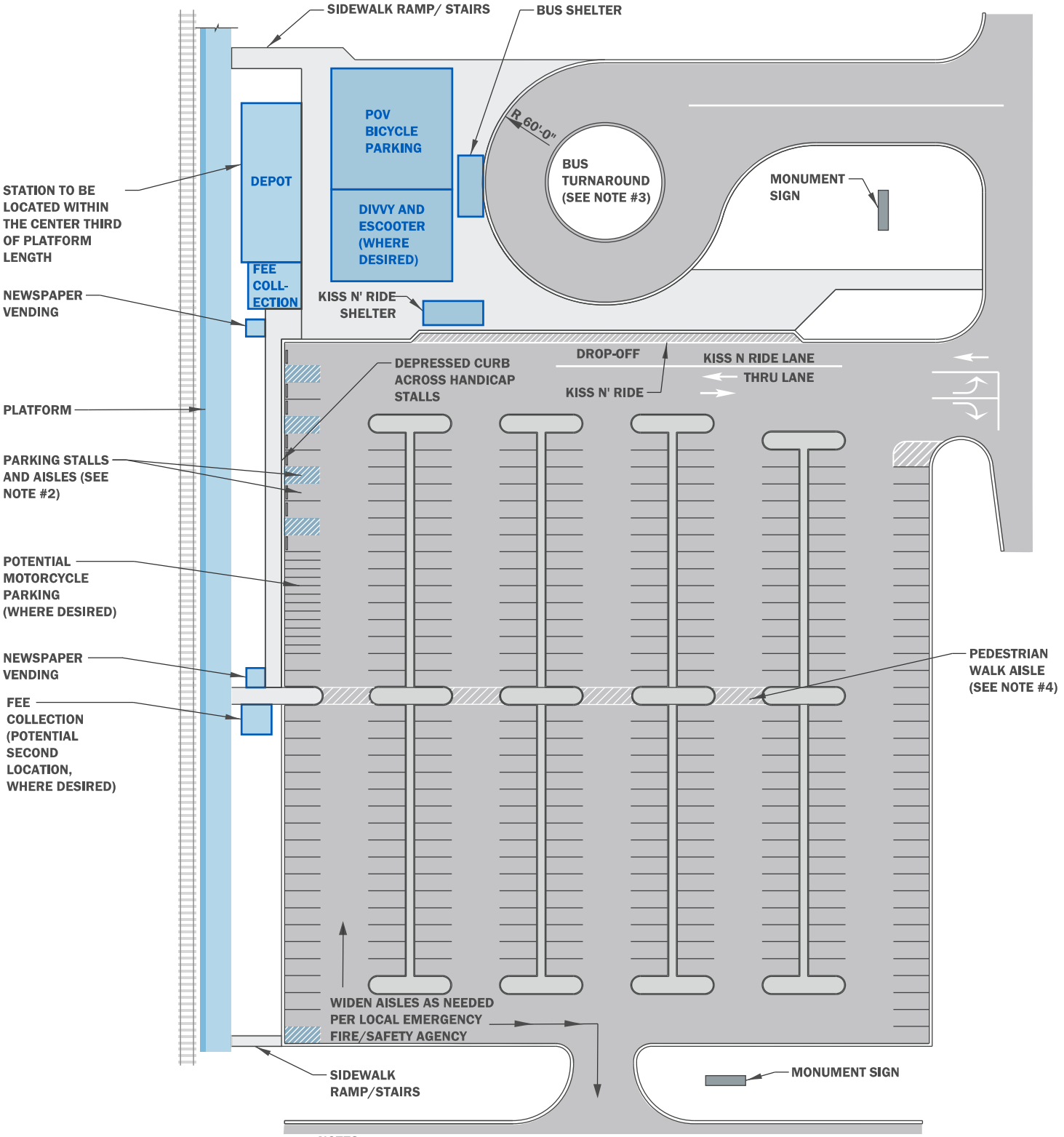
LOOP



JUG HANDLE

NOTES:
1. DESIGNER SHALL COORDINATE GEOMETRY NEEDED WITH CTA, PACE OR OTHER PUBLIC TRANSIT AGENCY AS APPROPRIATE

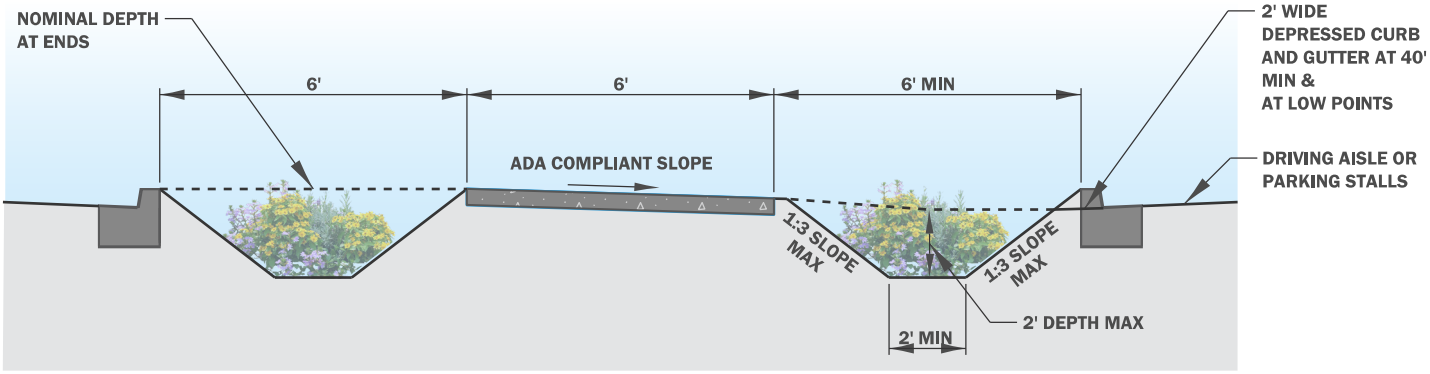
FIGURE 6A: SITE DESIGN



NOTES:

1. CURB RADII TO BE ADJUSTED AS NEEDED TO COMPLY WITH LOCAL AGENCY TRAFFIC CONTROL REQTS FOR VEHICLE ACCELERATION OR DECELERATION LANE
2. REFER TO FIGURES 6B-6E AND 6G FOR PARKING STALL AND AISLE DIMENSIONS
3. REFER TO FIGURE 6H FOR BUS TURNAROUND AND 6J FOR ALTERNATIVE PARKING CONFIGURATIONS
4. ENDS OF ISLANDS SHALL BE SLOPED PER ADA STANDARDS

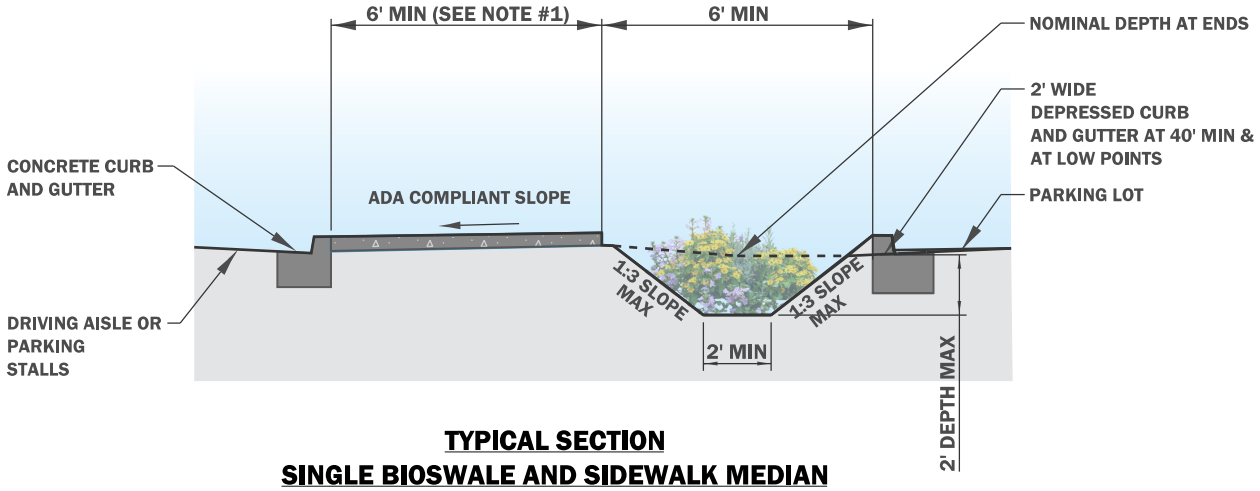
FIGURE 5D: DUAL BIOSWALES WITH SIDEWALK



TYPICAL SECTION
DUAL BIOSWALE WITH SIDEWALK MEDIAN

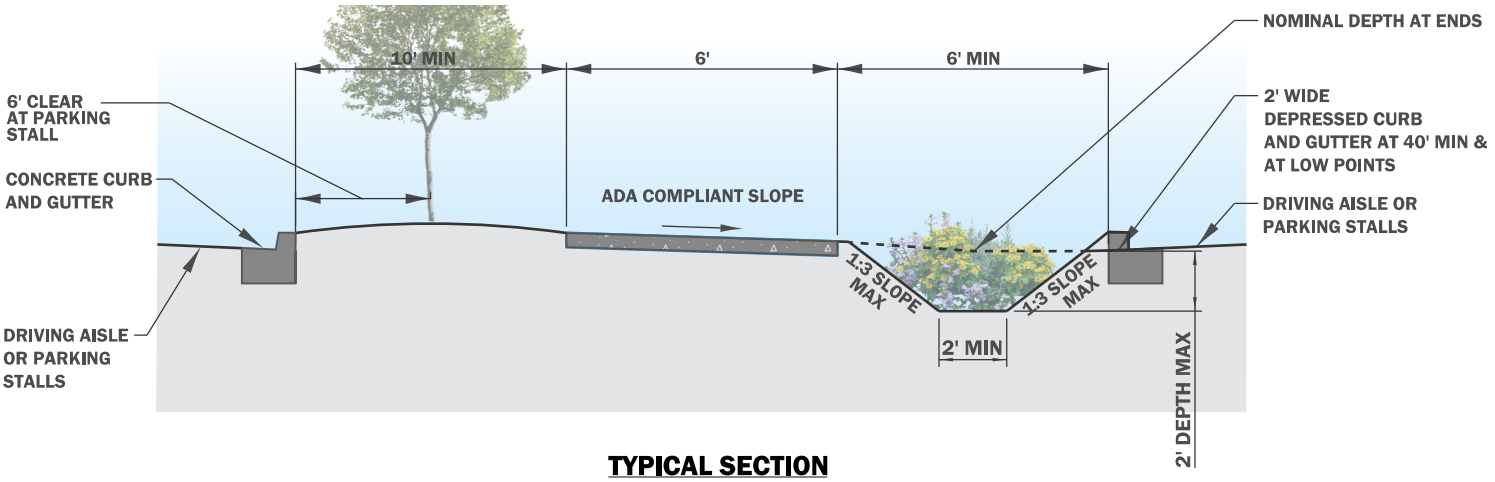
NOTES:
1. SLOPE BIOSWALE AS NEEDED TO ACHIEVE NECESSARY RETAINED WATER QUALITY VOLUME FOR THE SITE PER APPLICABLE ORDINANCE

FIGURE 5C: MULTI-USE MEDIANS



TYPICAL SECTION
SINGLE BIOSWALE AND SIDEWALK MEDIAN

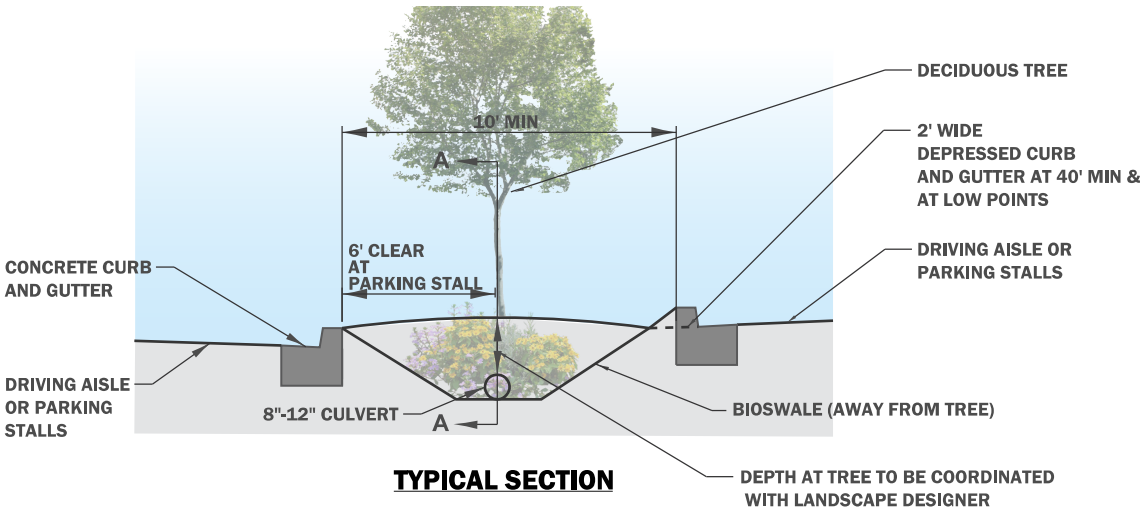
NOTES:
1. INCREASE TO 8' TO ALLOW FOR CAR OVERHANG IF LONG HEAD-IN PARKING STALLS



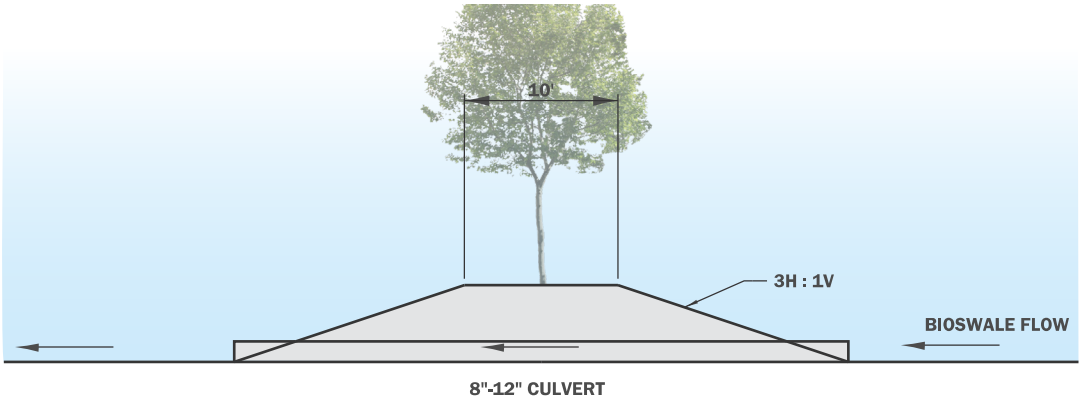
TYPICAL SECTION
BIOSWALE, SIDEWALK MEDIAN, AND SHADE TREE

NOTES:
1. SLOPE BIOSWALE AS NEEDED TO ACHIEVE NECESSARY RETAINED WATER QUALITY VOLUME FOR THE SITE PER APPLICABLE ORDINANCE

FIGURE 5B: BIOSWALE UNDER SHADE TREE



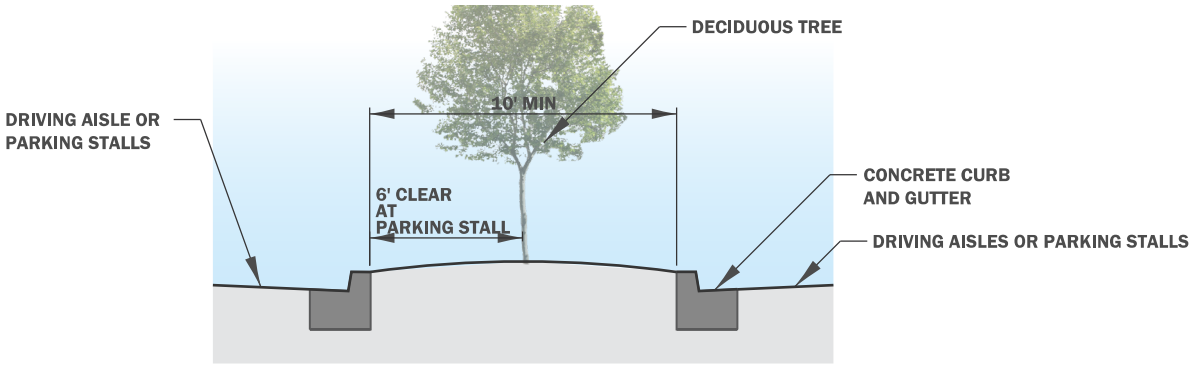
TYPICAL SECTION



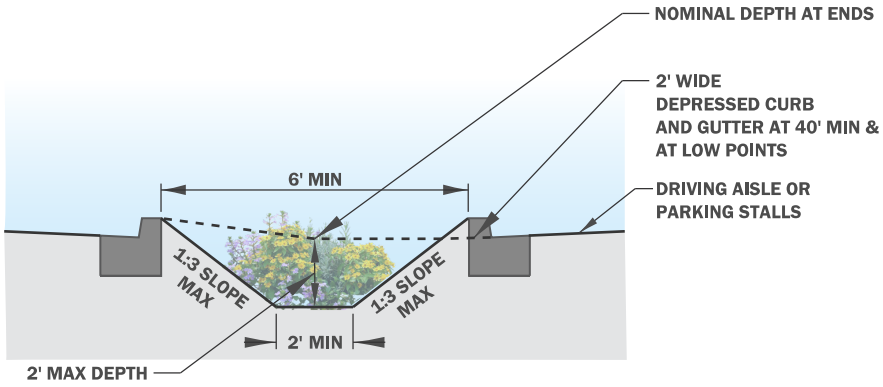
SECTION A-A

NOTES:
1. CULVERT SLOPE SHALL PROVIDE 3 FPS VELOCITY

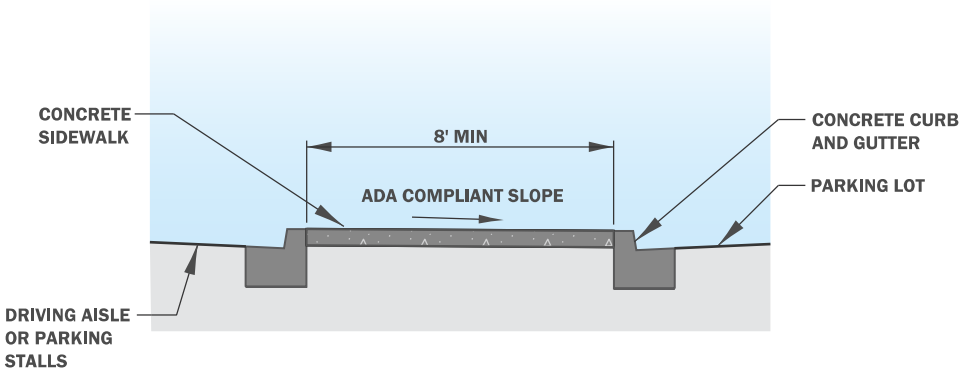
FIGURE 5A: SINGLE USE MEDIANS



TYPICAL SECTION
SHADE TREE MEDIAN



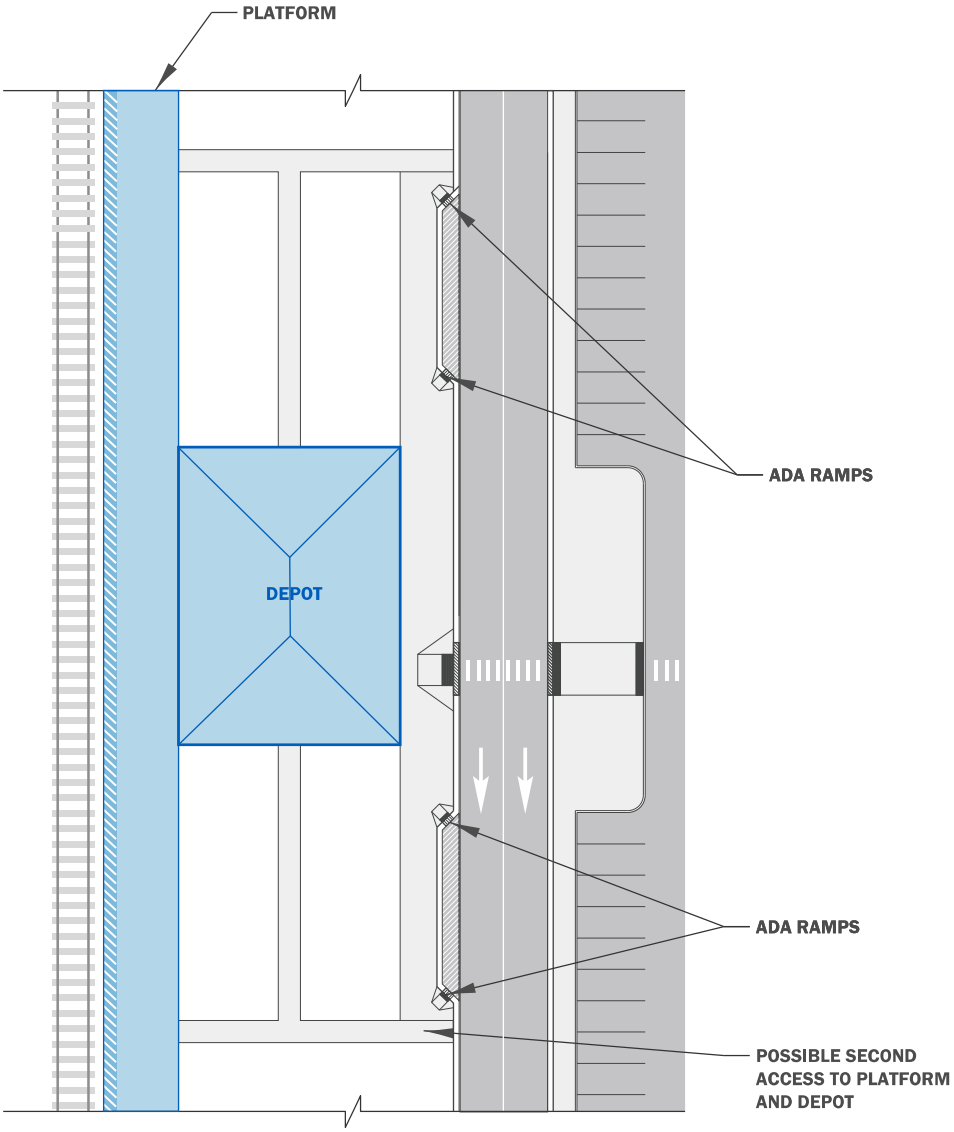
TYPICAL SECTION
BIOSWALE MEDIAN



TYPICAL SECTION
SIDEWALK MEDIAN

NOTES:
1. WITH TWO FT VEHICLE OVERHANG, 4FT SIDEWALK REMAINS
2. WITH PARKING ONLY ON ONE SIDE, MAY REDUCE TO 6' MIN

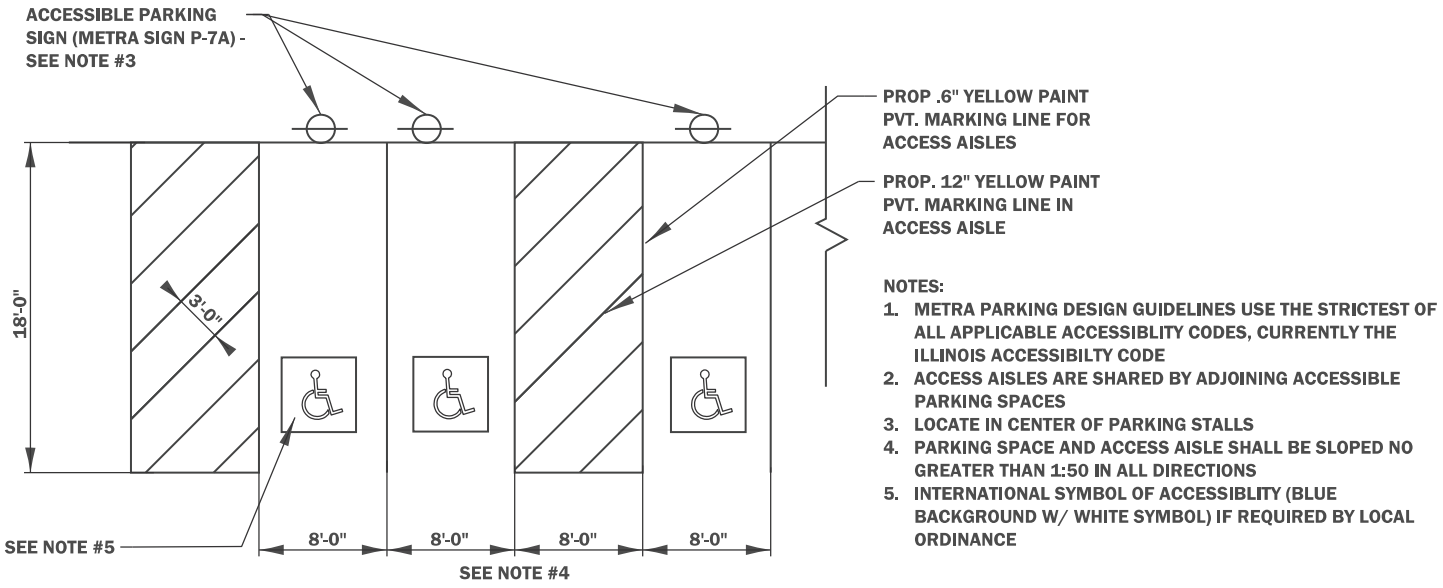
FIGURE XX: KISS ‘N RIDE



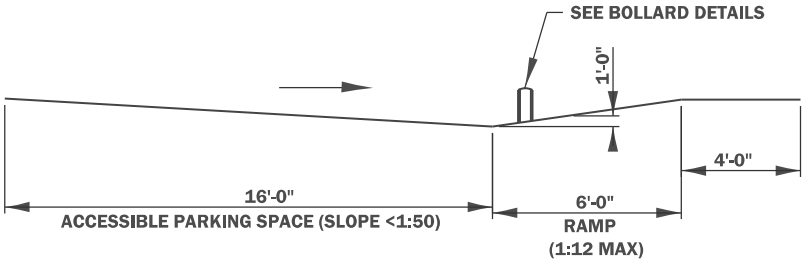
PLAN

NOTES:
1. KISS 'N RIDE LENGTH VARIES DEPENDING ON STORAGE NEEDED.
2. COORDINATE KISS N RIDE LENGTH AND LAYOUT WITH PASSENGER LOADING ZONE REQUIREMENT IN 2018 (OR LATEST) ADA STANDARDS FOR ACCESSIBLE DESIGN.
3. MARKED ACCESS AISLES SHOULD BE ON THE PASSENGER SIDE OF THE VEHICLES AT DROP-OFF KISS N RIDE.
4. SHORT-TERM PARKING STALLS MAY ALSO BE USED TO MEET KISS 'N RIDE CAPACITY IN CONJUNCTION WITH THIS CONCEPTUAL LAYOUT.
5. ADA ACCESSIBLE RAMPS TO DEPOT AND PLATFORM SHALL BE PROVIDED IN ALL KISS N' RIDE LOCATIONS

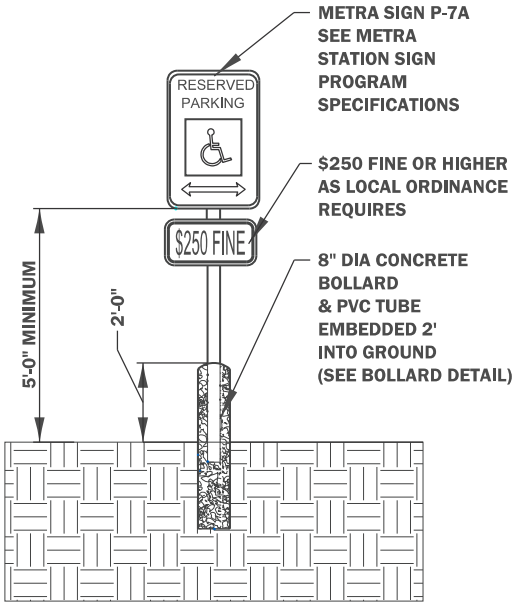
FIGURE XX: ACCESSIBLE PARKING



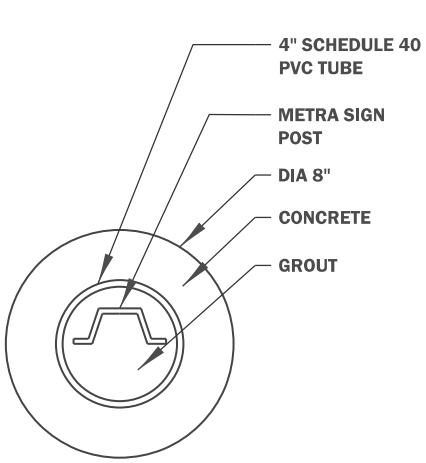
VAN/CAR ACCESSIBLE PARKING SPACES



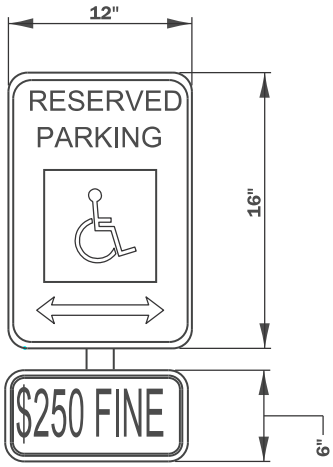
PARKING SPACE CROSS SECTION



ACCESSIBLE PARKING SIGN DETAIL

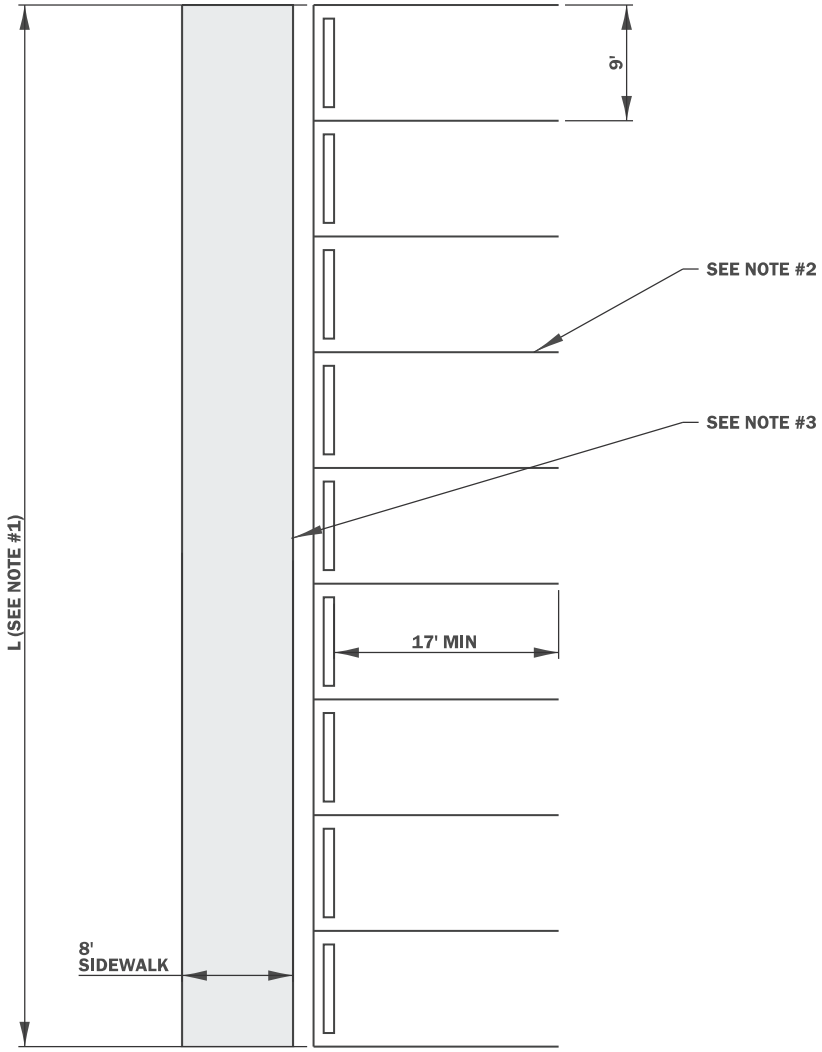


BOLLARD DETAIL



TYPE P-7A SIGN DETAIL

FIGURE XX:



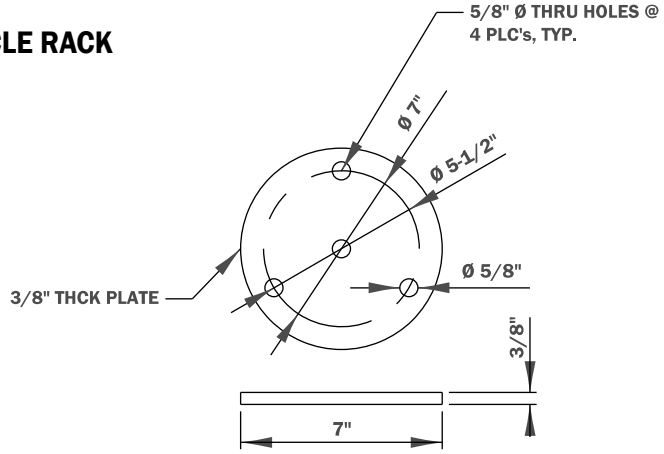
PLAN

NOTES:
1. L = DEPENDS ON NUMBER OF NECESSARY STALLS
2. PROVIDE ACCESSIBLE KISS-N-RIDE AS NEEDED
3. DEPRESSED CURB ACROSS KISS 'N RIDE STALLS

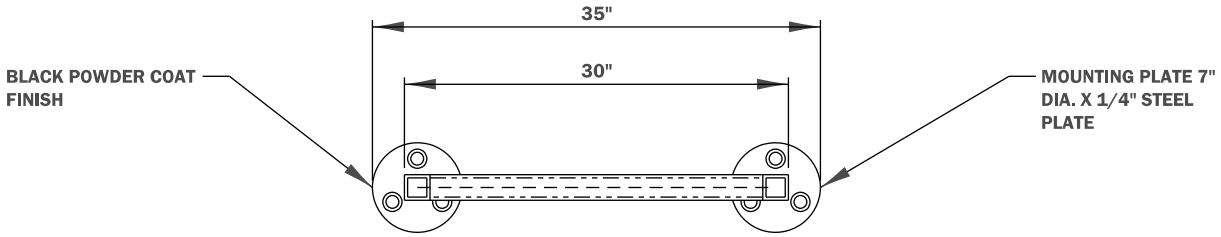
FIGURE XX: SIGN

SIGN

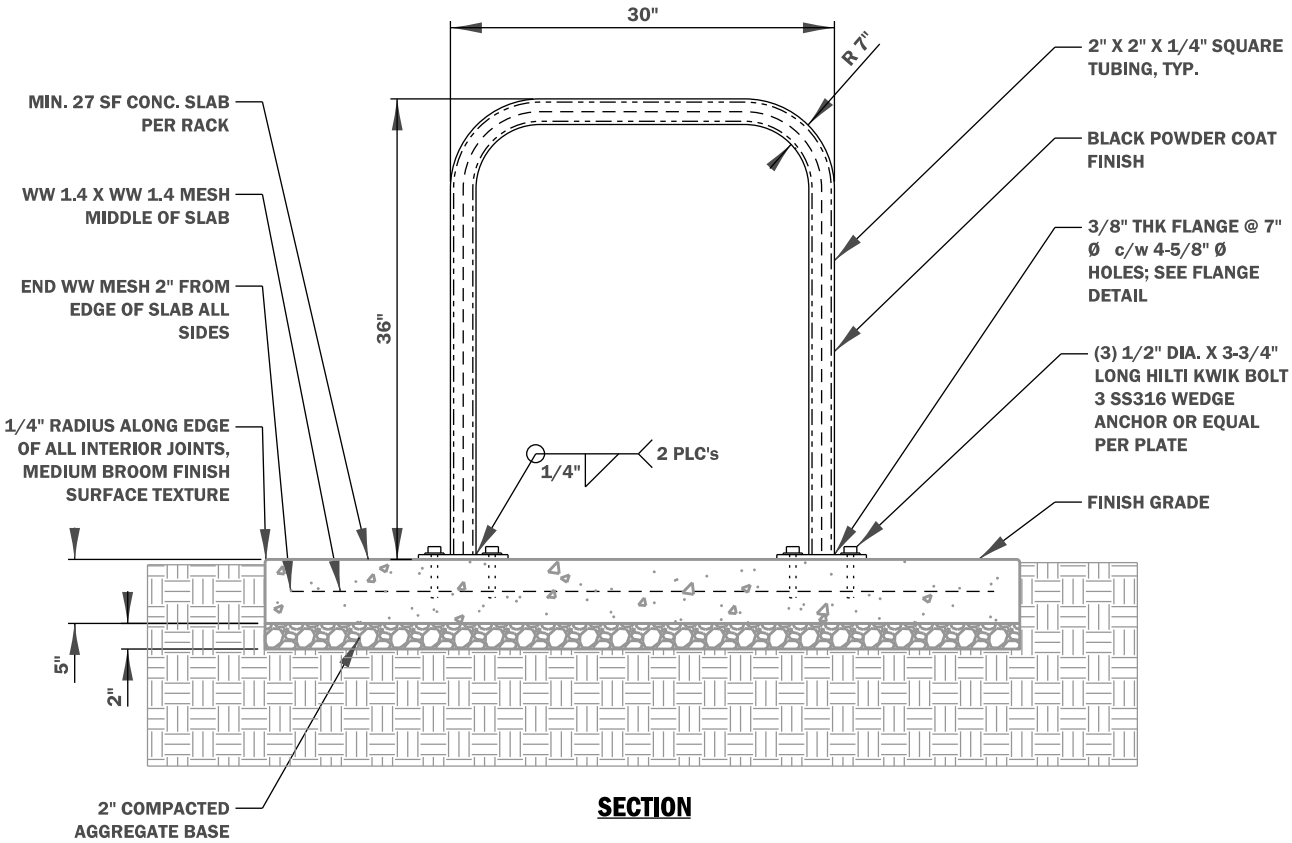
FIGURE XX: CDOT BICYCLE RACK



FLANGE DETAIL

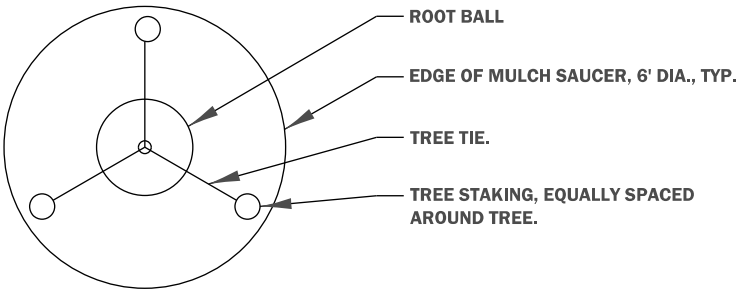


PLAN

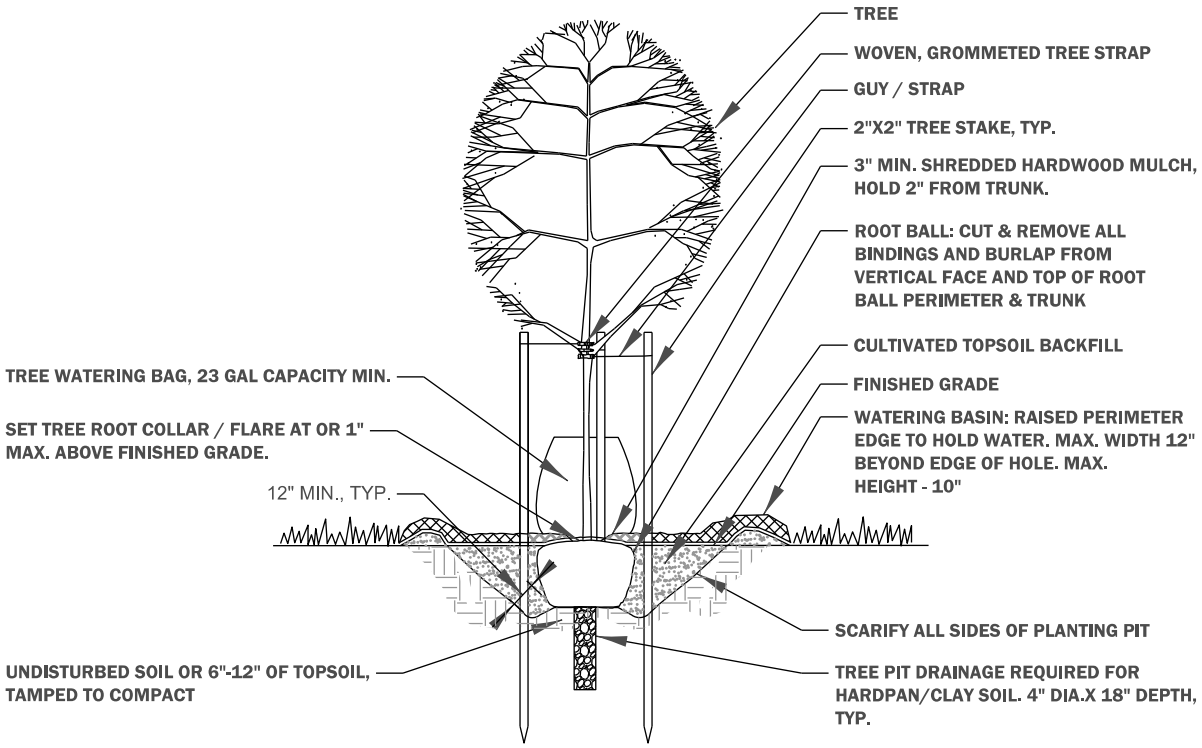


SECTION

FIGURE XX: STANDARD TREE PLANTING



PLAN

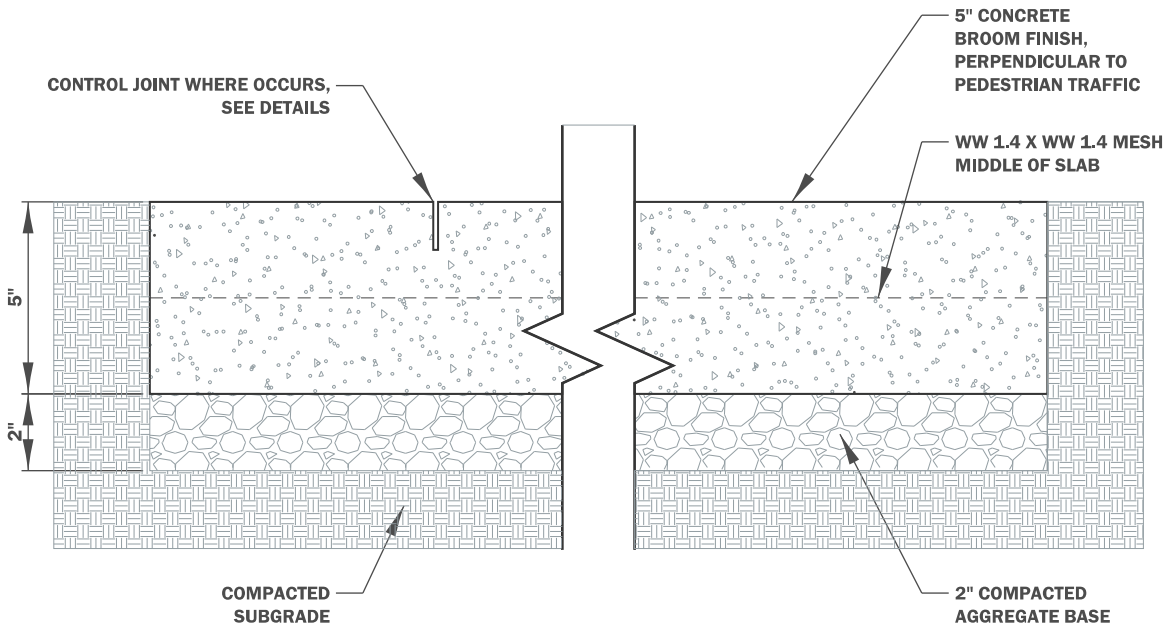


SECTION

NOTES:

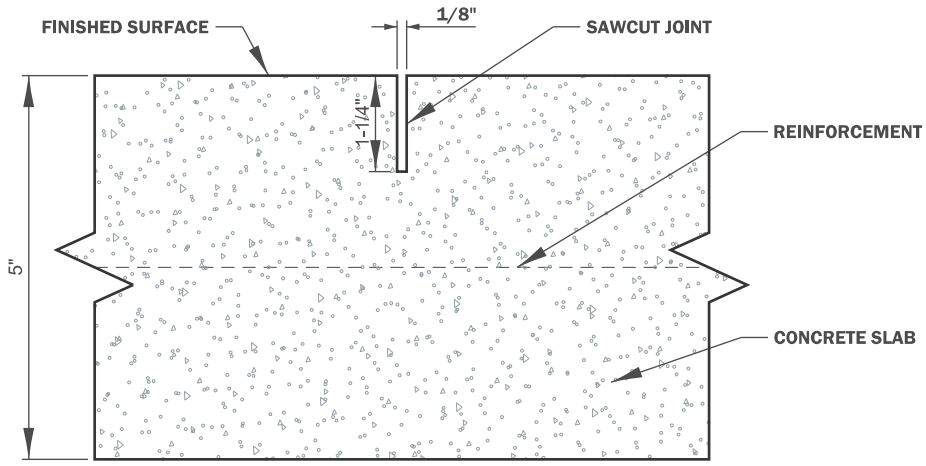
1. EXCAVATE PLANTING PIT WITH SIDES SLOPING AT 45-DEGREES MIN. FROM VERTICAL. VERTICAL SIDES ARE NOT ACCEPTABLE. TRIM PERIMETER OF PLANTING PIT, LEAVING CENTER RAISED SLIGHTLY.
2. SCARIFY EDGES OF EXCAVATION WHERE SMOOTHED DURING EXCAVATION.
3. DO NOT EXCAVATE DEEPER THAN ROOT BALL DEPTH. IF HOLE IS TOO DEEP, BACK FILL WITH TAMP-COMPACTED PLANTING SOIL TO CORRECT LEVEL.
4. SET TREE PLUMB AND IN CENTER OF PLANTING PIT.
5. REMOVE DEBRIS FROM AROUND ROOT COLLAR/FLARE PRIOR TO INSTALLATION.
6. TREES SHALL BE PLANTED SO ROOT COLLAR/FLARE IS SLIGHTLY ABOVE (1" MAX.) ADJACENT GRADE.
7. DO NOT DISTURB ROOT BALL WHEN PLANTING. CRACKED OR OTHERWISE DAMAGED ROOT BALLS SHALL BE REJECTED.
8. CUT AND REMOVE BINDINGS AND BURLAP AROUND VERTICAL FACES AND TOP OF BALL AND TRUNK.
9. TAMP PLANTING SOIL AND WATER THOROUGHLY. ADD REMAINING PLANTING SOIL AND THEN WATER UNTIL NO MORE WATER IS ABSORBED BY THE SOIL.
10. INSTALL STAKES/TREE TIES ON ALL TREES.
11. TREE TIES SHALL BE LOOSE FITTING SO AS NOT TO GIRDLE THE TRUNK. ATTACH TIES TO THE LOWER HALF OF THE TREE TRUNK ONLY TO ALLOW TRUNK MOVEMENT AND GROWTH. REMOVE ALL TIES AND STAKING AFTER 3 GROWING SEASON MONTHS (APRIL-SEPTEMBER) FOLLOWING INSTALLATION. OCTOBER THROUGH MARCH ARE DORMANCY MONTHS AND SHOULD NOT BE COUNTED AS GROWING SEASON MONTHS.
12. PROVIDE TREE WATERING BAGS FOR DURATION OF ESTABLISHMENT PERIOD. REMOVE AT END OF ESTABLISHMENT PERIOD.

FIGURE XX: TYPICAL PAVEMENT



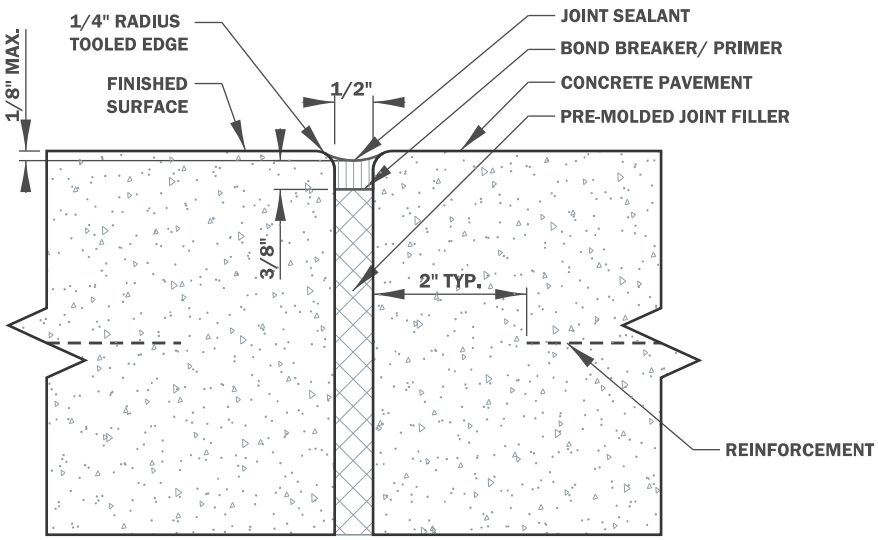
SECTION A-A

FIGURE XX: STANDARD NON VEHICULAR CONCRETE PAVEMENT



SECTION

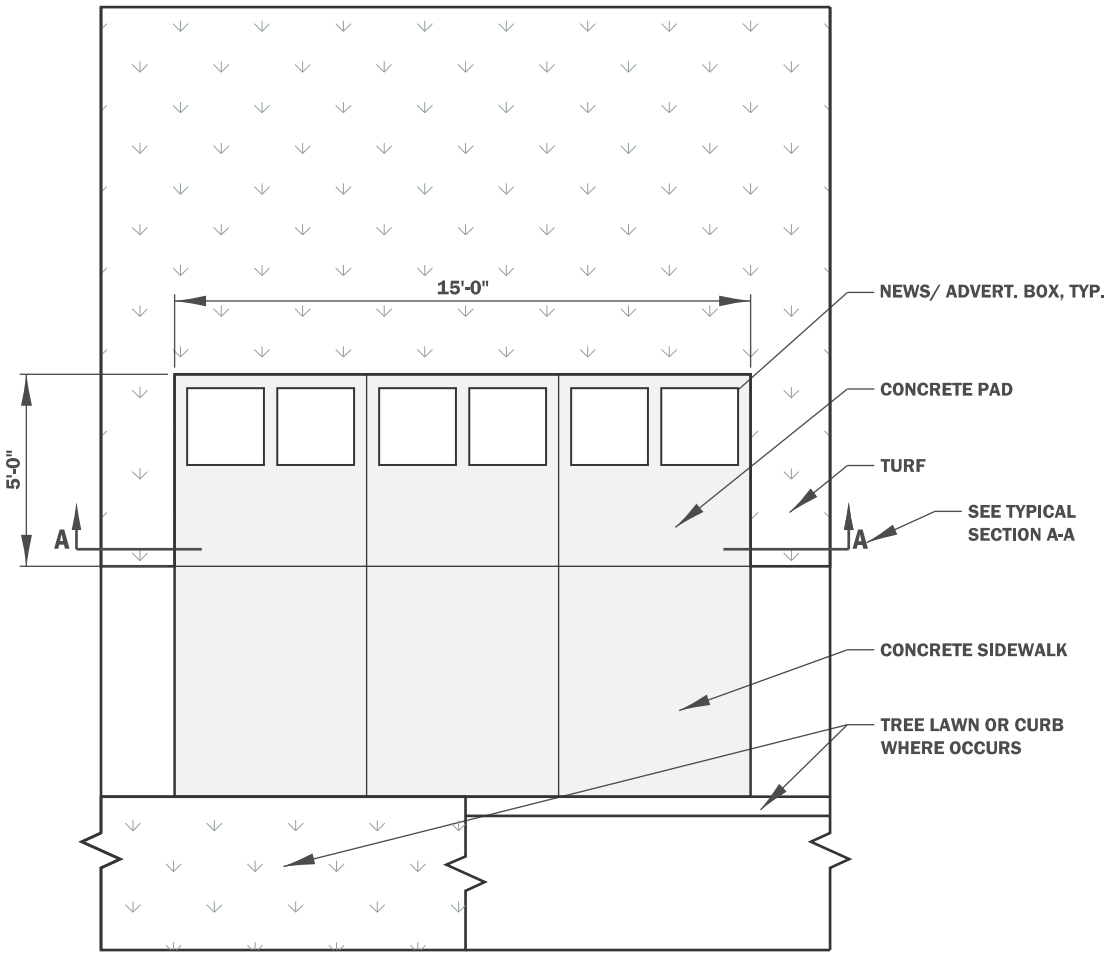
SAWCUT CONTROL JOINT



SECTION

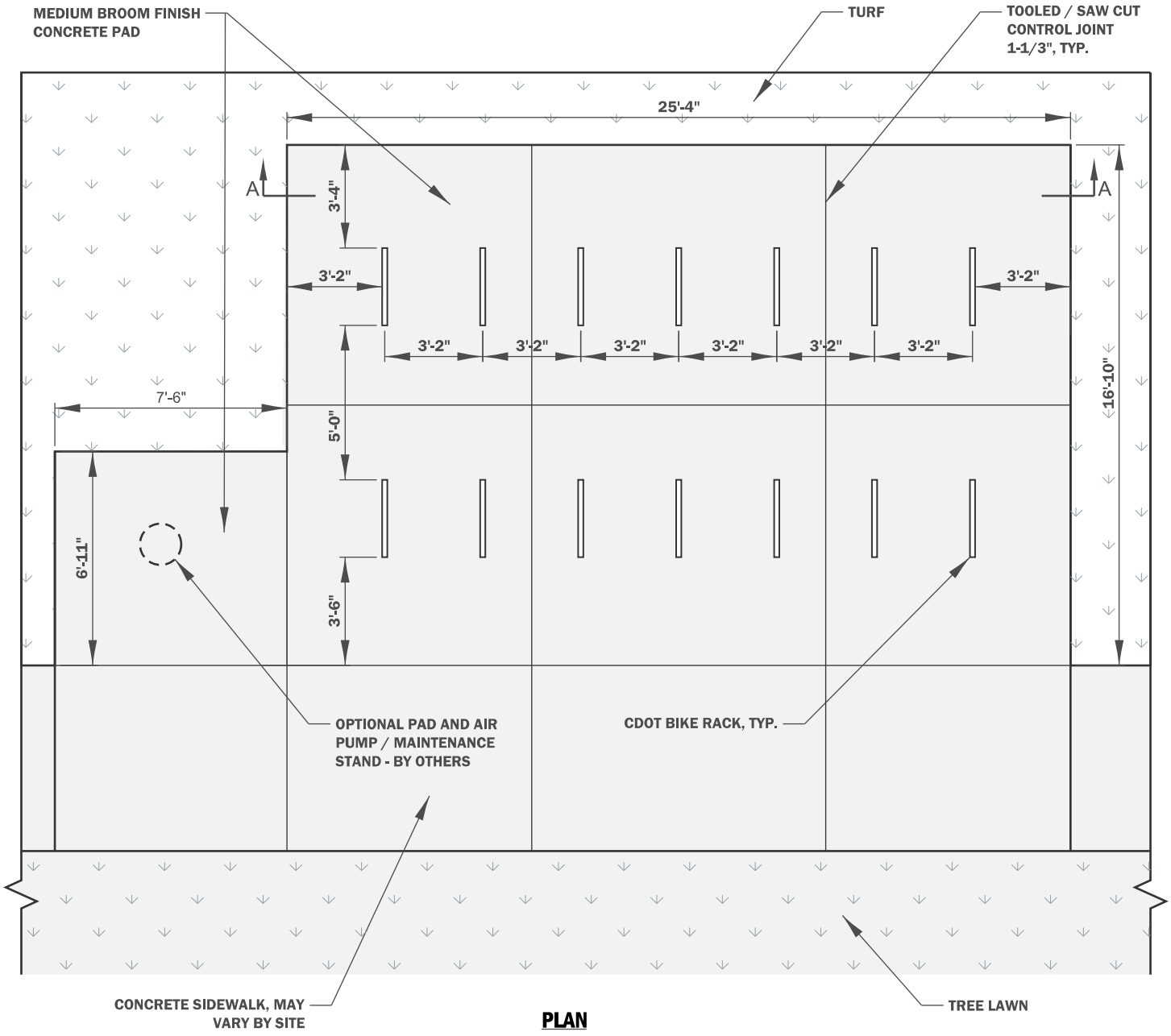
EXPANSION JOINT

FIGURE XX: NEWS/ ADVERT. BOX PAD LAYOUT



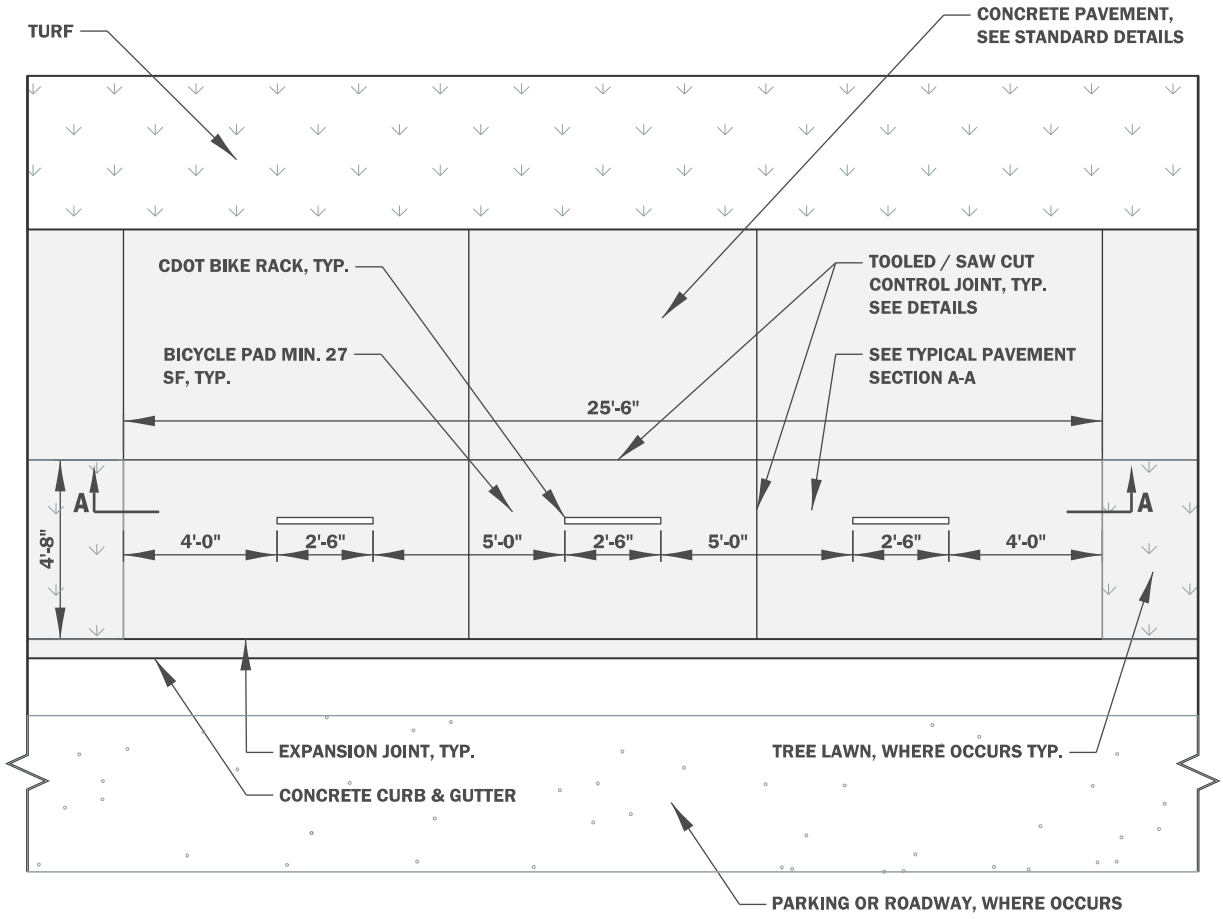
PLAN

FIGURE XX: BICYCLE PARKING PAD



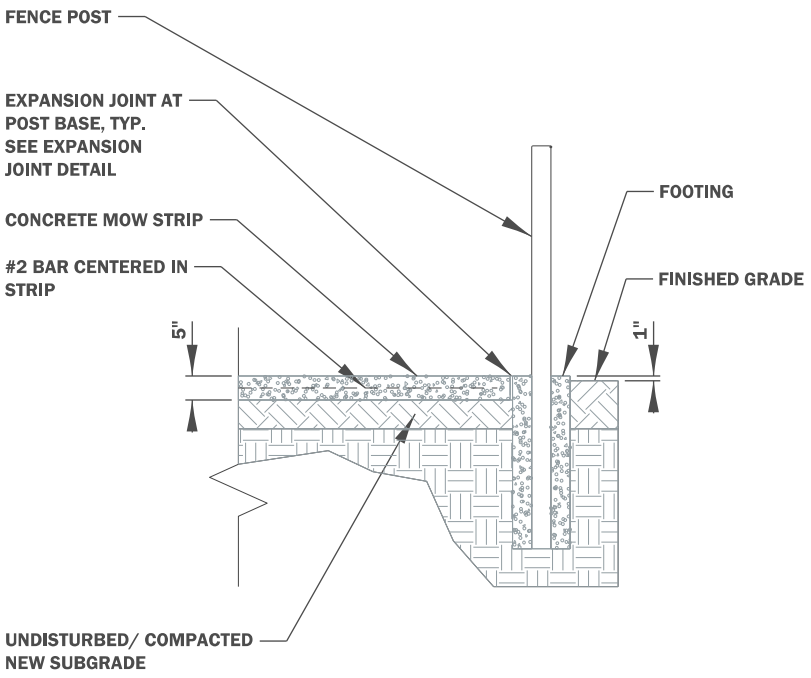
PLAN

FIGURE XX: BICYCLE PARKING PAD (TREE LAWN)

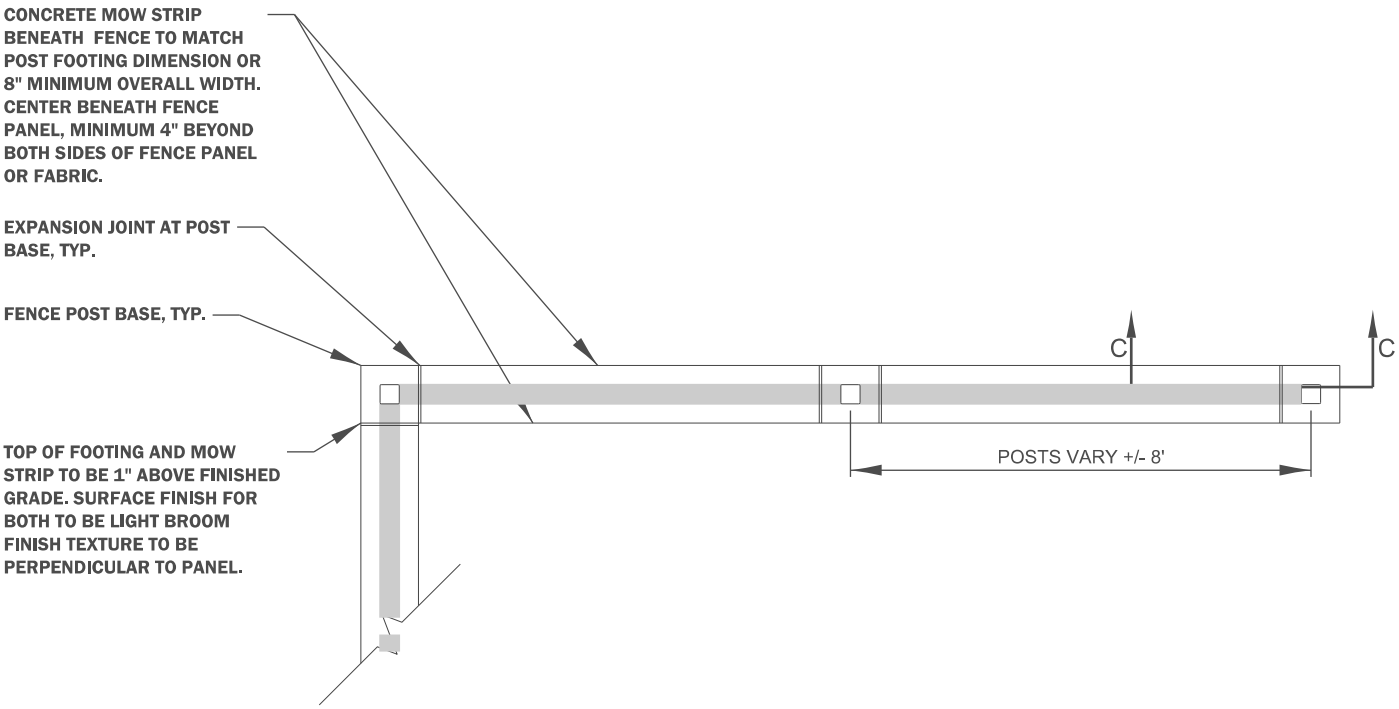


PLAN

FIGURE XX: FENCE LINE MOW STRIP

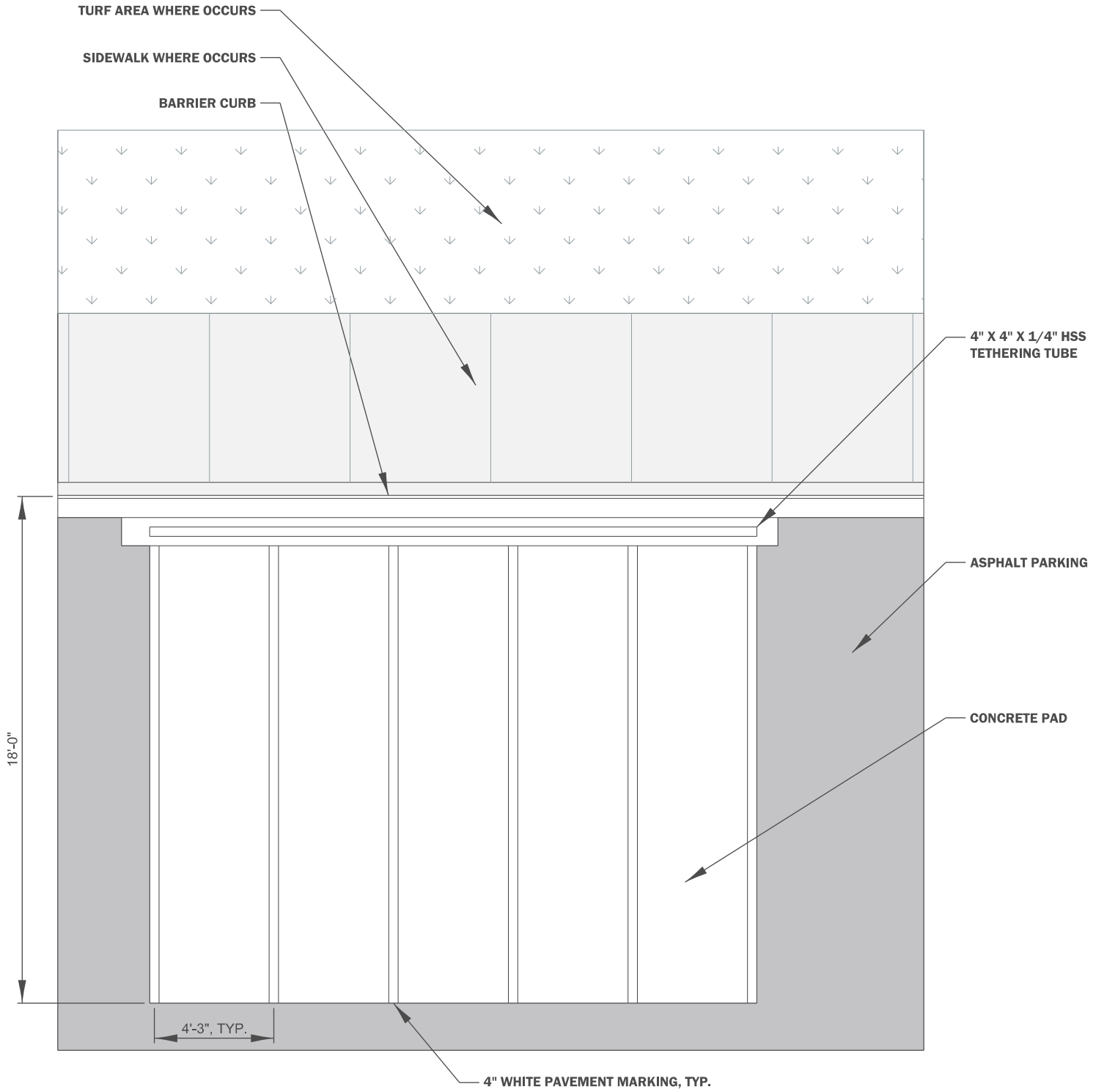


SECTION C-C



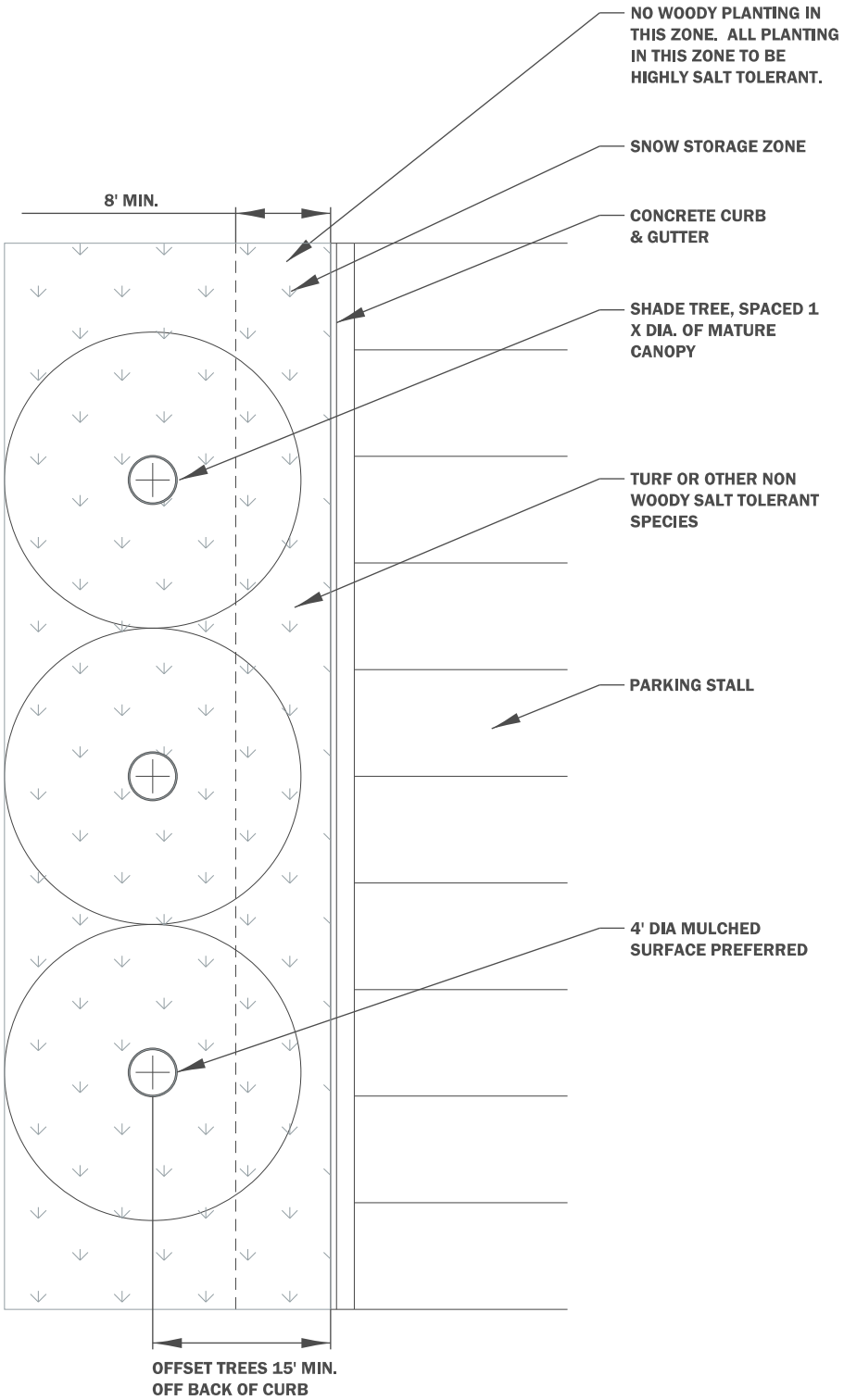
PLAN

FIGURE XX: MOTORCYCLE PARKING - TYPE 1



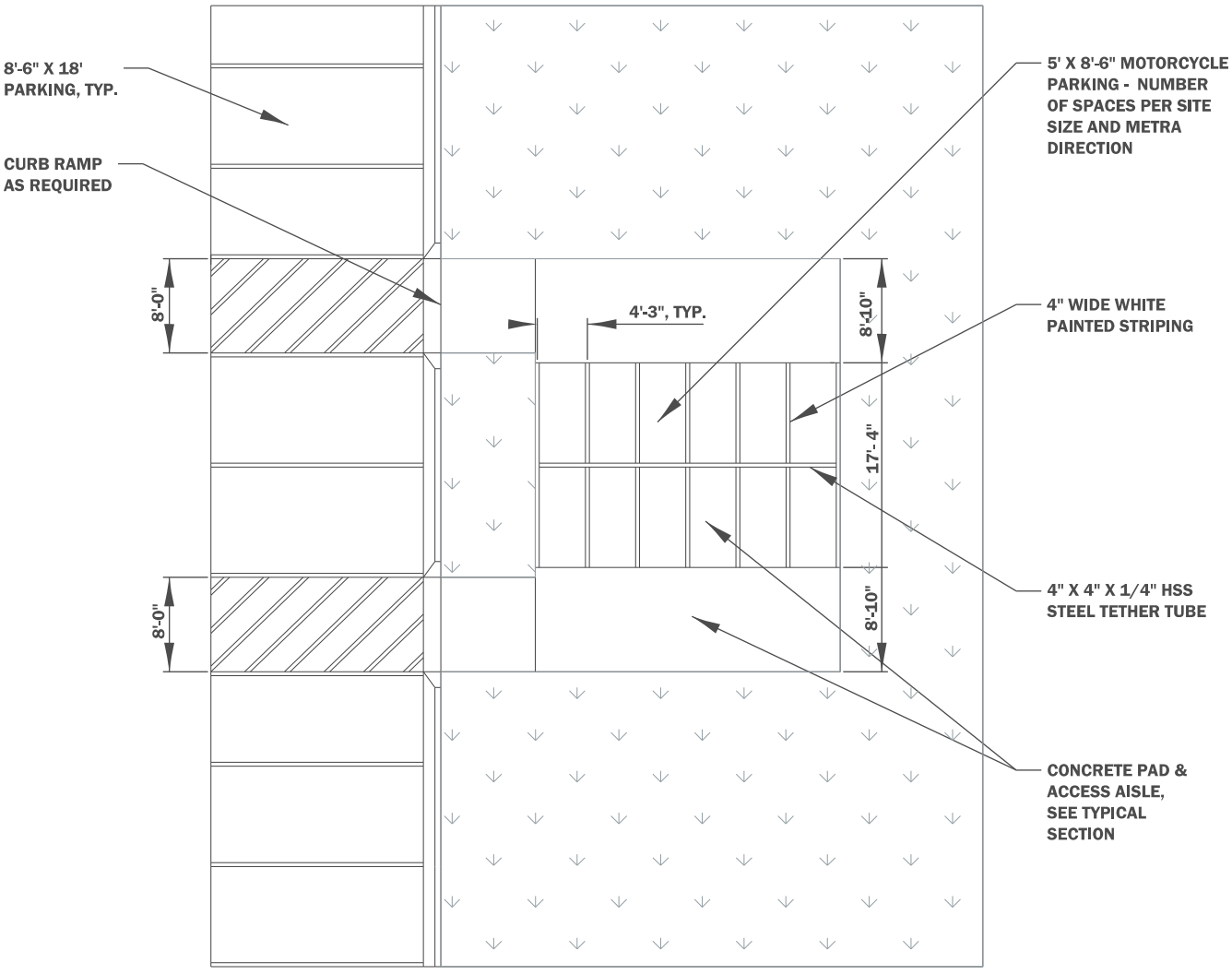
PLAN

FIGURE XX: PARKING LOT SNOW STORAGE



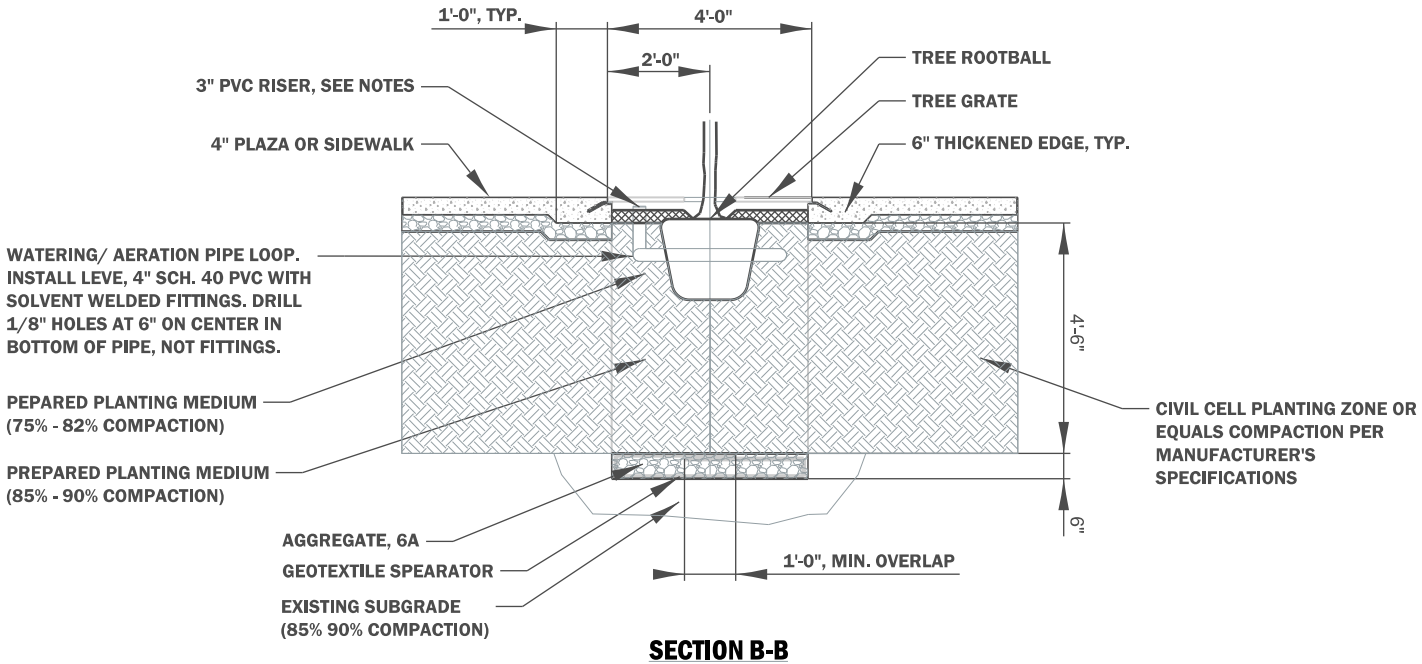
PLAN

FIGURE XX: MOTORCYCLE PARKING - TYPE 2



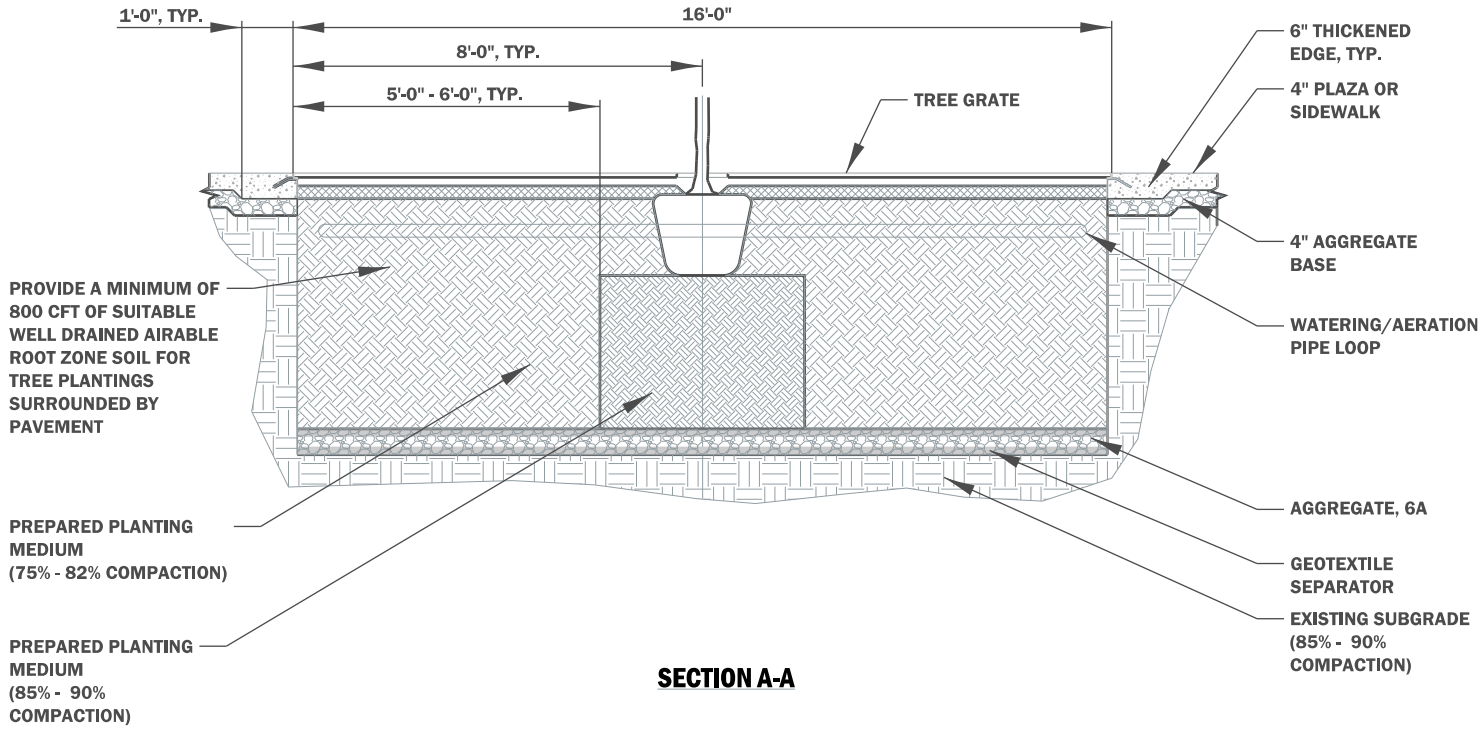
PLAN

FIGURE XX: TREE GRATE PLANTING (SECTIONS)



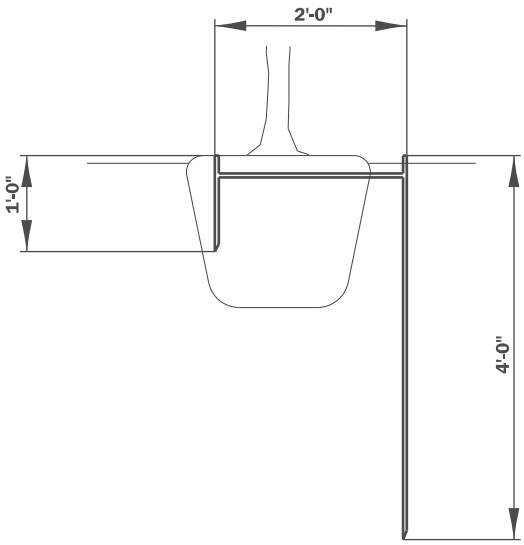
SECTION B-B

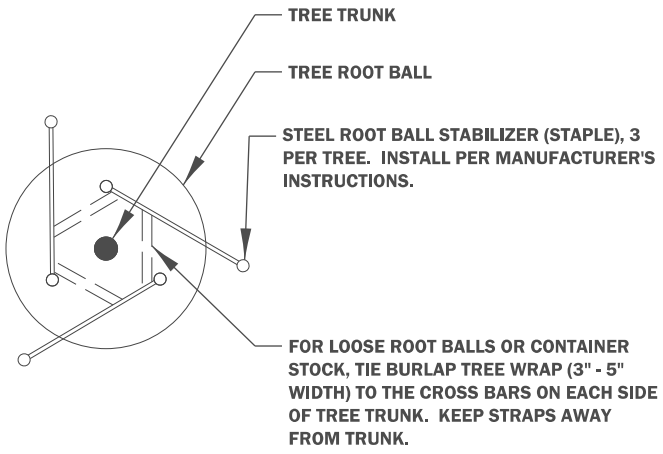
NOTES:
1. INSTALL SCH 40 PVC RISER TO WITHIN 1" INCH OF BOTTOM OF TREE GRATE. TOP OF RISER SHALL BE FITTED WITH A PVCE CAP WITH STAINLESS STEEL VENT SCREEN OPENING IN TOP TO PREVEN RODENT INTRUSION. SCREEN SHALL BE 3/16" TO 1/4" INCH MESH.



SECTION A-A

FIGURE XX: TREE GRATE PLANTING IN PLAZA PAVEMENT

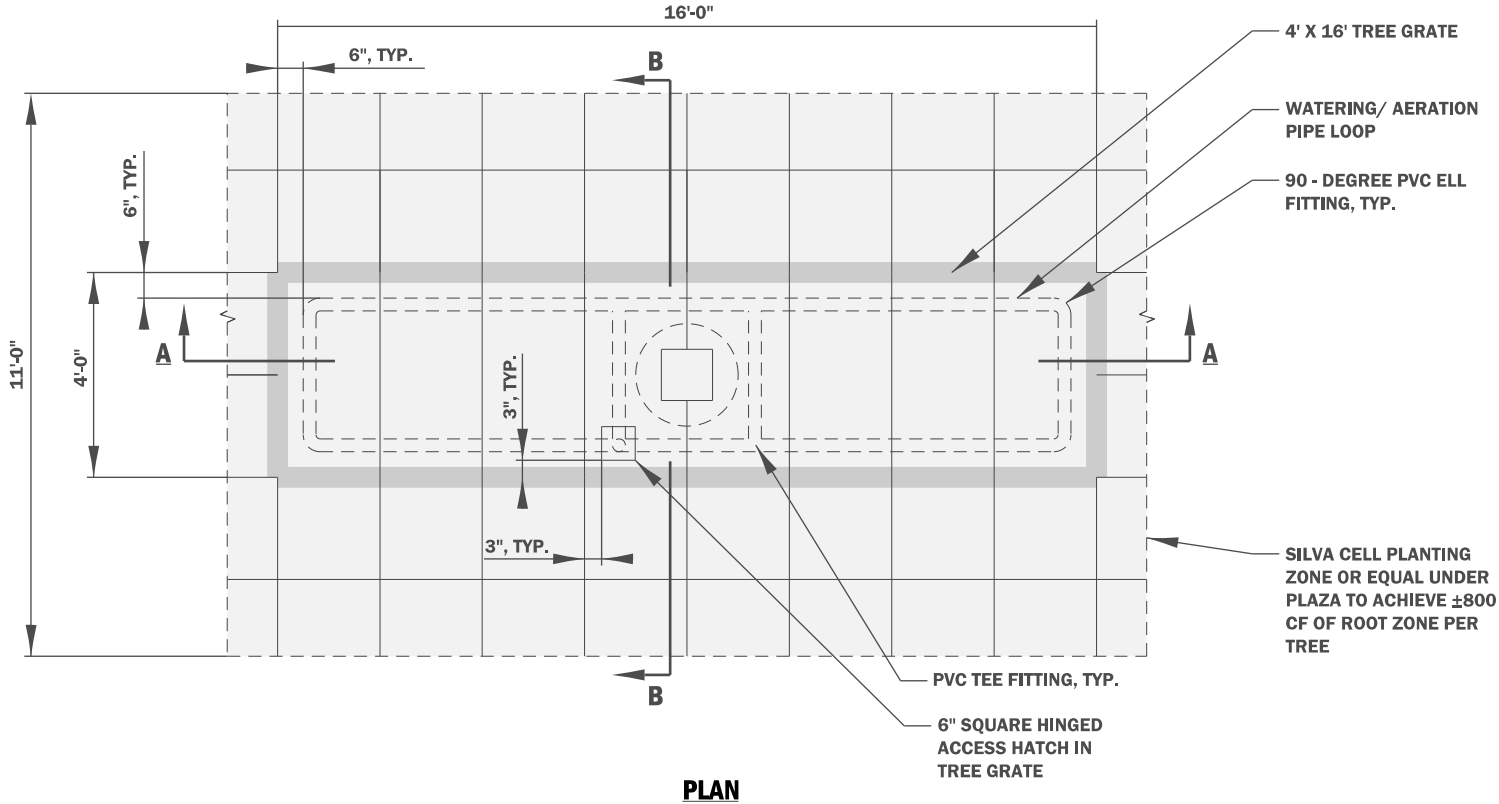




ELEVATION **PLAN**

ROOT BALL STABILIZER

NOTES:
1. ONCE STABILIZER IS INSTALLED CUT AWAY TREE WRAPPING FROM UPPER 1/3 OF ROOT BALL. LEAVE TREE WRAP INTACT WITHIN 3" INCHES OF STABILIZERS. PLACE SAFETY CAP ON EXPOSED ENDS OF STABILIZERS.



PLAN