

Development and Design Standards



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This document is available as a PDF on the district's webpage at bendparksandrec.org.
Hard copies will not be available.

Questions regarding these standards should be directed to the
Development Manager at 541-389-7275.

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Introduction

The development and design standards contained within this document serve to guide the district, developers and contractors on the means, methods and materials Bend Park and Recreation District (BPRD) uses most commonly for the development of parks, trails and facilities. This document is not meant to replace construction documentation for individual projects, but rather to supplement and inform individual projects. Projects listed in the district's five-year Capital Improvement Plan (CIP) should have individual construction documentation specific to each project. For other projects, usually small in nature, such as replacements, upgrades, and additions within existing facilities, these standards may be used for construction.

The district's Comprehensive Plan (Comp Plan) is the over-arching document that leads to park and trail projects, whether new development or renovation of existing assets. It drives the CIP that leads to funding for the projects identified within the plan. Within the plan, parameters are set for levels of service (LOS) for multiple types of parks, trails and facilities. The LOS comes from sound planning practices, community input and board direction to staff. The plan is rewritten approximately every ten years and updated once during the ten-year span.

These standards are updated periodically with new products, means or methods of construction and other updates the district feels best align with community needs. As new technology and products become available they may be incorporated into this document.

The planning and development (P&D) department is the lead department for the development and design standards, including standard drawings, specifications, and construction implementation. P&D involves other district departments, such as recreation and facilities, as resources for these documents.



Bend Park & Recreation
DISTRICT

Chapter 1

Procedure and Guidelines



Procedure

BPRD projects are determined through the district's 10-year comprehensive plan. From here, projects are added to the district's five-year CIP which is approved yearly by the BPRD budget committee and board of directors. The district's fiscal year is July 1 to June 30. New projects for the current fiscal year are added to the district's CIP where staff resources are committed and moved forward for implementation.

With funding available and staff resources in place, the projects can start. They follow a basic outline for development depending on the size, scale and type of project:

- Project Inception
- Concept Design
- Design Development
- Permitting
- Bidding/Procurement
- Construction
- Record Drawings

Project Inception

The process begins with initial discussions about the project including location, size, preliminary ideas, uses, budget, timeline, and other important information about the project. This is usually the time when a consultant team is brought onboard.

Procurement for design services follows Oregon's Administrative Rule. For larger projects over \$250,000 in expected consultant fees, procurement is normally achieved through an advertised request for proposal (RFP) process, and consultants are awarded contracts based on qualifications outlined in the RFP. For smaller projects, the district maintains a list of pre-qualified consultants, updated every 2 years via RFQ process. The district may ask for proposals from the consultants on the pre-qualified list, or direct appoint as necessary. The district prefers to group as many of the professional services contracts together under the umbrella of a single prime consultant, such as a landscape architecture, architecture, or engineering firm, depending on the project's needs. Small contracts such as survey, geotechnical and environmental should be contracted under the prime proposer.

At the start of a project, staff develops a public involvement plan (PIP) that will guide the project through community input and outreach. The extent of public involvement is dependent on the type and scale of the project. Creating the PIP upfront determines the level of involvement needed, including timing and duration of outreach. Public meetings and other engagements opportunities are planned, a project webpage is developed, and advisory committees are formed, which shape the overall external input for a given project. The PIP is a living document and may be revised to reflect information gathered during initial meetings with the public.

Concept Design

Concept design is the stage when the consultant team puts pen to paper to further develop the initial ideas for the project based on the information gathered in the project inception stage. The team will carefully evaluate site opportunities and constraints, infrastructure needs, cost considerations, BPRD programmatic desires, and public input. Typically, three concept designs are generated from the preliminary input. The concepts are then shared with the public for additional feedback and reviewed internally at BPRD. From there, the preferred concept design is developed. This design is most often a hybrid of the earlier concepts, taking elements from each and rolling them into the preferred concept plan. Once the final preferred concept is created, BPRD staff will take the plan to the district's board of directors for approval.

Cost estimating is critical and must be evaluated regularly in the design process. During concept design it is important to make sure features and designs presented to the public for consideration fit into the established project budget. This means having a solid understanding of infrastructure, permitting fees, and other project costs that may impact program features. This early attention to cost avoids showing the public options that exceed the project budget and need to be removed later in the project.

Phased Plan

Occasionally, a project will require a phased plan. A phased plan is a dynamic long-term planning document that provides a conceptual layout to guide future growth and development of a BPRD property. Phased planning is about making the connection between park property and the surrounding buildings, social settings, pedestrian connections and environments. A phased plan includes analysis, recommendations, and proposals for a site's facilities and land use. It is based on public input, surveys, planning initiatives, existing development, physical characteristics, and social and economic conditions. It is only required for projects that will be phased in construction.

Design Development

Design development is the stage when the board approved concept is developed in more detail. The documents evolve from a concept drawing to full construction drawings and technical specifications. During this stage, the consultant team determines if there are any major issues (topographic, access, services, drainage, budget) that need to be addressed as the design evolves. Public outreach is limited during the design development stage unless major changes from the approved concept plan occur. Such changes may entail the relocation, removal, or introduction of completely new features, and cost issues.

Cost estimates are conducted at regular milestones in design development. Typically, they are 30%, 60%, 90%, and 100%. If cost estimates exceed the approved budget, district staff will engage the consultant team in a value engineering (VE) exercise to move the project back within budget. The project should not move forward into the next milestone until the estimated cost is in alignment with the budget; budgets may be increased with approval of the board of directors. Minor discrepancies in budget may be allowed up to 10% if staff feels moving the project forward will help with estimating. By doing so, more details about the project will be known, allowing for a more comprehensive evaluation of costs.

Permitting

Permitting is the stage where the consultant team shall lead, coordinate, and obtain all necessary permits and land use decisions needed for the particular project.

Bidding/Procurement

In the bidding/procurement stage, the construction documentation package (drawings, schedules, specifications) are issued per public bidding requirements. Procurement for construction is obtained via public bidding per Oregon's Administrative Rule. Most projects bid as an invitation to bid, with a single prime bidder where cost is the primary consideration for award. In rare circumstances, the district may utilize an alternate bidding method such as construction manager/general contractor (CMGC) or design build procurements. These types of procurement use qualifications as the primary consideration for award because they involve construction of an extremely complex nature not normally performed by the district.

All bidders are to price the project and provide a construction program based on the documents available. Often these stages include various contractor questions to clarify the project design and requirements such as materials, engineering, scope, etc...) and may also be to suggest alternative material or construction methods that may offer savings for the client.

Construction

BPRD may request that the consultant team coordinate with the district construction manager to determine to what level the team shall manage specific aspects of the project; which can include site supervision at specific milestones, coordinate inspections, review and approval of submittals and responses to contractor requests for information (RFI).

Once a project enters construction, all efforts are made to reduce cost overruns. Contractors are expected, and shall be held responsible, to construct the project per the plans and specifications presented at the time of bid. The district applies a 10% contingency on all construction contracts that is available to staff for use during construction. This contingency will still fall within the overall project budget. Construction change orders are given only for issues where the bidding documents did not describe the work required, unforeseen issues, force majeure, or for work added by the district.

During construction the contractor will keep a record of all on-site changes made during construction that differ from the construction documents. This marked-up set of drawings are known as as-built drawings. The as-built drawings shall include a workable set of irrigation drawings that clearly shows each zone, locations of mains and laterals, and color code each zone for use by park maintenance staff in the field

Record Drawings

The consultant team will prepare a set of record drawings to reflect all changes made during construction from the as-built drawings provided by the contractor. The drawings will be provided to BPRD as a record of the completed project.

District Development and Design Guidelines

Development standards are applied to each facility type and include information such as:

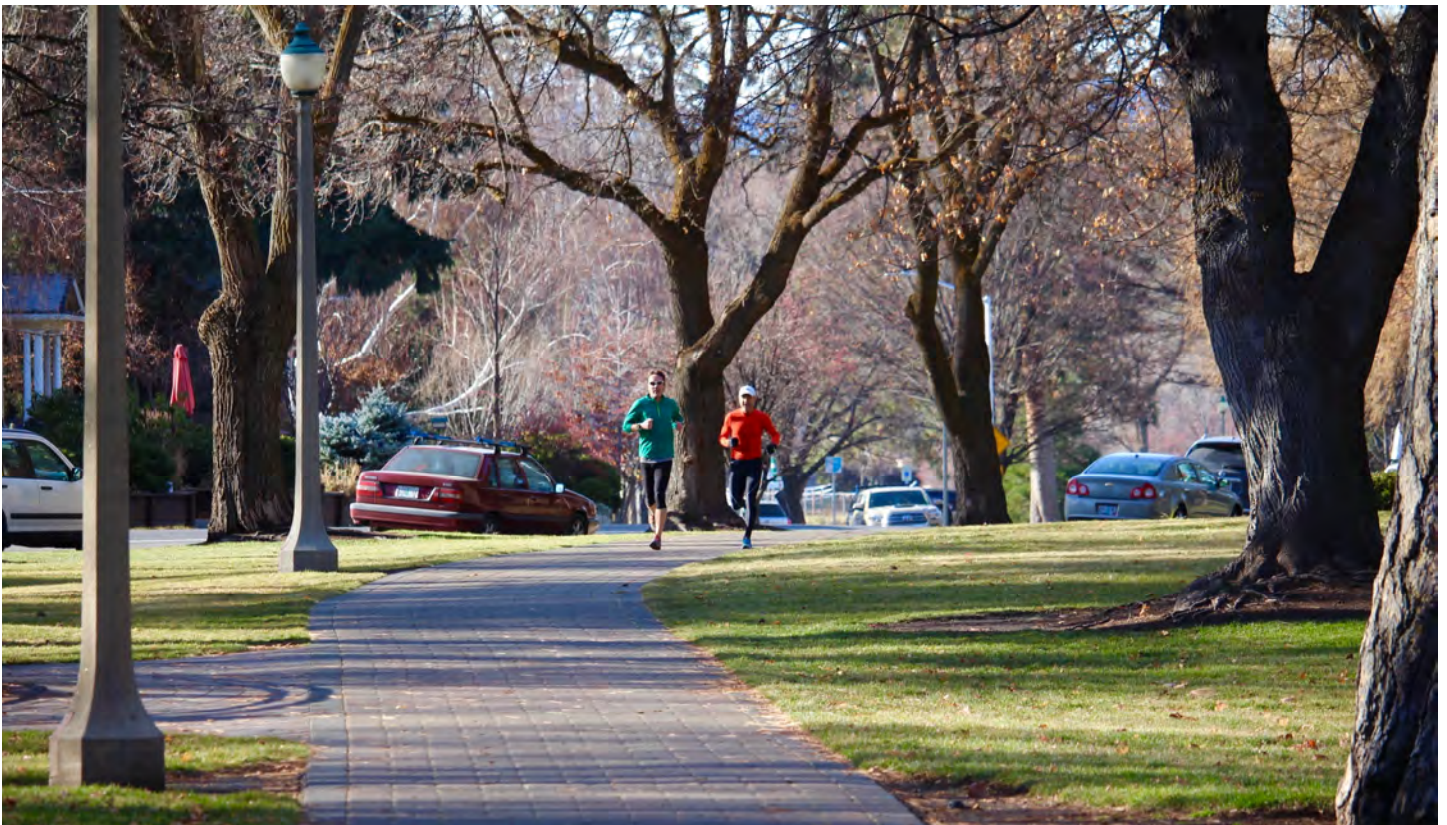
- Purpose or intent of the land or type of facility; considerations by specific area.
- Size guidelines generally including a range of number of acres, size of overall site, or square footage.
- Location criteria addressing things such as visibility, access, central or satellite function.
- Particular features or components that would be common and any development considerations that need to be taken into consideration such as parking, options for expansion, and ongoing maintenance cost considerations.

There are seven primary facility types identified in the district's comprehensive plan. They are neighborhood parks, community parks, regional parks, trails, natural areas, community and recreational centers, and urban plazas. Each type has its own standards such as purpose, location and size, service population, and amenities. Though not identified in the Comprehensive Plan, an eighth type of facility is a Privately Owned Public Space and standards for this type are also discussed with the other seven type standards which follow later in this chapter.

During the design process, emphasis should be given to the sustainability of the design. Each project will have unique characteristics that present opportunities for sustainability, and the design should consider these possibilities and weigh them against the costs of implementation. While the district desires to be a leader in the community for sustainable design, all costs should be evaluated against longevity of the product or design. When possible, grants or other funding should be sought to help offset costs versus payback, such as state and federal grants for solar use.

Concepts such as water usage, utility consumption, site access, safety, natural features, product selection, and procurement are all examples of items that should be considered throughout the design and development process. Plant selections should consider water usage, and when the design requires areas of high-water use, such as using turf grass, the size of these areas should be evaluated for maximum efficiencies. At a minimum, the items listed above should be considered and implemented where possible. The process for documenting the overall sustainability of a project will be recorded within the feasibility studies.

Every major capital project the district constructs should include a feasibility study to inform design decisions. This process can be a simple document for small neighborhood parks, or a more detailed, fully documented study for a large facility or park complex. The study should answer questions such as: goals, standards, scope, levels of service needs, site analysis, environmental analysis, accessibility, transportation, land ownership, construction impacts, alternatives, regulatory compliance, operations, maintenance, and community outreach. Larger studies may include economics, market studies, costs analysis, responsibilities and limitations. The report should include a conclusion that supports the design based on the feasibilities identified within the study.



Neighborhood Park Standards

Purpose

- Provides a location for the recreation needs of a surrounding residential neighborhood.
- Provides informal play for neighborhood children and adults.
- Provides opportunities for social gatherings, both formal and informal, that will promote a sense of neighborhood and community cohesion.
- Provides open space for a surrounding neighborhood.

Service Area

The district aims to provide a neighborhood or community park within a ½ mile walking distance (10-minute walk) of most homes within the district.

Service Population

7.85 acres of combined neighborhood and community parks per 1,000 residents.

Specific Area

As delineated by pedestrian access barriers such as unimproved at-grade crossings of arterial streets or railroad tracks, un-bridged irrigation canals, reaches of the Deschutes River, and other physical barriers. Barriers posed by at-grade crossings of arterial streets may be mitigated with pedestrian-friendly crossings.

Size Guidelines

1.5 to 6 acres per site.

Location Criteria

- Located as centrally as possible to the neighborhood it serves.
- Conveniently accessible from multiple locations and access points.
- Located along bikeway and trail connections.
- Located on at least one public roadway.
- Locating adjacent to an elementary school may provide for a greater array of services and may reduce space requirements.

Features/Components

Basic	Optional
Signs	Drinking fountains
Benches	Half-court basketball courts
Litter receptacles	Multi-purpose courts
Picnic areas with tables	Bikeway and trail connections
Open lawn/play areas	Small picnic shelters (less than 500 sf)
Children's play area	Off-street parking (when on-street is not available)
Seasonal toilet	Fenced dog off-leash area
Walkways and paths	Skate feature
Dog stations	Bike feature
Utilities (water)	Alternative sports feature
Irrigation (solar controller)	Natural areas
Steel monument sign	
Bicycle racks	
Small plaza area	



Development Considerations

- Neighborhood parks shall be developed primarily for informal recreation activities; a place to meet with friends, to play or relax.
- May include facilities and open lawn area for organized play when space allows.
- Developed primarily to serve pedestrians and bicyclists.
- On-street parking will be the norm. Limited off-street parking, particularly accessible parking, may be provided when space allows, or when on-street parking is not available.
- Site size and shape are important to accommodate park features and components.
- Landscaping should utilize native materials and/or preserve natural areas when possible. Landscape areas should be provided to buffer adjacent residential uses.

Community Park Standards

Purpose

- To serve as a focus for a community's recreation, social, and cultural needs and activities.
- To provide opportunities for a wide array of recreation activities ranging from active to passive recreation needs.
- To provide facilities for organized recreation activities and programs, such as group picnics, youth or adult sports league play, special events, alternative sports features, etc..
- To accommodate facilities and activities that require greater amounts of land, attract a high number of people, require off-street parking, and may need extensive buffering than what could be accommodated in neighborhood parks.
- To provide appropriate locations for regulation sports fields and complexes.
- To preserve and protect historic, cultural, or natural features with emphasis on interpretation and education.

Service Area

The district aims to provide a community or neighborhood park within a ½ mile walking distance (10-minute walk) of most homes within the district.

Service Population

7.85 acres of combined community and neighborhood parks per 1,000 residents.

Specific Area

Equally dispersed across the community, as feasible, but may also be located to take advantage of significant historical, cultural, or natural features. If the community park has a unique feature, that feature may serve the entire community.

Size Guidelines

20 to 100 acres per site.

Location Criteria

- Individual community parks should be centrally located in the portion of the community being served.
- Some community parks may be designed and located so as to serve the entire community.
- Collectively, community parks should be strategically located and uniformly dispersed throughout the community.
- Safe pedestrian and bicycle access is an important consideration. However, automobile and public transit access is also important for the activities and uses of a community park.
- Proximity to middle or senior high schools will allow for shared athletic facilities.
- Community centers, indoor recreation and aquatic facilities can be components of community parks. Locating these amenities in community parks could result in savings in land and development costs.
- Community parks should have visibility and access from arterial streets.
- Inclusion of, and adjacency to, natural features (woodlands, rivers, etc.) can contribute to the identity, popularity, and success of a community park.
- Sufficient size, shape, and configuration to allow for development of regulation facilities and all support components, as applicable on a per site basis.
- Separated and/or buffered from residential uses.
- Subject to the existence and availability of historic or cultural resources.

Features/Components

The following components may be included in a community park, dependent on park size, location, configuration and specific targeted use (i.e. sports, nature, etc.). A community park may also serve as a neighborhood park and include all of the components typical therein.

Basic	Optional	Ancillary Components
Drinking fountains	Regulation sports fields (baseball, softball, soccer, football, lacrosse, rugby, etc.)	Support facilities for activities programmed within the park
Benches	Multi-purpose lawn/playfields	Community/recreation centers
Permanent restrooms	Tennis/pickleball courts	Indoor aquatic centers
Picnic tables	Basketball courts	Health/fitness centers
Open lawn/play areas	Jogging paths and fitness circuits	Historic, cultural, or natural features
Children's play areas	Sports field lighting	Public golf courses
Natural areas	Concessions facility	Senior centers
Walkways, paths, trail and bike connections	Passive sports features (horseshoes, bocce, etc.)	Visitor and or interpretive center and facilities
Bicycle racks	Alternative sports features	Community meeting facilities
Litter receptacles	Disc golf course	Administrative offices
Signs	Bike trails	
Off-street parking	Active river recreation	
Dog stations	River access	
Irrigation (powered controller)	Fenced dog off-leash area	
Lighting	Event space	
Utilities (power, water, sewer)	Outdoor stages	
Masonry monument sign		
Large plaza/gathering area		
Large picnic shelter		

Development Considerations

- Community parks provide for the broadest range of recreation activity and facilities. They may take different forms and serve different functions. The level and type of development in community parks will be influenced by the particular location and need.
- May include areas of intense recreation activity such as athletic complexes and aquatic centers. May also include natural areas supporting passive outdoor recreation such as walking, hiking, viewing, and picnicking. Community parks may be a combination of active and passive facilities.
- Depending on specific recreation components or natural features, these parks may draw visitors from throughout the community. Visibility and access are major considerations. Off-street parking is generally required.
- Active and passive areas should be adequately separated.
- Undeveloped areas can be used for trails, nature study, or reserved for future development.
- Regulation sports facilities require intense development to exacting standards. A minimum of four fields is recommended for tournament use.
- Individual facilities for both youth and adult, at either separate sites or separated areas within a site.
- Buffering between sports fields and adjacent land uses is recommended.
- Long-range management plans should be generated prior to development, including historic and cultural resource research and documentation, educational and interpretive objectives and services, revenue and operational costs.



Regional Parks Standards

Purpose

- To provide park and recreation features and facilities that attract visitors and park users from the entire metropolitan area.
- To acquire and protect unique and/or significant natural areas and open space resources for the recreational enjoyment of the general public.
- To provide opportunities to escape the noise and congestion of the urban environment without traveling a great distance.
- To protect and preserve unique cultural, historical, or natural resources.
- To provide for a wide range of activities, from active to passive, organized to impromptu, larger group to individual, and natural to developed.
- To provide enough physical space and separation between the diverse activities so as one activity does not infringe upon the other; that low-density passive natural area activities may co-exist alongside high density developed active activities.

Service Area

The service area should serve the entire community and areas beyond.

Service Population

10 acres of regional parks per 1,000 residents.

Size Guidelines

200 to 1,000 acres per site

Location Criteria

- Proximity to unique cultural, historical, or natural areas or features.
- Availability of large expanse of land to provide for planned park development, including room for parking, support services and buffering.
- In an area not significantly infringed upon by development, industrial uses, highways or airports or areas of abandoned industrial uses, unless specific targeted activity and sufficient development resources exist to provide for appropriate levels of cleanup and mitigation.
- Safe and convenient access by vehicles and public transit, with entrances to the park fully visible.
- Access by bicyclists and pedestrians with the park linked to the community trail and bikeway network.

Features/Components

Regional parks generally include both developed facilities and undeveloped natural areas, with developed areas or portions of the park occurring around specific facilities or entrances.

Basic	Optional
All regional parks should provide some amount of the basic and optional components recommended for neighborhood and community parks as a basic regional park feature. Picnicking, play areas and open lawns can be located near entrances or in specific nodes within a larger regional park setting without infringing on natural areas.	Depending on the purpose of the specific regional park, if organized active recreation is to have some presence in the overall facility, some of the optional components recommended for community parks may be appropriate. Should natural areas be present, the active developed recreation components can be located near entrances, or in localized nodes. In addition to the optional components listed for community parks, some of the following elements may be appropriate for a specific regional park facility.
Drinking fountains	Large undefined open lawn play areas, play meadows
Benches	Large group picnic facilities for food preparation and barbecues
Restrooms (permanent or seasonal)	Extensive unpaved trail and hiking systems
Picnic areas with tables and shelters	Equestrian facilities and trails
Off-street parking	Fishing areas
Dog stations	Outdoor swimming in lakes, ponds, or rivers
Extensive natural areas/wildlife habitat	Boating facilities
Walkways, paths, trail, and bike connections	Day camps

Bicycle racks	Overnight camping or RV facilities
Litter receptacles	Amphitheaters, outdoor performing arts facilities
Signs	Botanical and display gardens, arboretums
Masonry monument sign	Wildlife and wild animal areas
Utilities (water, sewer, power)	Museums, educational facilities, outdoor exhibits, living history
	Holiday or cultural events
	Specialized recreation facilities
	Heritage or demonstration agriculture

Development Considerations

- Separate active areas from passive areas, developed areas from natural areas.
- Preserve significant proportion of the park in its natural state, generally developing no more than about 60 percent of the park.
- Develop and program facilities for seasonal variation - winter as well as summer use, and for long hours, well into the evening for some activities or events.
- Generate management plans with preservation and protection in mind when natural or historical/cultural features are present. Plan for moderate to larger crowds and in anticipation of future community growth.
- Management plans should be created and maintained for regional parks. Management plans should consider cultural, natural, and developed areas that provide for long term care and maintenance of the park.



Trail Standards

Purpose

- To provide recreational opportunities and public access to amenities throughout the community, including parks, schools, natural areas, local, state, and federal trail systems, and to the Deschutes River corridor.
- To provide a safe and convenient alternative to automobile transportation.

Service Area

The service area should serve the entire community and areas beyond.

Service Population

One mile of trail per 1,000 residents.

Size Guidelines

Trail widths are variable depending on the classification, intended use, and available rights of way (see design guidelines listed below).

Design Guidelines:

- All trails must adhere to the trail standards contained in the United States Access Board [Accessibility Standards](#) for Federal Outdoor Developed Areas.
- Primary trails should be a minimum of 10' wide. Wider widths should be considered in areas of intense use and across bridges and boardwalks to safely accommodate two-way traffic. Trail width may be reduced to 8' for short distances where there are physical constraints.
- Connector trails should be a minimum of 6' wide.
- Single track trails should be a minimum of 3' wide.

Location Criteria

- Linear in nature, trails, pathways and bikeways may be provided within existing parks and open spaces, along existing streets and roadways, within utility rights-of-way, or along greenways, irrigation canals, on other public properties or easements assembled for trail purposes.
- Trails should be located to minimize trail grade, minimize impacts to adjacent landowners, maximize connections to other trail, sidewalk, or bicycle facilities, and to ensure adherence to all applicable design criteria.

Features/Components

Trails should be designed to provide safe, convenient, and enjoyable experiences for all users.

Basic	Optional
Natural or compacted Trail Surface Aggregate surface	Hard surface such as pavement, concrete, or pavers
Wayfinding signage	Trailhead parking
Connections to other trails, sidewalks, or on-street bicycle facilities.	Trailhead kiosks
	Interpretive signs
	Benches, trash cans, dog bag stations
	Lighting
	Other amenities including drinking fountains, toilets, etc.
	Access control gates (in limited situations)
	Bicycle racks

Development Considerations

- The locations of planned trails are identified in the district's trail plan map which is included in the district's current Comp Plan. The trail plan map is incorporated by reference into the City of Bend's Transportation System Plan ([TSP](#)).
- Follows the Intergovernmental Agency Agreement between the district and the City of Bend which outlines trail management and maintenance responsibilities.
- The city may require the construction of additional trails not identified on the district's trail plan map. Generally, these trails will not be maintained by the district.
- Follows the specifications in this document and in the City of Bend Development Code that addresses surfacing materials, widths, grades, access, signage security and safety.
- Property owners and developers are highly encouraged to coordinate with the district early and often during land use planning to ensure that trails that are to be owned or maintained by BPRD meet all of the applicable design and location criteria.



Natural Area Standards

Purpose

- To preserve and protect significant natural areas and open space resources within and nearby the community.
- To promote environmental awareness and education, including interrelated natural processes such as wetlands, riparian areas, woodlands, meadows, and wildlife.
- To preserve remnant representative landscape types in coordination with urban development.
- To enhance the environmental quality of the community.

Service Area

Natural areas typically serve a community-wide population and include greenways, natural areas, and preserves. The natural area classification includes district held properties for which there are no immediate development plans and that are situated in such a way as to primarily serve the surrounding neighborhood.

Service Population

Variable. Need to recognize the limited carrying capacity of the natural resource and number of visitors it can reasonably accommodate without sustaining damage or degradation.

Size Guidelines

Variable acres per population and variable site size. Sites may vary in size from small riverfront parcels (less than 10 acres) to a large land-banked property of more than 200 acres. Size is a function of the natural resource to be protected, the long-term plan for the property and opportunity for acquisition. The acquisition of smaller, linear parcels may be a function of opportunity, especially for greenways. A number of small, interrelated parcels may aggregate to form a functioning natural area or preserve.

Location Criteria

- Locations are a function of available natural areas and resources. Can be along rivers, roadways, trail networks, irrigation canals or ridgelines. Can be of riparian, wetland, high desert, woodland, or meadow environments. Can include right-of-way corridors when significant natural resources are present.
- May be accessible by vehicle, though preserves are often best protected if direct vehicular access to the site is limited or difficult.
- Connected to bicycle, pedestrian, or trail networks when possible.

Features/Components

Natural areas differ from other park categories in that a park is primarily developed to provide active recreation while a natural area is normally managed primarily for the protection of a particular natural resource. Activity at natural areas should be limited to low impact outdoor recreation, with little facility development intruding on the area. Activities such as hiking, mountain biking, nature study and viewing and other passive recreation activities are generally allowed.

Basic	Optional
The basic level of facility for a natural area is the exclusion of any built components	Trails (see Trails Standards for typical amenities)
Extensive natural areas/wildlife habitat	Overlooks and viewing areas
Native trees, shrubs, grasses	Interpretative facilities
Meadows	Off-street parking areas
Riparian areas/wetlands	Seasonal or permanent restroom facilities
Woodlands	Signs
Areas of Special Interest (ASI) as defined in the City of Bend Comprehensive Plan	Fencing
	Benches
	Picnic tables
	Bicycle Racks



Development Considerations

- Environmental protection and/or environmental education objectives should be clearly articulated.
- Long-range protection and natural resource management plans should be developed.
- Land use controls should be established which would protect the resource from physical encroachment or from nearby visual or noise intrusion.
- Access should be controlled so visitors first enter an entry node, which has only modest development (i.e., site entry, trailhead, interpretive facility, parking, and restrooms).
- Conflicting uses, such as visitor's facilities, parking and the like should be physically separated and buffered (using native materials) from the natural areas.

Community and Recreation Center Standards

Purpose

- To provide year-around, community social, cultural, and recreation activities, including services and programs for preschool and school age children, adults, teens, seniors, and families.
- To serve as a headquarters for community recreation programs.
- May place an emphasis on serving a particular age group (e.g. youth, senior adults), but should also strive to include multi-generational programming in order that age groups are not isolated from one another.
- To provide an outreach location for private non-profit recreation organizations, clubs, and community social services.
- To provide opportunities for the development of sense of place, community, and identity via a successful gathering, recreating and meeting place.

Service Area

Community and recreation centers will serve the entire community. However, depending on identified need, community/recreation center facilities may be strategically located to serve specific geographic or economic segments of the community.

Service Population

Entire community

Location Criteria

- Generally need three to 12 acres for a basic public indoor community/recreation facility; though a larger site is often more desirable as the trend is towards integrating community, recreation, aquatics, health and fitness centers into a single complex or campus to economize capital investment and maximize public convenience and access.
- Should have direct vehicular and public transit access from major arterial.
- Should also be connected to community bikeway, trail and pedestrian circulation networks.
- Should be centrally located to conveniently serve the entire community.
- Should be highly visible from off-site.

Features/Components

Indoor:

Lobby, reception, registration, classrooms, meeting rooms, shop, crafts rooms, gymnasium, swimming pools and other aquatics facilities, fitness facilities, spectator areas, commercial kitchen or food warming/serving area, childcare area, staff office, and sufficient mechanical, maintenance and operational support area.

Outdoor:

Arrival, drop-off and pick-up, parking, and delivery area. A modest outdoor terrace/courtyard and small lawn/landscape area is recommended. May include outdoor children's play space and/or adjacent facilities for specific outdoor recreation activities (e.g. splash pad, sand volleyball courts, picnic shelter, etc.)

If in a larger setting, with other outdoor recreation components might also include:

Basic	Optional
All community park basic components.	Community park optional and ancillary components as appropriate for particular community park development or service provision program.



Development Considerations

- Sites for a community/recreation center should have well-developed site criteria. Location, visibility, target market, access, size and shape, are all important considerations in selecting an appropriate site.
- Programs for a community/recreation center should also have well developed target markets. Whether the facility will stand alone or be a part of a more comprehensive indoor and/or outdoor complex should be determined in advance.
- Direct, visible vehicular and public transit access, arriving and loading zones, and parking are important design elements for the success of the facility. The provision of adequate parking space for the near term and for future expansion is an important consideration.
- Growth in the community and in visitors to the facility should be planned for with options for future expansion designed into the building(s).
- Maintenance operations and support, equipment and supply storage, personnel and team space is vital to the community's support of the facility.
- The intense development and massing of the buildings, support areas and parking lots dictate sizable setbacks and buffering from residential and other adjacent sensitive uses.

Urban Plaza Standards

Purpose

- To promote and support place making in urban spaces that will foster community interaction and civic pride.
- To enhance the pedestrian environment within highly developed urban spaces.
- To provide open space, visual relief, and high traffic pedestrian corridors, minimizing conflicts with vehicles, in otherwise densely developed urban landscapes.
- To take advantage of occasional small urban spaces not otherwise suitable for park development.
- To support the preservation, interpretation and appreciation of cultural and historic resources.

Service Area

Due to their unique character, urban plazas would generally be accessed by, and thus serve, only those pedestrians who are nearby, however, some plazas may include features or programming that make it a destination.

Service Population

Variable. Generally, neighborhood serving plazas serve those who live, visit or work within the neighborhood where the plaza is located. Community serving plazas may draw a broader cross section of the community as a result of their larger size, quantity of amenities and programming.

Size Guidelines

Variable site size. Generally ¼ to one acres in size.

Location Criteria

- Function of specific urban development, facilities, and plans.
- Must be publicly visible and adjacent to, or connected to, public sidewalks, public parking, and streets.
- An unobstructed portion of a lot, with minimum dimensions of no less than 20 feet in each direction
- Integrated into overall site design and centrally located for ease of access by the residential units it is designed to serve, as well as the general public.
- Design and location shall minimize wind tunneling and ensure solar access to the maximum extent practicable.

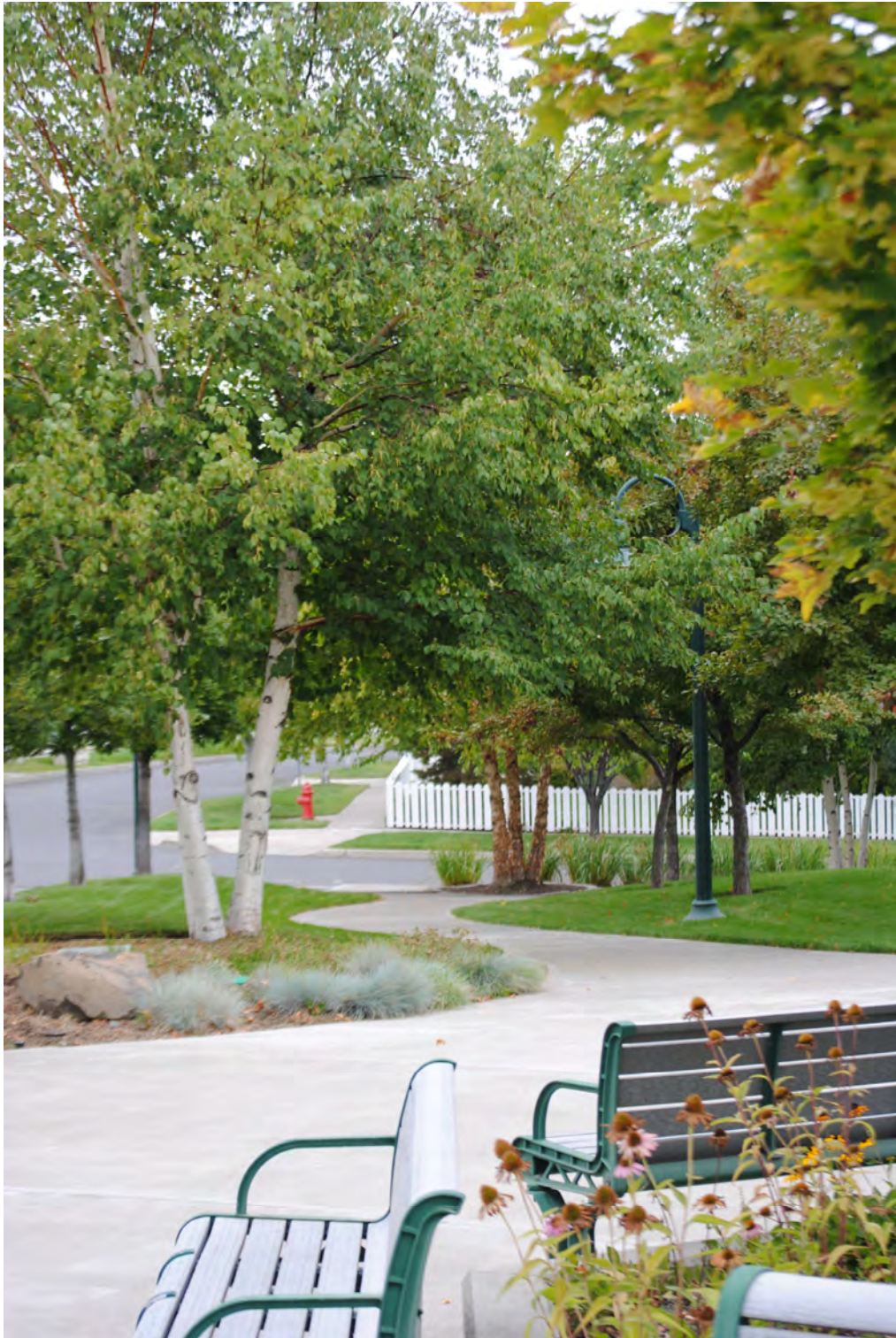
Features/Components

Function of specific size, location, and configuration of downtown or other urban location.

Basic	Optional
Signs	Tables
Drinking fountains	Turf or multi-purpose lawn area
Seating and benches	Outdoor stage or bandstand
Litter receptacles	Sculpture, murals, or other public art
Trees, planting and irrigation	Fountains, reflecting pools, terraces, broad steps
Bicycle racks	Facilities for vendors, food carts, farmer's market, etc.
Lighting	Restrooms
Circulation path to connect amenities	Splash pads
	Play structures
	Community garden

Development Considerations

- Should promote and enhance place making and quality urban design, utilizing appropriate materials for durability as well as urban aesthetics.
- Should integrate with and complement urban environments, providing space for people to gather, play, visit, relax, meet friends, have lunch or enjoy the community.
- Orientation as related to shade, shadow, solar access, wind tunneling, and visibility from a street or activated space.



Privately Owned Public Spaces

Purpose

Privately owned public space (POPS), also known as privately owned public open space (POPOS), are spaces dedicated to public use and enjoyment, which are owned and maintained by private property owners. Usable space can take many forms, and is not strictly limited to a plaza, in fact, creativity is encouraged. These spaces are generally subject to a Public Access Easement (PAE) that govern such public use. When a POPS is proposed with the intent of receiving public benefit credits (or similar), the developer must show compliance with POPS development standards. Any noncompliance will be documented in the district provided coordination letter. In addition, the district Board of Directors may review such requests, and those deemed to be non-compliant with POPS development standards may not be supported by the Board of Directors.

Service Area

A POPS can take a variety forms, but generally will primarily serve the surrounding neighborhood. Some POPS may include features or programming that make it a destination, therefore serving a larger area.

Service Population

Variable. Generally, neighborhood serving POPS serves those who live, visit or work within the neighborhood. Community serving POPS may draw a broader cross section of the community as a result of their larger size, quantity of amenities and programming.

Size Guidelines

Variable. Depending on the type of POPS the size will vary. The size must be sufficient to allow for programming and/or amenities sufficient to serve the intended population and ensure a variety of amenities and/or programming to create a welcoming and active space.

Location Criteria

- Space can be located at ground level, within an enclosed space or at the roof level.
- Must be publicly visible and adjacent to, or connected to, public sidewalks, public parking and streets.
- An unobstructed portion of a lot, with minimum dimensions of no less than 20 feet in each direction
- Contiguous property unless site size, site constraints (not self-imposed) or another factor render this infeasible.
- Integrated into overall site design and centrally located for ease of access by the residential units it is designed to serve, as well as the general public.
- Design and location shall minimize wind tunneling, ensure solar access and minimize heat island effect to the maximum extent practicable.

Features/Components

Usable open space can take the form of an urban plaza, urban garden, a view or sun terrace, urban playground, roof garden, park or similar. Features and components will vary based on the type of space provided. The list of optional features and components should not be considered exhaustive; creativity is encouraged.

Basic	Optional
Public space signage	Tables (fixed)
Seating and benches	Tables and chair (movable)
Litter receptacles	Turf or multi-purpose lawn area
Trees, planting and irrigation	Dog friendly facilities
Bicycle racks	Outdoor stage or bandstand
Lighting	Sculpture, murals, or other public art
Circulation path to connect amenities	Fountains, reflecting pools, terraces, broad steps
	Facilities for vendors, food carts, farmer's market, etc. (space may be used for special events and closed off on occasion)
	Restrooms
	Splash pads
	Play structures

Basic	Optional
	Community gardens
	Greenway/trails *
	Drinking fountains
	Restrooms
	Dog stations
	Picnic shelters
	Amphitheater

General Requirements

- Promote and enhance place making and quality urban design, utilizing appropriate materials for durability and urban aesthetics.
- Recordation of a Public Access Easement (PAE) or similar over the public open space is required. Easements can include reasonable restrictions and shall provide public access to the space in perpetuity.
- A minimum of 20% of the public open space must be planted areas (excluding tree canopy). Plantings may be in beds, groundcover, raised beds, planters, boxed trees or accessible lawns, or similar.
- Significant expanses of hardscape must create visual interest by changes in direction, material, pattern, texture, color, etc.
- Mature trees must be preserved to the maximum extent practicable.
- All spaces shall must comply with ADA requirements and standards.

The area may not:

- Be a widened sidewalk.
- Be surfaced primarily with asphalt or gravel, with the exception of trails.
- Include areas for private dining, private recreation, display or non-publicly accessible uses.
NOTE – although the above types of areas cannot be counted towards the POPs square footage, areas for private dining, display or retail adjacent to a POPS are permitted.
- Require a purchase or fee for entry
- Include garage entrances, driveways (except those providing controlled access for maintenance or events), parking spaces, loading berths, exhaust vents, mechanical equipment, building trash storage facilities, or similar.

Safe and Welcoming Design Requirements

- Pedestrian level lighting in all accessible locations to create a safe environment.
- Naturalized surveillance – is visible from the street or other activated space
- Public Space Signage – The provision of clear, visible, and readable signage will be provided to identify the area as public open space, and to identify hours of access and those responsible for the upkeep and maintenance of the space.

Site Connectivity and Circulation

- Space must support, not inhibit connectivity – circulation paths must provide for unobstructed pedestrian circulation throughout the public open space area.
- Paths are not required to be straight and direct, but they must be continuous and navigable, and provide access to all features of the site.

Maintenance Requirements:

- At the discretion of the City of Bend, POPS may require maintenance agreements. General maintenance requirements to ensure public spaces are functional and welcoming include:
- Landscaping must be maintained in good condition, without weeds. Dead or dying plants must be replaced by the owner.
- Snow will be removed as necessary to facilitate access and use as required by City of Bend Code 5.35.020, Snow and Ice.
- Site shall have regular clean-ups and trash service to ensure a cleanly and welcoming experience.
- Prompt repair of damaged materials to ensure safety
- Prompt removal of graffiti
- On-going replacement of assets as necessary at end of life-span.

* Greenways and trails are not in lieu of public sidewalk

Chapter 2

General Standards



General Professional Services Standards

GENERAL REQUIREMENTS FOR PROFESSIONAL SERVICES - The requirements contained in this development and design standard are for basic informational use only. Each individual project will be more fully described in an RFP. Additional requirements and terms of the contract will be outlined in an agreement for professional services contract administered by the district.

Basic Requirements

1. For projects up to \$250,000, every two years the district will issue an RFQ to maintain a list of qualified consultants to choose from. Qualified consultants may be chosen to participate in a RFP that will describe the type of services requested and any required licensure. Typically, the district seeks either licensed landscape architecture or civil engineering firms for leads. As a lead firm, the district asks that the firm hire sub-consultants needed for design such as geotechnical, traffic, etc.
2. The district issues RFPs for design services over \$250,000 in compliance with OAR137-048.
3. Insurance requirements are listed on the copy of contract included with a published RFP.
 - A. The insurance company will be a first-class insurer and the underwriter will have an A.M. Best's financial strength rating of A- or better, and financial size category of X or better.
 - B. Workers' compensation insurance shall be statutory limits.
 - C. Employer's liability insurance shall be subject to a waiver of subrogation in favor of the district, with limits of liability not less than \$1,000,000 per accident, \$1,000,000 disease per employee, and \$1,000,000 disease policy limit.
 - D. Commercial general liability insurance shall be applicable to all premises and operations, including bodily injury, property damage, personal injury, and blanket contractual liability, with limits of liability not less than \$2,000,000 per occurrence, and \$4,000,000 aggregate. The general liability coverage will name the district as additional insureds and will contain a severability of interest clause.
 - E. Business automobile liability insurance shall be applicable to any automobile assigned to, or used, in the performance of the services, whether owned, hired or non-owned, with a limit of liability not less than \$1,000,000 combined, single limit per accident.
 - F. Professional liability insurance shall be per-claim and aggregate limits of at least \$2,000,000 and a retroactive date no later than the effective date of a signed contract. The consultant will maintain such insurance for a period of three years after completion of the project construction. The consultant will require each sub-consultant engaged or employed by the consultant to be similarly insured with reasonably prudent limits and coverages in light of the services to be rendered.
4. Licensed professionals shall have the appropriate Oregon stamp.

RFP Publishing

1. Formal RFPs –for work over \$250,000 will be posted on Premier Builders Exchange, as well as in an Oregon statewide publication, customarily the Daily Journal of Commerce. Formal RFPs will not consider fees in the scoring process.
2. Informal RFPs –for work up to \$250,000 consultants may be chosen from the list of pre-qualified applicants for RFP. Informal RFPs will take proposed fee into account in the scoring process.

Key Personnel

1. RFPs are awarded on the basis of the unique background and abilities of the key personnel of the consultant and sub-consultants. The consultant will provide a list of the proposed key personnel to be assigned to the project. The list will include information on the professional background of each key person. Specific terms of the key personnel are provided in the professional services contract.

Contract

1. The contract will be provided by the district. The district will not sign or authorize any other form of contract.
2. It is the preference of the district to execute contracts for the total project. However, depending on the complexity of the project and desire of the district, project scopes may be limited to a given phase of the project such as DD development, or preferred design concept only, with an understanding that if the project moves forward, the district may ask for, and execute, additional work with an amendment to the professional services agreement.
3. The district may ask for allowances in the contract, and if executed, must be done so in writing on the district's form and executed by both parties.
4. It is the intent of the district that the consultant's design be a fully functional/buildable project, and that the full design is considered in the base cost of the project, unless the project has been broken into phases as mentioned in preceding item two above. It is also the intent of the district that the consultants have a responsibility to provide a design that fits within the overall budget given in the RFP. The district relies on the expertise of consultants to lead the design towards a fundable project. Additional services will not be granted for the consultant's inability to design within the project's given budget.

Project Phases

1. Project Inception – The phase where initial discussions about the project including location, size, preliminary ideas, uses, budget, timeline and other important information about the project occur. The design consultant will be hired in this phase.
2. Concept Design – The phase when the design team puts pen to paper to further develop the initial ideas for the project based on the information gathered to date and during this stage of the process. The majority of public outreach occurs in this phase. The preferred concept will be approved by the board and used as the foundation for design development.
3. Design Development – The phase when the board approved concept is developed in more detail to ensure that the preferred concept design is achievable and will meet the district's needs. Also, at this stage, the design team determines if there are any major issues as the design evolves. The design documents will include construction drawings, technical specifications, and cost estimates.
4. Permitting – In this phase the consultant shall lead, coordinate and obtain all necessary permits and land use decisions needed for the particular project.
5. Bidding/Procurement – In this phase the construction documentation package (drawings, schedules, specifications) are issued per public bidding requirements, local regulations and BPRD policies on procurement. All bidders are to price the project and provide a construction program based on the documents available.
6. Construction – In this phase BPRD may request that the consultant team coordinate with the district construction manager to determine to what level the consultant team shall manage specific aspects of the project in construction. During construction the contractor will keep a record of all on-site changes made during construction, known as as-built drawings.
7. Record Drawings – In this phase the consultant team will prepare a set of record drawings to reflect all changes made during construction from the as-built drawings provided by the contractor. The drawings will be provided to BPRD as a record of the completed project.

Phased Plan Document

A phased plan is a dynamic long-term planning document that provides a conceptual layout to guide future growth and development of a BPRD property. Phased planning is about making the connection between park property and the surrounding buildings, social settings, pedestrian connections and environments. A phased plan includes analysis, recommendations, and proposals for a site's facilities and land use. It is based on public input, surveys, planning initiatives, existing development, physical characteristics, and social and economic conditions. A phased plan is only required for projects that will be phased in construction.

Cost Estimates

1. Cost estimates should be performed by a local contractor or estimator familiar with the economy and bid environment of Central Oregon. The district will normally require cost estimates at the end of the master plan and schematic design phase; at the 50% and 100% of design development phase, and at the 30%, 60%, and 90% of construction document phase.
2. Cost estimates are to be provided to the district by the design professional.

Documents

1. Design documents shall be drawn to scale on 22 x 34" size paper, unless approved otherwise by the district.
2. Specifications shall be in CSI format, book form on 8-1/2 x 11" size paper. The district will provide a Division 01 basic specification for the consultant to modify to the project parameters.
3. Color renderings shall be a minimum of 11 x 17" size at 300 dpi for use in both print and digital formats. Renderings shall be provided in PDF and PSD format.
4. Final construction documents shall be provided to the district in PDF format. Each page should be its own file, and named as such: 3-digit number, sequential from the first sheet to the last, a hyphen, the sheet number, followed by the sheet name, an underscore, and finally the project name.
A. Naming Example: 001-CS Cover Sheet_New Park Name.pdf
5. To the extent possible, all documents should be electronic PDF format. If hard copies are required, it will be listed in the scope of work for the individual project. AutoCad files of the project are required for record drawings. AutoCad files should be a single file for each page, formatted for AutoCad Light.
A. Drawings can be submitted on a memory stick or CD once the record drawings are complete.
6. Drawings, specifications and other documents, including those in electronic form, prepared by the consultant and their sub-consultants, are instruments of service intended and authorized for particular uses with respect to a particular project and are not intended, or represented, to be suitable for any other purpose or for any other project.

7. All design documentation for all phases of the project, including, without limitation, the drawings, specifications, and all BIM information, and other instruments of service provided to the district shall be deemed the property of the district who may use them without the consultant's further permission for any lawful purpose.
 - A. The consultant and the consultant's sub-consultants shall retain common law, statutory and other reserved rights in their original work, including copyrights, except that the consultant grants to the district a nonexclusive license to reproduce the consultant's instruments of service for purposes of constructing, using, and maintaining the project.
 - B. Additional information is provided in the standard form of agreement (contract), for each individual project.

Payment

1. The consultant shall bill for work completed monthly, showing base contract, expenses, any allowances (if authorized), and any additional services (if authorized). The billing should sum the total paid to date, the current billing, and any amounts left owing on the contract. The district will pay the consultant within 30 days of receiving an approved invoice.



General Parking Standards

Basic Considerations

The quantity of vehicular parking spaces, as well as methods to reduce vehicular parking, should be considered with all facility types. The list below outlines basic considerations when determining if and how much vehicular parking to supply.

1. Availability of on-street parking: The availability of nearby on-street parking may reduce or eliminate the need to construct parking on site.
2. Shared parking opportunities: The district has agreements with multiple agencies and partners to share parking facilities in locations with high demand.
3. Access to transit services: Destinations served by transit may allow remote parking, or transit may be used as alternative transportation in well-served areas.
4. Safe and convenient bicycle/pedestrian routes: Sites served by safe and convenient bicycle/pedestrian routes may encourage alternative modes of transportation.
5. Use, seasonality, scheduling, etc.: How and when a park is used may impact peak parking demand. Opportunities may exist to stagger demand to decrease the need for parking stalls.
6. Public feedback: Feedback collected during the project's public outreach process will inform staff of how the community will access the park, trail or facility.

Basic Quantity

The minimum quantity of bicycle parking spaces shall be governed by the Bend Development Code (BDC) and bicycle parking exceeding code requirements can be provided at the discretion of district staff. The list below outlines basic considerations when determining the quantity, location and specifications for bicycle parking.

1. Rack Type: The district standard for bike parking is a U-Rack as it is the most efficient design to serve a variety of bike types and sizes. Consider alternative rack styles that allow attachment closer to the ground for a minimum of one bicycle rack at each parking location. These types of racks are better suited to cargo or utility style bicycles.
A. ***BPRD Standard Drawing: Detail 4.81***
2. Quantity: District staff may provide bicycle parking exceeding BDC code requirements when deemed appropriate. Additional bicycle parking may be warranted at high use parks and facilities, at parks and facilities along City of Bend identified greenways, at parks and facilities that host a large number of events, and at locations where a large number of spectators are drawn for practices and events.
3. Location: Bicycle parking should be convenient for the user/close to facility amenities, secure, visible from the intended destination, and easily accessible from the road or bicycle path,
4. Pad Dimensions: Design of bicycle parking areas should accommodate at least one bicycle parking space suitable for a larger cargo or utility style bicycle. Such space would include pad dimensions of approximately 10' in depth, with a minimum dimension of 36-inches from any other rack or obstacle.



General Construction Standards

GENERAL REQUIREMENTS FOR CONSTRUCTION - The requirements contained in this development standard are for basic informational use only. Each individual project will contain a complete Division 01 specification section that shall govern the project.

Owner-Furnished, Contractor-Installed (OFCI) Products, and Owner-Furnished, Owner-Installed (OFOI) Products

1. BPRD custom builds or procures certain products for use in parks. The products are normally installed by the contractor as OFCI. Each project will indicate how they are to be installed. The following is a basic list of owner supplied products.
 - A. Bike racks - BPRD single "U" shape hoop, quantity as noted on plans.
 - B. Doggy station - BPRD standard doggy station, quantity as noted on plans.
 - C. Park signage - BPRD standard signage, quantity and type as noted on plans.
 - D. Park Benches - BPRD standard benches, quantity as noted on plans.
 - E. Tables - BPRD standard, quantity as noted on plans.

Access to the Site

1. Limit use of the project site to solely work in areas indicated. Do not disturb portions of the project site beyond the area(s) in which the work is indicated.
2. Maintain portions of existing areas affected by construction operations in good condition throughout the construction period. Repair damage caused by construction operations to the satisfaction of the district.

Coordination with Occupants

1. Full owner occupancy: The owner will occupy the site and existing adjacent area(s) during entirety of the construction period. Cooperate with the owner during construction operations to minimize conflicts and facilitate continued owner usage. Perform the work so as not to interfere with the owner's day-to-day operations. Maintain existing exits unless otherwise indicated.
 - A. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from the owner and approval of authorities having jurisdiction.
 - B. Notify the owner no less than 48 hours in advance of activities that will affect the owner's operations.
2. Partial owner occupancy: The owner will occupy the premises during entire construction period, with the exception of areas under construction. Cooperate with the owner during construction operations to minimize conflicts and facilitate the owner's usage. Perform the work so as not to interfere with the owner's operations. Maintain existing exits unless otherwise indicated.
 - A. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from the owner and authorities having jurisdiction.
 - B. Provide not less than 48 hours notice to the owner of activities that will affect the owner's operations.
3. Owner limited occupancy of completed areas of construction: The owner reserves the right to occupy, and to place and install equipment in completed portions of the work area, prior to substantial completion of the work, provided such occupancy does not interfere with completion of the work. Such placement of equipment and limited occupancy shall not constitute acceptance of the total work.

Work Restrictions

1. Work restrictions, General: Comply with restrictions on construction operations.
 - A. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.
2. Existing utility interruptions: Do not interrupt utilities serving facilities occupied by the owner or others unless permitted under the following conditions, and then only after providing temporary utility services according to requirements indicated:
 - A. Notify the owner not less than two days in advance of proposed utility interruptions.
 - B. Obtain the owner's written permission before proceeding with utility interruptions.
 - C. Controlled Substances: Use of tobacco products and other controlled substances on the project site is not permitted.

PAYMENT PROCEDURES

Schedule of Values

1. Coordinate preparation of the schedule of values with preparation of contractor's construction schedule.
 - A. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:
 - 1) Application for payment forms with continuation sheets.

2. Format the schedule of values based on the itemized bid list provided during bidding.
 - A. Arrange schedule of values to be consistent with the format of the owners form 006365 "Owners Application for Payment".
 - B. Round amounts to the nearest whole dollar; total shall equal the contract sum.
 - C. Each item in the schedule of values and applications for payment shall be complete. Include the total cost and proportionate share of overhead and profit for each item.

Applications for Payment

1. Each application for payment following the initial application for payment shall be consistent with previous applications and payments.
2. The date for each progress payment is indicated in the agreement between the owner and contractor. The period of construction work covered by each application for payment is the period indicated in the agreement, normally 30 days, or one month.
3. Use the owners form 006365 "Owners Application for Payment" as form for applications for payment. An electronic copy will be available upon request to owner. No other forms of payment shall be used.
4. Complete every entry on the form. The form shall be executed by a person authorized to sign legal documents on behalf of contractor. Owner will return incomplete applications without action.
 - A. Entries shall match data on the schedule of values. Use updated schedules if revisions were made.
 - B. Include amounts for work completed following the previous application for payment, whether or not payment has been received. Include only amounts for work completed at the time of application for payment.
 - C. Include amounts of change orders issued before the last day of construction period covered by the application.
5. Submit electronically via email one signed PDF copy of each application for payment to owner.
 - A. Transmit required BOLI wage certifications of all contractor employees having worked onsite during the application period for the owner reference per contract documents.
6. After the owner issues the certificate of substantial completion, submit an application for payment showing 100% completion for portion of the work claimed as substantially complete.
7. After completing the project closeout requirements, submit final application for payment with releases and supporting documentation that have not been previously submitted and accepted, including, but not limited to, the following:
 - A. Evidence that claims have been settled if required.
 - B. Final meter readings for utilities, a measured record of stored fuel, and similar data at the date of substantial completion, or when the owner took possession of, and assumed responsibility for, corresponding elements of the work.

PROJECT MANAGEMENT AND COORDINATION

General Coordination Procedures

1. Coordinate construction operations included in different sections of the specifications to ensure efficient and orderly installation of each part of the work. Coordinate construction operations, included in different sections that depend on each other for proper installation, connection, and operation.
2. Each contractor shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the work, as well as those included in different sections that depend on each other for proper installation, connection, and operation.
3. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
4. Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the work.
5. Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

Coordination Drawings

1. Prepare coordination drawings according to requirements in individual sections, and additionally;
 - A. where installation is not completely shown on shop drawings.
 - B. where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.
2. Prepare coordination digital data files for final submittal using PDF format.

QUALITY REQUIREMENTS

Quality Control

1. Where quality-control services are indicated as owner's responsibility, the owner will engage qualified testing agency to perform these services.
2. Tests and inspections not explicitly assigned to the owner are the contractor's responsibility. The contractor shall perform additional quality-control activities required to verify that the work complies with requirements, whether specified or not.
3. Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 01 3300 "Submittal Procedures".
4. Where indicated, engage a manufacturer's technical representative to observe and inspect the work. Manufacturer's technical representative's services include participation in pre-installation conferences, examination of substrates and conditions, verification of materials, observation of installer activities, inspection of completed portions of the work, and submittal of written reports.
5. Regardless of whether original tests or inspections were the contractor's responsibility, provide quality-control services, including re-testing and re-inspecting, for construction that replaced work that failed to comply with the contract documents.
6. Testing agency shall cooperate with architect, owner and contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
7. Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel.
8. Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
 - A. Schedule times for tests, inspections, obtaining samples, and similar activities.
9. Prepare a schedule of tests, inspections, and similar quality-control services required by the contract documents as a component of contractor's quality-control plan. Coordinate and submit concurrently with the contractor's construction schedule. Update as the work progresses.
10. Distribute schedule to owner, architect, testing agencies, and each party involved in performance of portions of the work where tests and inspections are required.

Special Tests and Inspections

1. Owner will engage a qualified testing agency (special inspector) to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of the owner.

TEMPORARY FACILITIES AND CONTROLS

Security and Protection of Facilities

1. Protect existing landscaping, vegetation, irrigation systems, equipment, structures, utilities, and other improvements at project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities to the satisfaction of the owner.
2. Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and minimize possible air, waterway, and subsoil contamination, pollution, or other undesirable effects, including temporary erosion and sediment control, and stormwater control.
3. Install temporary fencing located as indicated, or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion. Contractor shall use a certified arborist for proper management of tree and plant protection.
4. Engage a qualified service for the removal and eradication of noxious weeds during construction activities. Weeds shall be removed prior to blooming.
5. Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so project will be free of pests and their residues at substantial completion. Perform control operations lawfully, using environmentally safe materials.
6. Before construction operations begin, furnish and install site enclosure fence in a manner that will prevent people and animals from easily entering site except by entrance gates.
 - A. Enclose entire project site or portion determined sufficient to accommodate construction operations as required.
 - B. Maintain security by limiting number of keys, and restricting distribution, to authorized personnel.
 - C. Allow for the owner's lock to be placed for owner's use and do not "lockout" owner's lock.

7. Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at the end of each work day.
8. Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
9. Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.
10. Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
11. Install and maintain temporary fire-protection facilities with the types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 24 and manage fire-prevention program.
12. Prohibit smoking while on owner's property.
13. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

Performance Requirements

1. Achieve end-of-project rates for salvage/recycling of 75% by weight of total non-hazardous solid waste generated by the work.
2. Practice efficient waste management in the use of materials in the course of the work. Use all reasonable means to divert construction and demolition waste from landfills and incinerators.
3. Facilitate recycling and salvage of materials.

Waste Management Plan

1. Develop a waste management plan according to ASTM E 1609 and requirements in this section. Plan shall consist of waste identification, waste reduction work plan, and cost/revenue analysis. Distinguish between demolition and construction waste. Indicate quantities by weight or volume, but the same units of measure should be used throughout waste management plan.
2. Indicate anticipated types and quantities of demolition site-clearing and construction waste generated by the work. Include estimated quantities and assumptions for those estimates.
3. Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the contract.
4. Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the work.
5. Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
6. Recycling receivers and processors: Knott Landfill, Deschutes County.
7. Recycling incentives: revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to contractor.
8. Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

CLOSEOUT PROCEDURES

Substantial Completions Procedures

1. Prepare and submit a list of items to be completed and corrected (contractor's punch list) indicating the value of each item on the list and reasons why the work is incomplete.
2. Complete the following a minimum of 10 days prior to requesting inspection for determining date of substantial completion. List all items below that are incomplete at the time of request.
 - A. Obtain and submit releases from authorities having jurisdiction permitting owner unrestricted use of the work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 - B. Submit closeout submittals specified, including project record documents, operation and maintenance manuals, final completion construction photographic documentation, damage or settlement surveys, property surveys, and similar final record information.
 - C. Submit closeout submittals specified, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 - D. Submit maintenance material submittals, including tools, spare parts, extra materials, and similar items, and deliver to location designated by owner. Label with manufacturer's name and model number where applicable.
 - E. Submit test/adjust/balance records.
 - F. Submit changeover information related to owner's occupancy, use, operation, and maintenance.

- G. Advise owner of pending insurance changeover requirements.
- H. Make final changeover of permanent locks and deliver keys to owner. Advise owner's personnel of changeover in security provisions.
- I. Complete startup and testing of systems and equipment.
- J. Perform preventive maintenance on equipment used prior to substantial completion.
- K. Instruct owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings as specified.
- L. Advise owner of changeover in heat and other utilities.
- M. Participate with the owner in conducting inspection and walkthrough with local emergency responders.
- N. Terminate and remove temporary facilities from project site, along with mockups, construction tools, and similar elements.
- O. Complete final cleaning requirements, including touchup painting.
- P. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- Q. Complete landscape restoration of all areas impacted by the work in accordance with the district's Development Standards.
- R. Clean and sweep all site hardscapes to an acceptable appearance.
- S. Remove all temporary sediment and erosion control measures.

Final Completion Procedures

1. Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, the owner will either proceed with inspection or notify the contractor of unfulfilled requirements. The owner will prepare a final certificate for final completion after inspection or will notify the contractor of construction that must be completed or corrected before the certificate will be issued.
2. Request re-inspection when the work identified in previous inspections as incomplete is completed or corrected.

List of Incomplete Items (Punch List)

1. Owner will provide a punch list of items needing correction with the notice of substantial completion.

Final Cleaning

1. Conduct cleaning and waste-removal operations to comply with local laws and ordinances, and federal, local environmental, and antipollution regulations.

Repair of the Work

1. Complete repair and restoration operations before requesting inspection for determination of substantial completion.
2. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, replacements shall be provided. Remove and replace operating components that cannot be repaired. Restore damaged construction and existing features to specified condition.
3. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, replacements shall be provided. Remove and replace operating components that cannot be repaired. Restore damaged construction and existing features to specified condition.

Chapter 3

Standard Specifications



1.0 Site Conditions

Definitions

1. Subsoil: Soil beneath the level of subgrade; soil beneath the topsoil layers of a naturally occurring soil profile, typified by less than 1% organic matter and few soil organisms.
2. Surface Soil: Soil that is present at the top layer of the existing soil profile. In undisturbed areas, surface soil is typically called "topsoil," but in disturbed areas such as urban environments, the surface soil can be subsoil.
3. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing in-place surface soil; the zone where plant roots grow. Its appearance is generally friable, pervious, and black or a darker shade of brown than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects larger than two inches in diameter; and free of weeds, roots, toxic materials, or other non-soil materials.
4. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction and indicated on drawings.
5. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction and indicated according to requirements in Section 015639 "Temporary Tree and Plant Protection".
6. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

Material Ownership

1. Except for materials indicated to be stockpiled, reinstalled or otherwise remain owner's property, cleared materials shall become contractor's property and shall be removed from project site.

Submittals

1. Existing Conditions: Documentation of existing trees and plantings, adjoining construction, and site improvements that establishes preconstruction conditions that might be misconstrued as damage caused by site clearing.
 - A. Use sufficiently detailed photographs or video recordings.
 - B. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plant designated to remain.
2. Topsoil stripping and stockpiling program.
3. Record Drawings: Identifying and accurately showing locations of capped utilities and other subsurface structural, electrical, and mechanical conditions.

Quality Assurance

1. Topsoil Stripping and Stockpiling: Prepare a written program to systematically demonstrate the ability of personnel to properly follow procedures and handle materials and equipment during the work. Include dimensioned diagrams for placement and protection of stockpiles.

Field Conditions

1. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
 - A. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from owner and authorities having jurisdiction.
 - B. Provide alternate routes around closed or obstructed traffic-ways if required by owner or authorities having jurisdiction.
2. Salvageable Improvements: Carefully remove items indicated to be salvaged and store on owner's premises.
3. Utility Locator Service: Notify utility locator service for area where project is located before site clearing.
4. Do not commence site clearing operations until temporary erosion and sedimentation-control measures are in place.
5. Soil Stripping, Handling, and Stockpiling: Perform only when the soil is dry or slightly moist.

Materials

1. Satisfactory Soil Material: Requirements for satisfactory soil material are specified in Section 2: Earthwork.
 - A. Obtain approved borrow soil material off-site when satisfactory soil material is not available on-site.

Preparation

1. Protect and maintain benchmarks and survey control points from disturbance during construction.
2. Verify that trees, shrubs, and other vegetation to remain or to be relocated have been flagged and that protection zones have been identified and enclosed.
3. Protect existing site improvements to remain from damage during construction.
 - A. Restore damaged improvements to their original condition, as acceptable to owner.

Temporary Erosion and Sedimentation Control

1. Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to erosion and sedimentation control drawings and requirements of authorities having jurisdiction.
2. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.
3. Inspect, maintain, and repair erosion and sedimentation control measures during construction until permanent vegetation has been established.
4. Remove erosion and sedimentation controls, and restore and stabilize areas disturbed during removal.

Tree and Plant Protection

1. Protect trees and plants remaining on-site.
2. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations.
3. Maintain restored areas by pruning, cultivating, watering, weeding, fertilizing, mulching, restoring, repairing, resetting to proper grades, and performing other operations as required to establish healthy, viable trees, shrubs, and other vegetation, including restoration seeding. Maintenance to be performed by qualified landscape contractor.

Clearing and Grubbing

1. Remove all noxious weeds and junipers smaller than four inches DBH within areas to be cleared as shown on drawings.
2. Remove obstructions, trees, shrubs, and other vegetation to permit installation of new construction.
 - A. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
 - B. Grind down stumps and remove roots larger than three inches in diameter, obstructions, and debris to a depth of 18 inches below exposed subgrade.
 - C. Use only hand methods or air spade for grubbing within protection zones.
 - D. Chip removed tree branches and stockpile in areas approved by architect.
3. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.
 - A. Place fill material in horizontal layers not exceeding a loose depth of eight inches, and compact each layer to a density equal to adjacent original ground.

Topsoil Stripping

1. Remove bunchgrass before stripping topsoil.
2. Strip topsoil to depth of six inches in a manner to prevent intermingling with underlying subsoil or other waste materials.
 - A. Remove subsoil and non-soil materials from topsoil, including clay lumps, gravel, and other objects larger than two inches in diameter; trash, debris, weeds, roots, and other waste materials.
3. Stockpile topsoil away from edge of excavations without intermixing with subsoil or other materials. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust and erosion by water.
 - A. Limit height of topsoil stockpiles to 72 inches.
 - B. Do not stockpile topsoil within protection zones.
 - C. Dispose of surplus topsoil. Surplus topsoil is that which exceeds quantity indicated to be stockpiled or reused.
 - D. Stockpile surplus topsoil to allow for re-spreading deeper topsoil.
4. Remove and stockpile from area of construction naturally formed rocks that measure more than one foot across in least dimension. Do not include crushed rock.
5. Stockpile rock away from edge of excavations without intermixing with other materials.

Disposal of Surplus and Waste Materials

1. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off owner's property.
2. Separate recyclable materials produced during site clearing from other non-recyclable materials. Store or stockpile without intermixing with other materials, and transport them to recycling facilities. Do not interfere with other project work.

2.0 Earthwork and Surface Drainage

Definitions

1. Backfill: Soil material or controlled low-strength material used to fill an excavation.
 - A. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
 - B. Final Backfill: Backfill placed over initial backfill to fill a trench.
2. Base Course: Aggregate layer placed between the subbase course and hot-mix asphalt paving.
3. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.
4. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.
5. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.
 - A. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by owner's representative. Authorized additional excavation and replacement material will be paid for according to contract provisions for changes in the work.
 - B. Bulk Excavation: Excavation more than 10 feet in width and more than 30 feet in length.
 - C. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by owner's representative. Unauthorized excavation, as well as remedial work directed by owner's representative, shall be without additional compensation.
6. Fill: Soil materials used to raise existing grades.
7. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material that exceed one cubic yard for bulk excavation or $\frac{3}{4}$ cubic yard for footing, trench, and pit excavation that cannot be removed by rock-excavating equipment equivalent to the following in size and performance ratings, without systematic drilling, ram hammering, ripping, or blasting, when permitted.
8. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.
9. Subbase Course: Aggregate layer placed between the subgrade and base course for hot-mix asphalt pavement, or aggregate layer placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.

Submittals

1. Product Data: For each type of the following manufactured products required:
 - A. Warning tapes.
2. Samples for Verification: For the following products, in sizes indicated below:
 - A. Warning Tape: 12 inches long; of each color.
3. Qualification Data: For qualified testing agency.
4. Material Test Reports: For each borrow soil material proposed for fill and backfill as follows:
 - A. Classification according to ASTM D 2487.
 - B. Laboratory compaction curve according to ASTM D 698.
5. Pre-excavation Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by earth-moving operations. Submit before earth moving begins.

Field Conditions

1. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth-moving operations.
 - A. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from owner and authorities having jurisdiction.
 - B. Provide alternate routes around closed or obstructed traffic ways if required by owner or authorities having jurisdiction.
2. Utility Locator Service: Notify utility locator service for area where project is located before beginning earth-moving operations.
3. Do not commence earth-moving operations until temporary site fencing and erosion and sedimentation-control measures as specified are in place.
4. Do not commence earth-moving operations until plant-protection measures as specified are in place.
5. The following practices are prohibited within protection zones:
 - A. Storage of construction materials, debris, or excavated material.
 - B. Parking vehicles or equipment.
 - C. Foot traffic.
 - D. Erection of sheds or structures.
 - E. Impoundment of water.
 - F. Excavation or other digging unless otherwise indicated.
 - G. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
6. Do not direct vehicle or equipment exhaust towards protection zones.
7. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones.

Soil Materials

1. General: Provide borrowed soil materials when sufficient satisfactory soil materials are not available from excavations.
2. Satisfactory Soils: Soil classification groups GW, GP, GM, SW, SP, and SM according to ASTM D 2487, or a combination of these groups; free of rock or gravel larger than three inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
3. Unsatisfactory Soils: Soil classification groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D 2487, or a combination of these groups.
 - A. Unsatisfactory soils also include satisfactory soils not maintained within 2% of optimum moisture content at time of compaction.
4. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940/D 2940M; with at least 90% passing a 1-1/2- inch sieve and not more than 12% passing a No. 200 sieve.
5. Base Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940/D 2940M 0; with at least 95% passing a 1-1/2- inch sieve and not more than 8% passing a No. 200 sieve.
6. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940/D 2940M; except with 100% passing a 1-inch sieve and not more than 8% passing a No. 200 sieve.
7. Drainage Course: Narrowly graded mixture of washed crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100% passing a 1-1/2- inch sieve and 0 to 5% passing a No. 8 sieve.
8. Sand: ASTM C 33/C 33M; fine aggregate.

Accessories

1. Detectable Warning Tape: Acid and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of six inches wide and four millimeters thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored as follows:
 - A. Red: Electric.
 - B. Yellow: Gas, oil, steam, and dangerous materials.
 - C. Orange: Telephone and other communications.
 - D. Blue: Water systems.
 - E. Green: Sewer systems.

Preparation

1. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth-moving operations.
2. Protect and maintain erosion and sedimentation controls during earth-moving operations.
3. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

Dewatering

1. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding project site and surrounding area.
2. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
3. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

Explosives

1. Explosives: Do not use explosives.

Excavation, General

1. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the contract sum or the contract time will be authorized for rock excavation or removal of obstructions.
 - A. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.
 - B. Remove rock to lines and grades indicated to permit installation of permanent construction without exceeding the following dimensions:
 - 1) 24 inches outside of concrete forms other than at footings.
 - 2) 12 inches outside of concrete forms at footings.
 - 3) Six inches outside of minimum required dimensions of concrete cast against grade.
 - 4) Outside dimensions of concrete walls indicated to be cast against rock without forms or exterior waterproofing treatments.
 - 5) Six inches beneath pipe in trenches and the greater of 24 inches wider than pipe.

Excavation for Structures

1. Excavate to indicated elevations and dimensions within a tolerance of plus or minus one inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.
 - A. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.
2. Excavations at Edges of Tree and Plant Protection Zones:
 - A. Excavate by hand or with an air spade to indicated lines, cross sections, elevations, and subgrades. If excavating by hand, use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
 - B. Cut and protect roots according to requirements in project specifications.

Excavation for Walks and Pavements

1. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

Excavation for Utility Trenches

1. Excavate trenches to indicated gradients, lines, depths, and elevations.
 - A. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.
2. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit unless otherwise indicated.
 - A. Clearance: 12 inches each side of pipe or conduit.
3. Trench Bottoms: Excavate trenches four inches deeper than bottom of pipe and conduit elevations to allow for bedding course. Hand-excavate deeper for bells of pipe.
 - A. Excavate trenches six inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.
4. Trenches in Tree and Plant-Protection Zones:
 - A. Hand-excavate to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
 - B. Do not cut main lateral roots or taproots; cut only smaller roots that interfere with installation of utilities.
 - C. Cut and protect roots according to requirements in project specifications.

Subgrade Inspection

1. Notify owner's representative when excavations have reached required subgrade.
2. If owner's representative determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.
3. Authorized additional excavation and replacement material will be paid for according to contract provisions for changes in the work.
4. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by owner's representative, without additional compensation.

Storage of Soil Materials

1. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 - A. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

Backfill

1. Place and compact backfill in excavations promptly, but not before completing the following:
 - A. Testing and inspecting underground utilities.
 - B. Removing concrete formwork.
 - C. Removing trash and debris.
 - D. Installing permanent or temporary horizontal bracing on horizontally supported walls.
2. Place backfill on subgrades free of mud, frost, snow, or ice.

Utility Trench Backfill

1. Place backfill on subgrades free of mud, frost, snow, or ice.
2. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
3. Backfill voids with satisfactory soil while removing shoring and bracing.
4. Initial Backfill:
 - A. Soil Backfill: Place and compact initial backfill of satisfactory soil, free of particles larger than one inch in any dimension, to a height of 12 inches over the pipe or conduit.
 - 1) Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of piping or conduit to avoid damage or displacement of piping or conduit. Coordinate back filling with utilities testing.
 - B. Controlled Low-Strength Material: Place initial backfill of controlled low-strength material to a height of 12 inches over the pipe or conduit. Coordinate backfilling with utilities testing.
5. Final Backfill:
 - A. Soil Backfill: Place and compact final backfill of satisfactory soil to final subgrade elevation.
6. Warning Tape: Install warning tape directly above utilities, 12 inches below finished grade, except six inches below subgrade under pavements and slabs.

Soil Fill

1. Plow, scarify, bench, or break up sloped surfaces steeper than one vertical to four horizontals so fill material will bond with existing material.
2. Place and compact fill material in layers to required elevations as follows:
 - A. Under grass and planted areas, use satisfactory soil material.
 - B. Under walks and pavements, use satisfactory soil material.
 - C. Under footings and foundations, use engineered fill.
3. Place soil fill on subgrades free of mud, frost, snow, or ice.

Soil Moisture Control

1. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2% of optimum moisture content.
 - A. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
 - B. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2% and is too wet to compact to specified dry density.

Compaction of Soil Backfills and Fills

1. Place backfill and fill soil materials in layers not more than eight inches in loose depth for material compacted by heavy compaction equipment and not more than four inches in loose depth for material compacted by hand-operated tampers.
2. Place backfill and fill soil materials evenly on all sides of structures to required elevations and uniformly along the full length of each structure.
3. Compact soil materials to not less than the following percentages of maximum dry density according to ASTM D 698:
 - A. Under walkways, scarify and re-compact top six inches below subgrade and compact each layer of backfill or fill soil material at 92%.
 - B. Under turf or unpaved areas, scarify and re-compact top six inches below subgrade and compact each layer of backfill or fill soil material at 85%.
 - C. For utility trenches, compact each layer of initial and final backfill soil material at 85%.

Grading

1. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
 - A. Provide a smooth transition between adjacent existing grades and new grades.
 - B. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.
2. Site Rough Grading: Slope grades to direct water away to prevent ponding. Finish subgrades to elevations required to achieve indicated finish elevations, within the following subgrade tolerances:
 - A. Unpaved Areas: Plus or minus one inch.
 - B. Walks: Plus or minus one inch.
 - C. Place and compact impervious fill over drainage backfill in six-inch-thick compacted layers to final subgrade.
3. Finish Grading: In Landscaped and Landscape Restoration areas, finish grade to be performed by licensed landscape contractor.

Subbase and Base Courses Under Walks

1. Place subbase course and base course on subgrades free of mud, frost, snow, or ice.
2. On prepared subgrade, place subbase course and base course under walks as follows:
 - A. Shape subbase course and base course to required crown elevations and cross-slope grades.
 - B. Place subbase course and base course six inches or less in compacted thickness in a single layer.
 - C. Place subbase course and base course that exceeds six inches in compacted thickness in layers of equal thickness, with no compacted layer more than six inches thick or less than three inches thick.
 - D. Compact subbase course and base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95% of maximum dry density according to ASTM D 698.

Field Quality Control

1. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:
 - A. Determine prior to placement of fill that site has been prepared in compliance with requirements.
 - B. Determine that fill material classification and maximum lift thickness comply with requirements.
 - C. Determine that, during placement and compaction, in-place density of compacted fill complies with requirements.
2. Testing Agency: Owner will engage a qualified geotechnical engineering testing agency to perform tests and inspections.
3. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.
4. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by owner's representative.
5. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2937, and ASTM D 6938, as applicable. Tests will be performed at the following locations and frequencies:
 - A. Paved Areas: At subgrade and at each compacted fill and backfill layer, at least one test for every 500 square feet or less of paved area but in no case fewer than two tests.
6. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; re-compact and retest until specified compaction is obtained.

Protection

1. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
2. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
 - A. Scarify or remove and replace soil material to depth as directed by owner's representative; reshape and re-compact.
3. Where settling occurs before project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
 - A. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

Disposal of Surplus and Waste Materials

1. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off owner's property.



3.0 Hardscape

ASPHALT PAVING

Submittals

1. Product Data: For each type of product.
 - A. Include technical data and tested physical and performance properties.
 - B. Job-Mix Designs: Certification, by authorities having jurisdiction, of approval of each job mix proposed for the work.
 - C. Job-Mix Designs: For each job mix proposed for the work.
2. Qualification Data: For testing agency.
3. Material Certificates: For each paving material.
4. Material Test Reports: For each paving material, by a qualified testing agency.
5. Field quality-control reports.

Quality Assurance

1. Manufacturer Qualifications: A paving-mix manufacturer registered with and approved by authorities having jurisdiction or the DOT of state in which project is located.
2. Testing Agency Qualifications: Qualified according to ASTM D 3666 for testing indicated.
3. Regulatory Requirements: Comply with materials, workmanship, and other applicable requirements of insert applicable standards of for asphalt paving work.
 - A. Measurement and payment provisions and safety program submittals included in standard specifications do not apply to this section.

Field Conditions

1. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp, if rain is imminent or expected before time required for adequate cure, or if the following conditions are not met:
 - A. Prime Coat: Minimum surface temperature of 60 F.
 - B. Tack Coat: Minimum surface temperature of 60 F.
 - C. Slurry Coat: Comply with weather limitations in ASTM D 3910.
 - D. Asphalt Base Course: Minimum surface temperature of 40 F and rising at time of placement.
 - E. Asphalt Surface Course: Minimum surface temperature of 60 F at time of placement.

Field Quality Control

1. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
2. Thickness: In-place compacted thickness of hot-mix asphalt courses will be determined according to ASTM D 3549.
3. Surface Smoothness: Finished surface of each hot-mix asphalt course will be tested for compliance with smoothness tolerances.
4. Asphalt Traffic-Calming Devices: Finished height of traffic-calming devices above pavement will be measured for compliance with tolerances.
5. In-Place Density: Testing agency will take samples of uncompacted paving mixtures and compacted pavement according to ASTM D 979 or AASHTO T 168.
 - A. Reference maximum theoretical density will be determined by averaging results from four samples of hot-mix asphalt-paving mixture delivered daily to site, prepared according to ASTM D 2041, and compacted according to job-mix specifications.
 - B. In-place density of compacted pavement will be determined by testing core samples according to ASTM D 1188 or ASTM D 2726.
 - 1) One core sample will be taken for every 1000 square yard or less of installed pavement, with no fewer than three cores taken.
 - 2) Field density of in-place compacted pavement may also be determined by nuclear method according to ASTM D 2950 and correlated with ASTM D 1188 or ASTM D 2726.
6. Replace and compact hot-mix asphalt where core tests were taken.
7. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.

Preparation

1. Prepare subgrade and aggregate base in conformance with the requirements of applicable specifications sections.
2. Surface Preparation
 - A. Prepare subgrade and aggregate base course in conformance with section 2.0 Earthwork and Surface Drainage.

Construction

1. Placement during rain or other adverse conditions will not be permitted, except that mix in transit at the time these conditions occur may be placed, provided the mix is of proper temperature, has been covered during transit, and is placed on a surface free of standing water.
2. The temperature of HMAC shall be:
 - A. Maximum mix temperature to be 350 F.
 - B. Minimum placement temperature behind the paving machine to be 240 F.
3. Mix shall be placed as to reduce the number of longitudinal joints. Longitudinal joints in any layer shall offset those joints in layers below by not less than six inches.
4. Minimum asphalt lift thickness shall be two inches. Maximum lift thickness shall be three inches.
5. HMAC Placement Equipment
 - A. Paving machines shall be self-contained, self-propelled, and supported on tracks or wheels. Neither wheels nor tracks shall contact the mixture during placement.
 - B. Conform finished surfaces to the lines and grades indicated in the contract documents.
 - C. Maintain grade control by means of automatic screed controls on the paving machine and by use of erected and mobile string lines as applicable.
 - D. The use of the automatically controlled paver may be waived by owner on irregular sections.
 - E. When paving shoulders or similar work, it may be permitted to use towed-type paving machines provided the machine meets the following requirements:
 - 1) The machine is equipped with a receiving and distribution system of a sufficient capacity for a uniform spreading operation without segregation of materials.
 - 2) The machine is equipped with a screed which will produce a finished surface of the specified thickness and smoothness, and will not tear or gouge the mixture.
6. When the capacity of the paver to properly spread and finish exceeds the rate of delivery of mixture, operate the paver at a reduced and uniform speed to give continuous spreading and finishing.
7. Spread and finish bituminous mixtures by hand methods only where machine methods are impractical as determined by owner.
8. Do not cast or otherwise manipulate hand placed mixtures in such manner that segregation occurs.
9. Site Tolerances
 - A. Level 1 and Level 2 HMAC shall be constructed such that placing a 12-foot straightedge parallel and perpendicular to the centerline will not result in a surface variance of more than 1/4 inch.
 - B. Single Course Construction
 - 1) HMAC shall be constructed such that placing a 12-foot straightedge parallel and perpendicular to the centerline will not result in a surface variance of more than 1/4 inch.
 - C. Multiple Course Construction
 - 1) Test the wearing surface with a rolling straightedge in a designated wheel path of a 300-foot strip of each travel lane, parallel to the centerline. The surface shall not vary more than 3/16 inch.
 - 2) Also test the wearing surface with a 12-foot straightedge placed perpendicular to the centerline at least once within the above-mentioned 300-foot strip. The surface shall not vary more than 1/4 inch.
10. Compaction Equipment
 - A. The contractor is responsible for providing sufficient rollers of the appropriate type and size to compact the mixture while it is still within the specified temperatures.
 - B. Operate compaction equipment at slow, uniform speeds as recommended by the manufacturer.
 - C. Begin rolling at the sides and proceed longitudinally (parallel to the road centerline), gradually progressing to the center line.
 - D. Do not make sharp turn or park rollers on hot asphalt surfaces.
 - E. Provide self-propelled rollers capable of reversing without backlash.
 - F. Contractor shall use an appropriate combination of rollers needed to obtain required compaction.
 - G. Along curbs and walks, on walks, irregular areas, and other areas not practicably accessible to specified rollers, compact the asphalt mix with small rollers, mechanical tampers, hot hand tampers, or smoothing irons. On depressed areas, a trench roller may be used or cleated compression strips may be used under the roller to transmit compression to the depressed area.
 - H. Improved or modernized equipment which will produce results equal in quality to those which would result from the specified equipment will be considered for use.
 - I. Complete breakdown and intermediate compaction before the HMAC temperature drops below 80 F, unless otherwise directed or accepted by owner.

Repair/Restoration

1. Remove and replace defective areas by cutting to the full depth of the course.
 - A. Make cuts perpendicular and parallel to the direction of traffic with edges vertical.
 - B. Apply a tack coat of emulsified asphalt to exposed surfaces.
 - C. Fill the area with fresh hot asphaltic concrete mix in lifts of the same depths as the adjacent area, then compact by rolling to specified surface density and smoothness.

Field Quality Control

1. Site Tests, Inspection
 - A. Compaction
 - 1) Compliance with the density requirements for dense graded HMAC shall be determined by random testing of the compacted HMAC surface with calibrated nuclear gauges.
 - 2) For Level 1-3, compact the HMAC to at least 91% for single course construction, and top courses of multi-course construction. For subsequent courses of multi-course construction, compact to 92%.
 - 3) After completion of finish rolling, determine the density of the HMAC by averaging five tests performed at random locations with a nuclear density gauge operated in backscatter mode.
 - B. Frequency of Testing
 - 1) At least one each day of HMAC production.
 - 2) One test per 1,000 tons of HMAC placed. One test is defined as the average of five random tests taken in accordance with WAQTC TM8.
 - C. Samples and tests can be taken as frequently and at such locations as the owner elects.

Cleaning

1. After completion of paving operation, clean all areas of excess spilled asphalt materials to the satisfaction of owner.

Protection

1. Protect adjacent concrete and masonry so that no damage will occur as the result of subsequent construction operations.
2. Repair damage or discoloration to the satisfaction of owner before final acceptance by owner.
3. Prevent bituminous materials from spraying or splashing.
4. Protect adjacent construction by covering with suitable fabric or paper.

CONCRETE PAVING**Submittals**

1. Product Data: For each type of product.
2. Samples for Initial Selection: For each type of product, ingredient, or admixture requiring color selection.
3. Samples for Verification: For each type of product or exposed finish.
4. Design Mixtures: For each concrete paving mixture. Include alternate design mixtures when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.
5. Qualification Data: For qualified ready-mix concrete manufacturer.
6. Material Certificates: For the following, from manufacturer:
 - A. Cementitious materials.
 - B. Steel reinforcement and reinforcement accessories.
 - C. Fiber reinforcement.
 - D. Admixtures.
 - E. Curing compounds.
 - F. Applied finish materials.
 - G. Bonding agent or epoxy adhesive.
 - H. Joint fillers.
7. Material Test Reports: For each of the following:
 - A. Aggregates: Include service-record data indicating absence of deleterious expansion of concrete due to alkali-aggregate reactivity.
 - B. Field quality-control reports.

Quality Assurance

1. Stamped Detectable Warning Installer Qualifications: An employer of workers trained and approved by manufacturer of stamped concrete paving systems.
2. Ready-Mix-Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
3. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities" (Quality Control Manual - Section 3, "Plant Certification Checklist").
4. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.
5. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - A. Build mockups of full-thickness sections of concrete paving to demonstrate typical joints; surface finish, texture, and color; curing; and standard of workmanship.
 - B. Build mockups of concrete paving in the location and of the size indicated or, if not indicated, build mockups where directed by owner's representative and not less than 96" x 96".
 - C. Approval of mockups does not constitute approval of deviations from the contract documents contained in mockups unless owner's representative specifically approves such deviations in writing.
 - D. Subject to compliance with requirements, approved mockups may become part of the completed work if undisturbed at time of substantial completion.

Field Quality Control

1. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
2. Testing Services: Testing and inspecting of composite samples of fresh concrete obtained according to ASTM C 172/C 172M shall be performed according to the following requirements:
 - A. Testing Frequency: Obtain at least one composite sample for each 100 cubic yard or fraction thereof of each concrete mixture placed each day.
 - 1) When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
 - B. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
 - C. Air Content: ASTM C 231/C 231M, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 - D. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 F and below and when it is 80 F and above, and one test for each composite sample.
 - E. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.
 - F. Compressive-Strength Tests: ASTM C 39/C 39M; test one specimen at seven days and two specimens at 28 days.
 - 1) A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at 28 days.
3. Strength of each concrete mixture will be satisfactory if average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
4. Test results shall be reported in writing to owner's representative, concrete manufacturer, and contractor within 48 hours of testing. Reports of compressive-strength tests shall contain project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both seven and 28-day tests.
5. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by owner's representative.
6. Concrete paving will be considered defective if it does not pass tests and inspections.
7. Additional testing and inspecting, at contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

Repair and Protection

1. Remove and replace concrete paving that is broken, damaged, or defective or that does not comply with requirements in this section. Remove work in complete sections from joint to joint unless otherwise approved by owner's representative.
2. Protect concrete paving from damage. Exclude traffic from paving for at least 14 days after placement. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.
3. Maintain concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep paving not more than two days before date scheduled for substantial completion inspections.

CONCRETE UNIT PAVING**Submittals**

1. Product Data: For the following:
 - A. Pavers.
 - B. Edge restraints.
2. Sieve Analyses: For aggregate setting-bed materials.
3. Samples for Initial Selection: For each type of unit paver indicated.
4. Material Certificates: For unit pavers. Include statements of material properties indicating compliance with requirements, including compliance with standards. Provide for each type and size of unit.
5. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for unit pavers, indicating compliance with requirements.
 - A. For solid interlocking paving units, include test data for freezing and thawing according to ASTM C 67.

Quality Assurance

1. Mockups: Build mockups to verify selections made under sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
 - A. Subject to compliance with requirements, approved mockups may become part of the completed work if undisturbed at time of substantial completion.

Delivery, Storage, and Handling

1. Store pavers on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied.
2. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

Field Conditions

1. Cold-Weather Protection: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen subgrade or setting beds. Remove and replace unit paver work damaged by frost or freezing.

Concrete Pavers

1. Concrete Pavers: Solid interlocking paving units complying with ASTM C 936/C 936M and resistant to freezing and thawing when tested according to ASTM C 67, made from normal weight aggregates.
 - A. Provide pavers
 - 1) Willamette Graystone, Holland Interlocking Pavers, edge course.
 - 2) Willamette Graystone, Plaza Stone Interlocking Pavers, field.
 - B. Thickness: 2- 3/8".
 - C. Plaza Stone Face Size and Shape: 6" x 6" square, and 6" x 9" inch rectangle.
 - D. Holland Face Size and Shape: 4" x 8" inch rectangle.
 - E. Color: Walnut Blend field color, Charcoal edge course.
 - F. Pattern: Muster K with Soldier Course at edger.

Edge Restraints

1. Edge Restraints: Pave Tech; Pave Edge Pro Rigid and Pave Edge Pro Flexible, where specified or per manufacturer requirements.

Aggregate Setting - Bed Materials

1. Graded Aggregate for Subbase: Sound, crushed stone or gravel complying with requirements in "Earthwork" for subbase material.
2. Graded Aggregate for Base: Sound, crushed stone or gravel complying with requirements in "Earthwork" for base course.
3. Sand for Leveling Course: Sound, sharp, washed, natural sand or crushed stone complying with gradation requirements in ASTM C 33/C 33M for fine aggregate.
4. Stone Screenings for Leveling Course: Sound stone screenings complying with ASTM D 448 for Size No. 10.
5. Sand for Joints: Fine, sharp, washed, natural sand or crushed stone with 100% passing No. 16 sieve and no more than 10% passing No. 200 sieve.
 - A. Provide sand of color needed to produce required joint color.

Examination

1. Examine surfaces indicated to receive unit paving, with installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
2. Where unit paving is to be installed over waterproofing, examine waterproofing installation, with waterproofing installer present, for protection from paving operations, including areas where waterproofing system is turned up or flashed against vertical surfaces.
3. Proceed with installation only after unsatisfactory conditions have been corrected.

Preparation

1. Remove substances from concrete substrates that could impair mortar bond, including curing and sealing compounds, form oil, and laitance.
2. Sweep concrete substrates to remove dirt, dust, debris, and loose particles.
3. Proof-roll prepared subgrade to identify soft pockets and areas of excess yielding. Proceed with unit paver installation only after deficient subgrades have been corrected and are ready to receive course for unit pavers.

Installation - General

1. Do not use unit pavers with chips, cracks, voids, discolorations, or other defects that might be visible or cause staining in finished work.
2. Mix pavers from several pallets or cubes, as they are placed, to produce uniform blend of colors and textures.
3. Cut unit pavers with motor-driven masonry saw equipment to provide clean, sharp, unchipped edges. Cut units to provide pattern indicated and to fit adjoining work neatly. Use full units without cutting where possible. Hammer cutting is not acceptable.
4. Joint Pattern: Muster K with Soldier Course at edger.
 - A. Provide joint filler at waterproofing that is turned up on vertical surfaces unless otherwise indicated; where unfilled joints are indicated, provide temporary filler or protection until paver installation is complete.
5. Tolerances: Do not exceed $\frac{1}{32}$ " unit-to-unit offset from flush (lippage) or $\frac{1}{8}$ " in 10 feet from level, or indicated slope, for finished surface of paving.
6. Provide edge restraints as indicated. Install edge restraints before placing unit pavers.
 - A. Install edge restraints to comply with manufacturer's written instructions. Install stakes at intervals required to hold edge restraints in place during and after unit paver installation.
 - B. Install edge restraints directly to finished base. Do not install on bedding sand or leveling course.

Aggregate Setting - Bed Applications

1. Compact soil subgrade uniformly to at least 95% of ASTM D 698 laboratory density.
2. Proof-roll prepared subgrade to identify soft pockets and areas of excess yielding. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by owner's representative, and replace with compacted backfill or fill as directed.
3. Place separation geotextile, when specified, over prepared subgrade, overlapping ends and edges at least 12 inches.
4. Place aggregate subbase and base, compact by tamping with plate vibrator, and screed to depth indicated.
5. Place aggregate subbase and base, compact to 100% of ASTM D 1557 maximum laboratory density, and screed to depth indicated.
6. Place drainage geotextile, when specified, over compacted base course, overlapping ends and edges at least 12 inches.
7. Place leveling course and screed to a thickness of one inch, assure that moisture content remains constant and density is loose and uniform until pavers are set and compacted.
8. Treat leveling course with herbicide to inhibit growth of grass and weeds.

9. Set pavers with a minimum joint width of 1/16 inch and a maximum of 1/8 inch, being careful not to disturb leveling base. If pavers have spacer bars, place pavers hand tight against spacer bars. Use string lines to keep straight lines. Fill gaps between units that exceed 3/8 inch with pieces cut to fit from full-size unit pavers.
 - A. When installation is performed with mechanical equipment, use only unit pavers with spacer bars on sides of each unit.
10. Vibrate pavers into leveling course with a low-amplitude plate vibrator capable of a 3500 to 5000-lb compaction force at 80 to 90 Hz. Use vibrator with neoprene mat on face of plate or other means as needed to prevent cracking and chipping of pavers. Perform at least three passes across paving with vibrator.
 - A. Compact pavers when there is sufficient surface to accommodate operation of vibrator, leaving at least 36 inches of uncompacted pavers adjacent to temporary edges.
 - B. Before ending each day's work, compact installed concrete pavers except for 36-inch width of uncompacted pavers adjacent to temporary edges (laying faces).
 - C. As work progresses to perimeter of installation, compact installed pavers that are adjacent to permanent edges unless they are within 36 inches of laying face.
 - D. Before ending each day's work and when rain interrupts work, cover pavers that have not been compacted and cover leveling course on which pavers have not been placed with non-staining plastic sheets to protect them from rain.
11. Spread dry sand and fill joints immediately after vibrating pavers into leveling course. Vibrate pavers and add sand until joints are completely filled, then remove excess sand. Leave a slight surplus of sand on the surface for joint filling.
12. Do not allow traffic on installed pavers until sand has been vibrated into joints.
13. Repeat joint-filling process 30 days later.

Repairing and Cleaning

1. Remove and replace unit pavers that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Provide new units to match adjoining units and install in same manner as original units, with same joint treatment and with no evidence of replacement.
2. Cleaning: Remove excess grout from exposed paver surfaces; wash and scrub clean.
 - A. Remove temporary protective coating as recommended by coating manufacturer and as acceptable to paver and grout manufacturers.

SOFT-SURFACE - TRAIL SURFACE AGGREGATE

Submittals

1. Submit one cubic foot of crushed rock base material and sieve analysis indicating gradation.
2. The contractor shall submit certified test results from a commercial testing laboratory or other evidence satisfactory to the owner proving that all materials used meet the quality and gradation requirements specified.

Quality Assurance

1. Proprietary items shown on the drawings and specified herein are shown to establish standards of quality, utility, design, and function. Equivalent units by other manufacturers (substitutions) will be considered provided they are similar in characteristics. They shall be substituted only if approved by the owner's representative.
2. Construction shall be done by a contractor with at least five years of experience in construction of similar surfaces.
3. Construction superintendent shall have a minimum of three years of documented experience with successful completion of projects of similar size and complexity.
4. Work shall be completed in accordance with the United State Access Board section 1017 (Trails).
5. All local, municipal and state laws and rules and regulations governing or relating to any portion of this work are hereby incorporated into and made a part of these specifications and the contractor shall carry out their provisions. Any specification herein contained, shall not be construed to conflict with the above rules, regulations or requirements.

Products

1. **Trail Surface Aggregate, (#10 Minus, or TSA)" Crushed Rock Surface**
 - A. TSA mix design:
 - 1) One part AASHTO #8
 - 2) Four parts unwashed AASHTO #10
 - 3) One part minus #200 fines

B. TSA shall be crushed rock free from deleterious or foreign matter with a plasticity index not exceeding 6 by ASTM D4318, a pH between 6-12.45 per EPA 9045C, and abrasion of 35% maximum per AASHTO T96, meeting the following gradation:

SIEVE	PERCENT PASSING
1/2"	100
3/8"	100
#4	95-100
#8	85-95
#16	45-60
#30	25-40
#50	15-25
#100	10-20
#200	10-15

2. Crushed Rock Base Course (State Spec)

A. Crushed rock base shall conform to the following quality standards:

Abrasion (AASHTO T 96) Maximum wear	35%
Fractured Face Minimum wear	75%
Liquid Limit (AASHTO T89) not greater than	30%
Plasticity Limit (AASHTO T91) not greater than	6%

B. Aggregates shall consist of uniform quality, clean, tough, durable fragments of rock or gravel, free from flat, elongated, soft or disintegrated pieces, and other objectionable matter occurring either free or as a coating on the stone.

C. Based on U.S. standard sieves, the gradation of the aggregates to be furnished shall be as indicated below:

GRADATION		
Sieve designation (Square Opening)	Percent Passing By Weight	
	1-1/2" Minus Base or Surfacing Course	3/4" Minus Leveling or Surfacing Course
2"	100	-
1-1/2"	95-100	-
1"	-	100
3/4"	55-75	90-100
3/8"	-	55-75
1/4"	35-50	40-60
No. 200	0-5	0-5

Geotextile Fabric

1. Filter fabric shall be pervious synthetic polymer, non-woven, from continuous filaments. Fabric shall be Mirafi N series nonwoven, or approved equal.

Preparation

1. Prior to all work of this section, the contractor shall carefully inspect all previously installed work and verify that all such work is complete to the point where specified installation may properly commence.
2. Verify that proposed path(s) may be installed in strict accordance with all pertinent codes and regulations, the accepted design, and the referenced standards.
3. Based on site walk-through, contractor shall furnish survey of proposed surfacing and paths including centerline staking marked with stationing and other significant layout information. Survey shall also stake all proposed locations of culverts, water bars, and other drainage features, changes in path types and other significant features. These stakes shall be marked with appropriate stationing. Staking shall be reviewed and approved by owner prior to beginning excavation for paths.

Path Excavation

1. Contractor shall excavate path to create a smooth, even subgrade for path base rock material.

Preparation of Subgrade

1. Bring all pathway and paving areas to required subgrade levels on undisturbed ground and compact by sprinkling and rolling or mechanical tamping. As depressions occur, refill with specified fill material and re-compact until the surface is at the proper grade. Prior to placement of concrete curbs, the subgrade shall be inspected and approved by the owner. Subgrade shall be compacted to not less than 92% relative compaction as determined by ASTM D 1557-00.

Geotextile Fabric

1. Geotextile fabric shall be placed prior to the rock base course. Fabric shall be unrolled directly to the line and dimension shown on the drawings. Fabric shall be lapped a minimum of 24 inches in all directions. Contractor shall place base rock material in such a way as to not tear, puncture, or shift the filter fabric. Tears or rips in the fabric shall be patched with fabric lapped a minimum of 12 inches around the rip. Tracked or wheeled equipment shall not be permitted on the filter fabric.

Base Course Placement

1. Place base rock in maximum of three-inch lifts to reach designed thickness. Compact each lift to 95% compaction prior to placing additional lifts.
2. Compact base rock to 95% of maximum dry density at optimum moisture content as determined by ASTM D 698.

Surface Course Placement

1. Trail Surface Aggregate
 - A. Place TSA only after acceptance of base rock by owner.
 - B. Place TSA in a maximum lift thickness of three inches.
 - C. TSA shall be pre-conditioned to maximum moisture content prior to being placed on base rock. Pre-conditioning may occur onsite if sufficient storage and stockpile area is available, or be conditioned at the plant prior to trucking.
 - D. Compact TSA to 95% of maximum dry density at optimum moisture content as determined by ASTM D 698 with a vibratory roller capable of rolling a minimum of 6-foot width in a single pass.
 - E. Slope surface of tread as necessary to provide positive drainage across tread, and to minimize drainage along path length.
 - F. Place TSA with a small paver in four-inch loose, three-inch compacted lifts
 - G. If unable to place material with a paver, verify with owner for normal aggregate placement methods.
 - H. TSA to be delivered and placed at optimum moisture content.
 - I. Do not operate equipment on finished surface.

Finish Grading

1. After path surface is constructed, complete grading of path-side ditches, swales, and slopes as necessary.
2. Shoulder material should be placed with enough coverage to create a minimum of 3:1 slope from the top of the finished path to native grade. Once placed the shoulder material shall be mechanically compacted along its top edge to work the material into the TSA finished path. Shoulder material shall then be hand raked to along the slope to prepare the surface for restoration planting.
3. Final grades should appear natural, with slope rounding as necessary.
4. Place stockpiled duff material on all disturbed ground, to a depth of two to three inches.

Final Inspection and Cleaning

1. Remove all construction debris from site.
2. Repair all path surface irregularities.
3. Eliminate all areas of pooling or standing water on path surface.
4. Remove all excess path materials from plant beds, walks, roadways or other adjacent paving surfaces.



4.0 Furnishings and Equipment

GENERAL REQUIREMENTS

Summary

1. Provide products that comply with requirements of contract documents and that are undamaged and, unless otherwise indicated, unused at time of installation. Provide products that are complete with all accessories, trim, finish, safety guards and other devices and details needed for complete installation and for intended use and effect.
2. Where they are available, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Where, because of nature of its application, owner is likely to need replacement or additional amounts of product at later date, either for maintenance and repair, or replacement, provide standard, domestically produced products for which manufacturer has published assurances that products and parts are likely to be available to owner at later date.
4. Except as otherwise indicated for required labels and operating data, do not permanently attach or imprint manufacturer's or producer's name plates or trademarks on exposed surfaces of products which will be exposed to view.
5. Notify owner of long lead items and any need to expedite ordering.
6. Contractor is responsible for timely ordering of items to meet schedule requirements.
7. No schedule adjustments will be granted for contractor's failure to order items in a timely manner.

Submittals

1. Comparable Product Requests: Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include specification section number and title, and drawing numbers and titles.

Quality Assurance

1. Compatibility of Options: If contractor is given option of selecting between two or more products for use on project, select product compatible with products previously selected, even if previously selected products were also options.
 - A. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
 - B. If a dispute arises between contractors over concurrently selectable but incompatible products, owner will determine which products shall be used.

Product Delivery, Storage, and Handling

1. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.
2. Delivery and Handling:
 - A. Schedule delivery to minimize long-term storage at project site and to prevent overcrowding of construction spaces.
 - B. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
 - C. Deliver products to project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
 - D. Inspect products on delivery to determine compliance with the contract documents and to determine that products are undamaged and properly protected.
 - E. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.
3. Storage:
 - A. Store products to allow for inspection and measurement of quantity or counting of units.
 - B. Store materials in a manner that will not endanger project structure.
 - C. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
 - D. Provide off-site storage and protection when site does not permit on-site storage or protection. Coordinate off-site storage with owner's representative if said materials are to be included in applications for payment. Materials stored off-site shall be in bonded facilities if included in application for payment.
 - E. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
 - F. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
 - G. Protect stored products from damage and liquids from freezing.

Selection Procedures

1. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
2. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the contract documents.
3. Where products are accompanied by the term "as selected" owner will make selection.
4. Descriptive, performance, and reference standard requirements in the specifications establish salient characteristics of products.
5. For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements to obtain approval for use of an unnamed product.
6. Where specifications include a list of manufactures' names, provide a product by one of the manufacturers listed that complies with requirements.
7. Where specifications name a product, or refer to a product indicated on drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements for consideration of an unnamed product by one of the other named manufacturers.

PLAYGROUNDS

Playground Equipment

1. Quality Assurance
 - A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
 - B. Field Control Quality
 - 1) Testing Agency: Contractor will engage a qualified testing agency to perform tests and inspections.
 - 2) Perform the following tests and inspections, fall height rating with the assistance of a factory-authorized service representative.
 - 3) Perform inspection and testing for each type of installed playground equipment according to ASTM F 1487.
 - 4) Playground equipment items will be considered defective if they do not pass tests and inspections.
 - 5) Prepare test and inspection reports.
 - 6) Notify owner 48 hours in advance of date(s) and time(s) of testing and inspection.

Playground Protective Surfacing

1. Quality Assurance
 - A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
 - B. Field Quality Control
 - 1) Testing Agency: Contractor will engage a qualified testing agency to perform tests and inspections.
 - 2) Perform the following tests with the assistance of a factory-authorized service representative:
 - a. Perform "Installed Surface Performance Test" according to ASTM F 1292 for each protective surfacing type and thickness in each playground area.
 - b. Playground protective surfacing will be considered defective if it does not pass tests.
 - c. Prepare test reports.

Picnic Tables

1. Oregon Corrections Enterprises, 8' Cut-Steel top picnic table, Frame: RAL 8028, Top: cut steel, thermoplastic coating.
2. Pilot Rock, Picnic Table Recycled Plastic top. 6' or 8'. Model: WXTH, Frame: RAL 8028, Top: PC – Cedar, or cut steel.
 - A. ***BPRD Standard Drawing: D4.41***
3. Oregon Corrections Enterprises, 4' Cut-Steel top pedestal table, Frame: RAL 8028, Top: cut steel, thermoplastic coating.
 - A. ***BPRD Standard Drawing: D4.42***
4. DuMor, Inc., 76-33 PL – 3, 76-33 PL – 4, Frame Color: Terra Brown (RAL 8028), Slats: Cedar, recycled plastic. S1 – Post embedment, BPRD Standard Drawing: D4.41, S2 -Surface mount.
 - A. ***BPRD Standard Drawing: D4.42***
5. Outdoor Creations, Inc., Concrete Picnic Tables. 6' or 8'. Model: 101FSS, 100FSS.
6. Forms+Surfaces, Soleris Sunshade with Tangent Table Ensemble. Frame Color: Aluminum Texture. Seats, Table Top: Stainless steel sandstone finish. Sunshade: SUSOL-APT, Cloud Pattern.
 - A. 4 Seat: ***BPRD Standard Drawing: D4.44***
 - B. 6 Seat: ***BPRD Standard Drawing: D4.45***

Seating

1. DuMor, Inc., 57-40-PL (4'), 57-60 PL (6'), Frame Color: Terra Brown (RAL 8028), Slats: Cedar, recycled plastic.
2. Oregon Corrections Enterprises, 4' Cut-Steel seat and top bench, Frame: RAL8028, Seat and Top: cut steel, thermoplastic coating.
 - A. **BPRD Standard Drawing: D4.51A, D5.41B, D5.41C**

Trash Receptacles and Dog Stations

1. Trash Receptacles
 - A. Oregon Corrections Enterprises trash receptacle with steel dome lid, 42-gallon plastic liner, side-opening with latch. Surface mount.
 - B. Color: Terra Brown (RAL 8028).
 - C. **BPRD Standard Drawing: D4.61A, D4.61B, D4.61C**
2. Dog Stations
 - A. Owner furnished, contractor installed (OFCI), owner will furnish product indicated. The work includes receiving, unloading, handling, storing, protecting, and installing owner-furnished product. Direct ground post installation. Surface mount post installation.
 - B. Color: Terra Brown (RAL 8028).
 - C. **BPRD Standard Drawing: D4.63**

Miscellaneous

1. Bike Racks
 - A. Owner furnished, contractor installed (OFCI), owner will furnish product indicated. The work includes receiving, unloading, handling, storing, protecting, and installing owner-furnished product.
 - B. Custom manufactured 'Bicycle Hoop', U-shape metal hoop. Surface mount.
 - C. Bicycle Rack Construction:
 - D. Color: Terra Brown (RAL 8028)
 - F. **BPRD Standard Drawing: D4.81**
2. Bottle Filler
 - A. Contractor furnished and contractor installed (CFCI).
 - B. Most Dependable Fountains, MDF 10100SM, Powder coated steel frame bottle filler.
 - C. Color: Terra Brown (RAL 8028)
 - D. **BPRD Standard Drawing: D4.85**
3. Electrical Enclosure
 - A. Hoffman, Single-Door Dual Access enclosure, A-L1DR latch kit, with two full length panels.
 - B. Size: 72" x 24" x 24" or 72" x 24" x 30"
 - C. Color: Gray
 - D. Preparation: Ensure surfaces to receive furnishings are clean, flat, and level.
 - E. Installation:
 - 1) Install in accordance with manufacturer's instructions.
 - 2) Install furnishings level, plumb, square, and as indicated on the drawings.
 - 3) Prior to installation, review location of furnishings with owner for approval. Make adjustments to locations as directed.
 - F. **BPRD Standard Drawing: D8.32A, D8.32B**
4. Freestanding Outlet Pedestals
 - A. PEDOC Power Solutions, 5P42-C, 14-gallon stainless steel pedestal, weatherproof outlet covers.
 - B. Color: Terra Brown (RAL 8028)
 - C. Preparation: Ensure surfaces to receive furnishings are clean, flat, and level.
 - D. Installation:
 - 1) Install in accordance with manufacturer's instructions.
 - 2) Install furnishings level, plumb, square, and as indicated on the drawings.
 - 3) Prior to installation, review location of furnishings with owner for approval. Make adjustments to locations as directed.
 - E. **BPRD Standard Drawing: D8.31**

Toilet Accessories

1. Toilets

A. Acorn Penal-Ware, Model #1695, floor mount

- 1) Wall supply (concealed)
- 2) Fixture mounting on-floor with floor outlet
- 3) A 1.6 GPF hydraulic flush valve
- 4) Hinged toilet seat
- 5) Flush thru wall connector
- 6) ADA 18" integral seat height
- 7) Wall sleeve
- 8) All stainless steel

B. Acorn Penal-Ware, Model #1675, wall mount

- 1) Wall supply (concealed)
- 2) Off-floor with wall outlet
- 3) A 1.6 GPF hydraulic flush valve
- 4) Hinged toilet seat
- 5) Cleanout with o-ring connection to no-hub 4" (plain end only)
- 6) Flush thru wall connector
- 7) Wall sleeve
- 8) All stainless steel

2. Sinks

A. Acorn Penal-Ware, Model #1652LRB Series

- 1) 18" Lavatory with lavy rectangular bowl, ADA compliant
- 2) Fixture mounting and waste to be off-floor, wall outlet
- 3) Deck mounted spout
- 4) Valve selection to be pneumatic hot, metering
- 5) Concealed thermostatic mixing valve
- 6) Thru-wall waste extension with p-trap
- 7) Wall sleeve
- 8) All stainless steel

3. Soap Dispenser

A. Bobrick, Model #B-4112 or

B. Royce Rolls Ringer, Model LSV & LSH

C. Bradley, Model #6562

4. Napkin Disposal

A. Bradley, Model #4781-15

5. Hand Dryer

A. FastAire, Model #HD03 or

B. Dyson, Model Air Blade V

6. Grab bars

A. Bradley, Model #812-001

- 1) Safety grip finish

7. Coat Hooks

A. Bobrick, Model #B-2116

8. Baby Changing Station

A. Koala Bear Care, Model #KB101-01

- 1) Vertical wall mount
- 2) Grey color

B. Koala Bear Care, Model #KB200-01

- 1) Horizontal wall mount
- 2) Grey color

9. Wall Heater

A. King Electric, Model #KCV 2404

- 1) White color

10. Toilet Paper Dispenser
 - A. Royce Rolls Ringer Co.
 - 1) Standard TP Series
 - 2) 2 or 3 Roll Bar
 - B. Aslin Ind., Model # TPD0250SR-SS
 - 1) 2 Piece
 - 2) Slow roll
 - 3) 2 or 3 roll bar

DOORS AND FRAMES

Custom Hollow Metal Doors and Frames

1. Furnish all labor, material, equipment and services required for the fabrication and installation of hollow metal doors, and frames for doors, and relites. Include all required anchor bolts and devices.
 - A. References: American Society for Testing and Materials (ASTM) and Hollow Metal Manufacturers Association's (HMMA) standards published by the National Association of Architectural Metal Manufacturers (NAAMM).
 - B. Submit the following in accordance with Division 1 Section "Submittal Procedures."
 - C. Shop drawings showing anchor locations, hardware, and other pertinent installation information.
 - D. Provide doors and frames complying with HMMA standards published by NAAMM.
 - 1) Manufacturer shall be assessed and registered as meeting the requirements of Quality Systems under ISO 9001.
 - E. Deliver to job in time for building into walls and protect from weather and construction damage. Replace dented or bent hollow metal work with new undamaged work as directed. Filled dents and straightened work are not acceptable.
 - 1) Provide manufacturer's 2-year warranty against rust and paint adhesion failure for all doors and frames.
 - F. Products: Doors and frames shall be custom manufactured by the same manufacturer.
 - 1) Metal Door and Frame Manufacturers:
 - a. Amweld Building Products, 800-248-6116
 - b. Benson Industries, 503-226-7621
 - c. Curries Company, 515-423-1334
 - d. Deansteel Manufacturing, 800-825-8271
 - e. Grand Openings, 503-235-3105
 - f. NCS Manufacturing, 605-343-5486
 - g. Stiles Custom Metal, Inc., 209-538-3667
 - h. Ceco Door Products, 509-455-8239
 - i. Steelcraft, 513-745-6400
 - j. Fleming Steel Doors and Frames, 800-263-7515
2. Other Manufacturers: Submit Substitution Requests prior to bid date in accordance with Division 1 Section "Product Requirements."
 - A. Fabrication:
 - 1) Frames: Fabricate accurately with all breaks, arises, and angles or curves uniform, straight, sharply defined and true. Miter fit and full weld all corners, weld seams and grind smooth to produce an invisible joint. All fastenings concealed where possible.
 - 2) Doors and frames for doors, and relites formed from minimum 16 gauge (0.054-inch thick) commercial quality cold-rolled steel conforming to ASTM A366 or tension leveled steel conforming to ASTM A924, galvanized to ASTM A653, commercial steel, type B, coating designation A40, commercially known as paintable galvalume. Steel for fabrication of all members exposed on exterior walls shall be galvanized to ASTM A653 with a minimum total coating weight of A60, 0.60 oz./s.f. (0.058 minimum thickness).
 - 3) Flush panel doors shall be 1-3/4 inches thick, reinforced and welded full length at joints, and ground smooth. Reinforce doors six inches o.c. vertically. Lock reinforcing shall be provided between faces of door to prevent collapsing of door faces and side movement of latch and face plate. Void spaces in door shall be sound deadened and filled full height with insulating material. Exterior doors and doors in high moisture areas shall have additional flush closure channel at top and bottom edge. Seal top door edge watertight with silicone sealant. Provide openings in bottom closure to permit escape of moisture. Stops for door lites shall be flush style unless detailed otherwise.
 - 4) Frames for doors to be type, design and size as detailed. Provide 12-gauge (0.097-inch) minimum channel reinforcing in the head of frames over three feet in width and other frame locations as detailed. Provide not less than four anchors at each jamb including a 16-gauge (0.054-inch) bent plate anchor clip at the bottom. Provide for three rubber silencers in all door frames on lock side

- 5) Provide suitable sinkages in doors and frames for all mortised or countersunk hardware, with steel reinforcement inserted for attaching hardware. Reinforcement of doors and frames to be as follows:
 - a. Hinge Pockets: Reinforce hinge pockets with $\frac{3}{16}$ -inch thick x 12-inch long x full frame width steel backing welded fabrication.
 - b. All Other Hardware Mountings: Reinforce all other hardware mountings at heads, jambs, stiles, or rails with minimum 12-gauge (0.097-inch) steel plate welded fabrication at all machine screw sinkages and 16-gauge (0.054-inch) minimum at all cylinder lock hole locations to prevent collapsing of doors and malfunctioning of hardware. Double gauge sheet metal reinforcing is not acceptable for hardware backing.

B. Finish

- 1) Cold-Rolled Steel: Sand surfaces smooth eliminating all weld marks; chemically clean and "Bonderize" after fabrication. Paint with rust inhibiting ferrous metal primer and oven dry. All finished surfaces smooth, uniformly protected, and ready for finish painting on the job site. All exposed screw heads filled and ground smooth.
- 2) Galvanized Steel: Touch up with zinc-rich primer only at areas where galvanizing has been removed during fabrication.

C. Hardware

- 1) The door manufacturer shall be furnished with hardware templates by the finish hardware supplier. Doors and frames shall be prepared for hardware at the factory. Out-of-state door manufacturers are required to pay for all hardware shipping charges.
- 2) All hardware shall be attached by machine screws, threaded into reinforced tapped holes or through-bolted. All drilling and tapping for mortised hardware shall be done at the factory. Self-tapping sheet metal screws or welding is not permitted.

D. Execution

- 1) Installation
 - a. Frames: Install metal frames in accordance with manufacturer's instructions. Anchor frame to wall and floor as recommended by manufacturer.
 - b. Doors: Fit doors to frame providing clearances recommended by door manufacturer.
- 2) Completion: Adjust door clearances and hardware placement to allow smooth door operation. Touch up scratched door and frame prime paint to match adjacent surfaces. Touch up damaged galvanized.

Door Hardware

1. Products: The following manufacturers are approved subject to compliance with requirements of the Contract Documents. Approval of manufacturers other than those listed shall be in accordance with Division 1.

Items	Manufacturer	Approved
Hinges	Stanley	Boomer, McKinney
Continuous Hinges	Stanley	Select, ABH
Locksets	Best	No substitute
Cylinders	Best	No substitute
Exit Devices	Precision	No substitute
Closers	Stanley D-4550	No substitute
Automatic Operators	Stanley D-4990	No substitute
Push/Pull Plates	Trimco	Hager, Rockwood
Push/Pull Bars	Trimco	Hager, Rockwood
Protection Plates	Trimco	Hager, Rockwood
Overhead Stops	ABH	Rixson, Glynn Johnson Door
Stops	Trimco	Hager, Rockwood
Flush Bolts	Trimco	ABH, Rockwood
Coordinator & Brackets	Trimco	ABH, Rockwood
Threshold & Gasketing	Pemko	National Guard, Reese

2. Materials:

A. Hinges: Shall be Five Knuckle Ball bearing hinges

- 1) Template screw hole locations
- 2) Bearings are to be fully hardened.
- 3) Bearing shell is to be consistent shape with barrel.
- 4) Minimum of two permanently lubricated non-detachable bearings on standard weight hinge and four permanently lubricated bearing on heavy weight hinges.
- 5) Equip with easily seated, non-rising pins.
- 6) Non-Removable Pin screws shall be slotted stainless steel screws.
- 7) Hinges shall be full polished, front, back and barrel.
- 8) Hinge pin is to be fully plated.
- 9) Bearing assembly is to be installed after plating.
- 10) Sufficient size to allow 180-degree swing of door.
- 11) Furnish five knuckles with flush ball bearings.
- 12) Provide hinge type as listed in schedule.
- 13) Furnish three hinges per leaf to seven-foot and six-inch height. Add one for each additional 30 inches in height or fraction thereof.
- 14) Tested and approved by BHMA for all applicable ANSI Standards for type, size, function and finish
- 15) UL10C listed for Fire rated doors.

B. Geared Continuous Hinges:

- 1) Tested and approved by BHMA for ANSI A156.26-1996 Grade 1
- 2) Anti-spinning through fastener
- 3) UL10C listed for three-hour fire rating
- 4) Non-handed
- 5) Lifetime warranty
- 6) Provide Fire Pins for 3-hour fire ratings
- 7) Sufficient size to permit door to swing 180 degrees

C. Mortise Type Locks and Latches:

- 1) Tested and approved by BHMA for ANSI A156.13, Series 1000, Operational Grade 1, Extra-Heavy Duty, Security Grade 2 and be UL10C.
- 2) Furnish UL or recognized independent laboratory certified mechanical operational testing to four million cycles minimum.
- 3) Provide 9001-Quality Management and 14001-Environmental Management.
- 4) Fit ANSI A115.1 door preparation
- 5) Functions and design as indicated in the hardware groups
- 6) Solid, one-piece, $\frac{3}{4}$ -inch (19mm) throw, anti-friction latchbolt made of self-lubricating stainless steel
- 7) Deadbolt functions shall have one inch (25mm) throw bolt made of hardened stainless steel
- 8) Latchbolt and Deadbolt are to extend into the case a minimum of $\frac{3}{8}$ -inch (9.5mm) when fully extended
- 9) Auxiliary deadlatch to be made of one-piece stainless steel, permanently lubricated
- 10) Provide sufficient curved strike lip to protect door trim
- 11) Lever handles must be of forged or cast brass, bronze or stainless steel construction and conform to ANSI A117.1. Levers that contain a hollow cavity are not acceptable
- 12) Lock shall have self-aligning, thru-bolted trim
- 13) Levers to operate a roller bearing spindle hub mechanism
- 14) Mortise cylinders of lock shall have a concealed internal setscrew for securing the cylinder to the lockset. The internal setscrew will be accessible only by removing the core, with the control key, from the cylinder body.
- 15) Spindle to be designed to prevent forced entry from attacking of lever
- 16) Provide locksets with seven pin removable and interchangeable core cylinders
- 17) Each lever to have independent spring mechanism controlling it
- 18) Core face must be the same finish as the lockset.

D. Cylindrical Type Locks and Latchsets:

- 1) Tested and approved by BHMA for ANSI A156.2, Series 4000, Operational Grade 1, Extra-Heavy Duty, and be UL10C listed.
- 2) Provide 9001-Quality Management and 14001-Environmental Management.
- 3) Fit modified ANSI A115.2 door preparation.
- 4) Locksets and cores to be of the same manufacturer to maintain complete lockset warranty
- 5) Locksets to have anti-rotational studs that are thru-bolted
- 6) Keyed lever shall not have exposed "keeper" hole

- 7) Each lever to have independent spring mechanism controlling it
- 8) 2-¾ inch (70 mm) backset
- 9) 9/16 inch (14 mm) throw latchbolt
- 10) Provide sufficient curved strike lip to protect door trim
- 11) Outside lever sleeve to be seamless, of one-piece construction made of a hardened steel alloy
- 12) Keyed lever to be removable only after core is removed, by authorized control key
- 13) Provide locksets with seven pin removable and interchangeable core cylinders
- 14) Hub, side plate, shrouded rose, locking pin to be a one-piece casting with a shrouded locking lug.
- 15) Locksets outside locked lever must withstand minimum 1400 inch pounds of torque. In excess of that, a replaceable part will shear. Key from outside and inside lever will still operate lockset.
- 16) Core face must be the same finish as the lockset.
- 17) Functions and design as indicated in the hardware groups.

E. Exit Devices shall:

- 1) Tested and approved by BHMA for ANSI 156.3, Grade 1
- 2) Provide 9001-Quality Management and 14001-Environmental Management.
- 3) Furnish UL or recognized independent laboratory certified mechanical operational testing to nine million cycles minimum.
- 4) Provide a deadlocking latchbolt
- 5) Non-fire rated exit devices shall have cylinder dogging.
- 6) Touchpad shall be "T" style
- 7) Exposed components shall be of architectural metals and finishes.
- 8) Lever design shall match lockset lever design
- 9) Provide strikes as required by application.
- 10) Fire exit devices to be listed for UL10C
- 11) UL listed for Accident Hazard
- 12) Shall consist of a cross bar or push pad, the actuating portion of which extends across, shall not be less than one half the width of the door leaf.
- 13) Provide vandal resistant or breakaway trim
- 14) Aluminum vertical rod assemblies are acceptable only when provide with the manufacturers optional top and bottom stainless steel rod guard protectors.

F. Cylinders:

- 1) Provide the necessary cylinder housings, collars, rings & springs as recommended by the manufacturer for proper installation.
- 2) Provide the proper cylinder cams or tail piece as required to operate all locksets and other keyed hardware items listed in the hardware sets.
- 3) Coordinate and provide as required for related sections.

G. Door Closers shall:

- 1) Tested and approved by BHMA for ANSI 156.4, Grade 1
- 2) UL10C certified
- 3) Provide 9001-Quality Management and 14001-Environmental Management.
- 4) Closer shall have extra-duty arms and knuckles
- 5) Conform to ANSI 117.1
- 6) Maximum of two 7/16 inch case projection with non-ferrous cover
- 7) Separate adjusting valves for closing and latching speed, and backcheck
- 8) Provide adapter plates, shim spacers and blade stop spacers as required by frame and door conditions
- 9) Full rack and pinion type closer with 1-½ inch minimum bore
- 10) Mount closers on non-public side of door, unless otherwise noted in specification
- 11) Closers shall be non-handed, non-sized and multi-sized.

H. Door Stops: Provide a dome floor or wall stop for every opening as listed in the hardware sets.

- 1) Wall stop and floor stop shall be wrought bronze, brass or stainless steel.
- 2) Provide fastener suitable for wall construction.
- 3) Coordinate reinforcement of walls where wall stop is specified.
- 4) Provide dome stops where wall stops are not practical. Provide spacers or carpet riser for floor conditions encountered

I. Over Head Stops: Provide a Surface mounted or concealed overhead when a floor or wall stop cannot be used or when listed in the hardware set.

- 1) Concealed overhead stops shall be heavy duty bronze or stainless steel.
- 2) Surface overhead stops shall be heavy duty bronze or stainless steel.

- J. Push Plates: Provide with four beveled edges ANSI J301, .050 thickness, size as indicated in hardware set. Furnish oval-head countersunk screws to match finish.
 - K. Pulls with plates: Provide with four beveled edges ANSI J301, .050 thickness Plates with ANSI J401 Pull as listed in hardware set. Provide proper fasteners for door construction.
 - L. Push Pull Bars: Provide ANSI J504, 1 inch diameter. Pull and push bar model and series as listed in hardware set. Provide proper fasteners for door construction.
 - M. Kickplates: Provide with four beveled edges ANSI J102, 10 inches high by width less two inches on single doors and one inch on pairs of doors. Furnish oval-head countersunk screws to match finish.
 - N. Mop plates: Provide with four beveled edges ANSI J103, four inches high by width less one inch on single doors and one inch on pairs of doors. Furnish oval-head countersunk screws to match finish.
 - O. Door Bolts: Flush bolts for wood or metal doors.
 - 1) Provide a set of Automatic bolts, Certified ANSI/BHMA 156.3 Type 25 for hollow metal label doors.
 - 2) Provide a set of Automatic bolts, Certified ANSI/BHMA 156.3 Type 27 at wood label doors.
 - 3) Manual flush bolts, Certified ANSI/BHMA 156.16 at openings where allowed local authority.
 - 4) Provide Dust Proof Strike, Certified ANSI/BHMA 156.16 at doors with flush bolts without thresholds.
 - P. Coordinator and Brackets: Provide a surface mounted coordinator when automatic bolts are used in the hardware set.
 - 1) Coordinator, Certified ANSI/BHMA A1156.3 Type 21A for full width of the opening.
 - 2) Provide mounting brackets for soffit applied hardware.
 - 3) Provide hardware preparation (cutouts) for latches as necessary.
 - Q. Weatherstripping: Provide at head and jambs only those units where resilient or flexible seal strip is easily replaceable. Where bar-type weatherstrip is used with parallel arm mounted closers install weatherstrip first.
 - 1) Weatherstrip shall be resilient seal of (Neoprene, Polyurethane, Vinyl, Pile, Nylon Brush, Silicone)
 - 2) UL10C Positive Pressure rated seal set when required.
 - R. Door Bottoms/Sweeps: Surface mounted or concealed door bottom where listed in the hardware sets.
 - 1) Door seal shall be resilient seal of (Neoprene, Polyurethane, Nylon Brush, Silicone)
 - 2) UL10C Positive Pressure rated seal set when required.
 - S. Thresholds: Thresholds shall be aluminum beveled type with maximum height of ½ inch for conformance with ADA requirements. Furnish as specified and per details. Provide fasteners and screws suitable for floor conditions.
 - T. Silencers: Furnish silencers on all interior frames, three for single doors, two for pairs. Omit where any type of seals occur.
3. Finish:
- A. Designations used in Schedule of Finish Hardware - 3.05, and elsewhere to indicate hardware finishes are those listed in ANSI/BHMA A156.18 including coordination with traditional U.S. finishes shown by certain manufacturers for their products.
 - B. Powder coat door closers to match other hardware, unless otherwise noted.
 - C. Aluminum items shall be finished to match predominant adjacent material. Seals to coordinate with frame color.
4. Keys and Keying
- A. Provide keyed brass construction cores and keys during the construction period. Construction control and operating keys and core shall not be part of the owner's permanent keying system or furnished in the same keyway (or key section) as the owner's permanent keying system. Permanent cores and keys (prepared according to the accepted keying schedule) will be furnished to the owner.
 - B. Cylinders, removable and interchangeable core system: Best CORMAX™ Patented 7-pin.
 - C. Permanent keys and cores: Stamped with the applicable key mark for identification. These visual key control marks or codes will not include the actual key cuts. Permanent keys will also be stamped "Do Not Duplicate."
 - D. Transmit grand master keys, master keys and other security keys to owner by registered mail, return receipt requested.
 - E. Furnish keys in the following quantities:
 - 1) One each grand master keys
 - 2) Four each master keys
 - 3) Two each change keys each keyed core
 - 4) 15 each construction master keys
 - 5) One each control keys
 - F. The owner, or the owner's agent, will install permanent cores and return the construction cores to the hardware supplier. Construction cores and keys remain the property of the hardware supplier.
 - G. Keying Schedule: Arrange for a keying meeting, and programming meeting with architect owner and hardware supplier, and other involved parties to ensure locksets and locking hardware, are functionally correct and keying and programming complies with project requirements. Furnish three typed copies of keying and programming schedule to architect.

5. Magnetic Lock System:

A. Controller: Altronix AL600ULX

- 1) Magnetic Lock: Securitron M32 Magnalock
- 2) Exit Button: Securitron EEB 3/30 sec., timer - single gang, SPST, green/red/handicap
- 3) Motion Sensor: Securitron XMS Exit Motion Sensor
- 4) Keyswitch: SCHLAGE - 653-04 SPDT maintained; two LEDs, dual voltage, 630 satin finish, 7 pin BEST core.

B. ***BPRD Standard Drawing: Detail 5.86***

6. Execution

A. Examination: Verification of conditions: Examine doors, frames, related items and conditions under which work is to be performed and identify conditions detrimental to proper and or timely completion.

- 1) Do not proceed until unsatisfactory conditions have been corrected.

B. Hardware locations: Mount hardware units at heights indicated in the following publications except as specifically indicated or required to comply with the governing regulations.

- 1) Recommended locations for builder's hardware for standard steel doors and frames, by the Door and Hardware Institute (DHI).
- 2) Recommended locations for architectural hardware for flush wood doors (DHI).
- 3) WDMA Industry Standard I.S.-1A-04, Industry Standard for Architectural wood flush doors.

C. Installation: Install each hardware item per manufacturer's instructions and recommendations. Do not install surface mounted items until finishes have been completed on the substrate. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

- 1) Conform to local governing agency security ordinance.
- 2) Install Conforming to ICC/ANSI A117.1 Accessible and Usable Building and Facilities.
 - a. Adjust door closer sweep periods so that from the open position of 70 degrees, the door will take at least three seconds to move to a point three inches from the latch, measured to the landing side of the door.
- 3) Installed hardware using the manufacturers fasteners provided. Drill and tap all screw holes located in metallic materials. Do not use "Riv-Nuts" or similar products.

D. Field Quality Control and Final Adjustment - Contractor/Installers, Field Services: After installation is complete, contractor shall inspect the completed door openings on site to verify installation of hardware is complete and properly adjusted, in accordance with both the contract documents and final shop drawings.

- 1) Check and adjust closers to ensure proper operation.
- 2) Check latch set, lockset, and exit devices are properly installed and adjusted to ensure proper operation.
 - a. Verify levers are free from binding.
 - b. Ensure latch bolts and dead bolts are engaged into strike and hardware is functioning.
- 3) Report findings, in writing, to architect indicating that all hardware is installed and functioning properly. Include recommendations outlining corrective actions for improperly functioning hardware if required.



5.0 Structures

GENERAL REQUIREMENTS

Summary

1. Provide products that comply with requirements of contract documents and that are undamaged and, unless otherwise indicated, unused at time of installation. Provide products that are complete with all accessories, trim, finish, safety guards and other devices and details needed for complete installation and for intended use and effect.
2. Where they are available, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Where, because of nature of its application, owner is likely to need replacement or additional amounts of product at later date, either for maintenance and repair, or replacement, provide standard, domestically produced products for which manufacturer has published assurances that products and parts are likely to be available to owner at later date.
4. Except as otherwise indicated for required labels and operating data, do not permanently attach or imprint manufacturer's or producer's name plates or trademarks on exposed surfaces of products which will be exposed to view.
5. Notify owner of long lead items and any need to expedite ordering.
6. Contractor is responsible for timely ordering of items to meet schedule requirements.
7. No schedule adjustments will be granted for contractor's failure to order items in a timely manner.

Submittals

1. Comparable Product Requests: Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include specification section number and title and drawing numbers and titles.

Quality Assurance

1. Compatibility of Options: If contractor is given option of selecting between two or more products for use on project, select product compatible with products previously selected, even if previously selected products were also options.
 - A. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
 - B. If a dispute arises between contractors over concurrently selectable but incompatible products, owner will determine which products shall be used.

Product Delivery, Storage, and Handling

1. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.
2. Delivery and Handling:
 - A. Schedule delivery to minimize long-term storage at project site and to prevent overcrowding of construction spaces.
 - B. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
 - C. Deliver products to project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
 - D. Inspect products on delivery to determine compliance with the contract documents and to determine that products are undamaged and properly protected.
 - E. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.
3. Storage
 - A. Store products to allow for inspection and measurement of quantity or counting of units.
 - B. Store materials in a manner that will not endanger project structure.
 - C. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
 - D. Provide off-site storage and protection when site does not permit on-site storage or protection. Coordinate off-site storage with owner's representative if said materials are to be included in applications for payment. Materials stored off-site shall be in bonded facilities if included in application for payment.
 - E. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
 - F. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
 - G. Protect stored products from damage and liquids from freezing.

Selection Procedures

1. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
2. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the contract documents.
3. Where products are accompanied by the term "as selected" owner will make selection.
4. Descriptive, performance, and reference standard requirements in the specifications establish salient characteristics of products.
5. For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements to obtain approval for use of an unnamed product.
6. Where specifications include a list of manufactures' names, provide a product by one of the manufacturers listed that complies with requirements.
7. Where specifications name a product, or refer to a product indicated on drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements for consideration of an unnamed product by another named manufacturer.

Chain Link Fencing

1. Steel Chain Link Fabric:
 - A. Nine-gauge vinyl coated to six-gauge, 2" mesh; unless no-climb is indicated then mesh meeting the requirements of ASTM 2049-11, nine-gauge vinyl coated to six-gauge.
 - B. Polymer Coated Steel Fabric: Class 2a extruded and adhered, nine-gauge; the wire gauge specified for polymer-coated wire is that of the metallic coated steel core wire.
 - 1) Color: brown, in compliance with ASTM F934, or as specified on drawings.
 - C. Fabric selvage: Selvage shall be knuckled at both top and bottom on all fabric below nine feet in height.
 - D. Tie Wire and Hog Rings: Polymer coated; match the coating, class and color to that of the chain link fabric, tie wire every 12 inches along top rail, hog rings every 24 inches along tension wire.
2. Chain Link Fabric, Hardware, Gates and Tubing:
 - A. Specify consistent with the Chain Link Fence Manufacturers Institute guide for Commercial Chain Link Fence and Gate (CLFS 2445)
 - 1) ***BPRD Standard Drawings: D5.11, D5.12, D5.14***

Other Fencing

1. Concrete Rail Fence:
 - A. Columns to be 6" x 6", chamfered top, reinforced concrete.
 - 1) Single or double rail systems.
 - B. Rail spacing not to exceed 8 feet on center.
 - C. Texture: All exposed sides to have wood-grained texture.
 - 1) ***BPRD Standard Drawing: 5.21***
2. Split Rail Fence:
 - A. Posts of 18-inch girth (approximately 25 square inches)
 - 1) Single or double rail systems.
 - B. Rail Spacing not to exceed 10 feet on center.
 - 1) ***BPRD Standard Drawing: 5.15***

Bollards and Gates

1. Removable Bollard:
 - A. Owner furnished, contractor installed (OFCI), owner will furnish product indicated. The work includes receiving, unloading, handling, storing, protecting, and installing owner-furnished product.
 - 1) ***BPRD Standard Drawing: 5.82***
2. Trail Gates:
 - A. Owner furnished, contractor installed (OFCI), owner will furnish product indicated. The work includes receiving, unloading, handling, storing, protecting, and installing owner-furnished product.
 - 1) ***BPRD Standard Drawing: 5.84***
3. Park Gates:
 - A. Owner furnished, contractor installed (OFCI), owner will furnish product indicated. The work includes receiving, unloading, handling, storing, protecting, and installing owner-furnished product.
 - 1) ***BPRD Standard Drawing: 5.85***

6.0 Irrigation

IRRIGATION

Performance Requirements

1. Irrigation zone control shall be programmable, automatic operation with controller and automatic control valves.

Submittals

1. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
2. Wiring Diagrams: For power, signal, and control wiring.
3. Coordination Drawings: Irrigation systems, drawn to scale, on which components are shown and coordinated with each other, using input from installers of the items involved. Also include adjustments necessary to avoid plantings and obstructions such as signs and light standards.
4. Qualification Data: For qualified installer.
5. Zoning Chart: Show each irrigation zone and its control valve.
6. Controller Timing Schedule: Indicate timing settings for each automatic controller zone.
7. Field quality-control reports.

Quality Assurance

1. Installer Qualifications: An employer of workers that include a Professional Class member of the American Society of Irrigation Consultants. For irrigation installer, include list of similar projects completed by installer demonstrating installer's capabilities and experience. Include project names, addresses, and year completed, and include names and addresses of owners' contact persons.
 - A. Experience: Five years' experience installing commercial irrigation systems, in addition to requirements in Section 014000 "Quality Requirements."
 - B. Installer's Field Supervision: Require installer to maintain an experienced full-time supervisor on project site when work is in progress.

Pipes, Tubes, and Fittings

1. Comply with requirements in the piping schedule for applications of pipe, tube, and fitting materials, and for joining methods for specific services, service locations, and pipe sizes.
 - A. PVC pipe in sizes of 1", 1-1/2", 2", 2 1/2", 3", 4".
 - B. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer unless otherwise indicated.

Automatic Control Valves

1. Plastic, Automatic Control Valves:
 - A. Description: Rainbird
 - 1) Molded-ABS, plastic body
 - 2) Normally closed, diaphragm type with manual-flow adjustment and operated by 24-V ac solenoid.
 - 3) Sized appropriately for flow requirements.
 - 4) Dirty water/scrubber valves to be installed in non-potable applications
 - B. ***BPRD Standard Drawing: D6.12***

Sprinklers

1. General Requirements: Designed for uniform coverage over entire spray area indicated as turf lawn, adequate for uniform coverage of plant material in shrub/planting areas.
2. Plastic Rotors:
 - A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Rain Bird Corporation.
 - B. Description: Rainbird 6504 Falcon, Rainbird 5000
 - 1) Body Material: ABS.
 - 2) Nozzle: ABS.
 - 3) Retraction Spring: Stainless steel.
 - 4) Internal Parts: Corrosion resistant.
 - 5) SAM Check Device as needed.
 - C. ***BPRD Standard Drawings: D6.21 and 6.22***

3. Plastic Shrub Sprinklers:
 - A. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - 1) Rain Bird 1800 Series Pop-up Fixed Spray Sprinklers
 - B. Description:
 - 1) Body Material: ABS or other plastic.
 - 2) Pattern: Fixed, with flow adjustment.
 - C. ***BPRD Standard Drawing 6.25***
4. Plastic Tree/Shrub Bubblers
 - A. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - 1) Rain Bird Corporation
 - B. Description: 1400 Series Full Circle Bubblers
 - 1) Fixed gpm bubblers Models 1401 and 1402
 - 2) Bubblers shall be installed using swing pipe and barbed fitting/marlex swing assembly
 - 3) Plant materials installed shall determine bubbler quantity and gpm

Irrigation Sprinkler Heads

1. Install heads 4 inches off paving and sidewalks, 12 inches off curbs, parking areas or driveways
2. Install heads 12 inches off curbs at vehicle overhangs in shrub zones
3. Install sprinkler heads after final grading.

Balancing

1. Adjust and balance system to provide uniform coverage following installation of landscape work.
2. Adjust heads for proper direction and optimum coverage without excessive overthrow on walkways, roads and soft surface trails
3. Assure that no spray strikes buildings, roadways, or parked cars.
4. Set controllers to operate system as required

Quick Couplers

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - A. Rain Bird Corporation: Model; 3-RC: ¾ inch (20/27) Rubber Cover, 1-Piece Body
 - B. 44-RC: one-inch (26/34) Rubber Cover, 2-Piece Body

Trace Wire

1. Provide 18-gauge direct burial wire (blue) for locating irrigation circuit piping.
2. Provide connectors which securely connect wires to the main trace wire, effectively moisture sealed by means of a dielectric non-hardening silicone sealant, and manufacturer approved for direct burial, for splices to establish a continuous run of trace wire.
3. Trace wire shall be installed in the same trench, including through sleeves, with the piping during installation. The wire shall be installed directly above the pipe. The trace wire shall be securely bonded together at all wire joints with an approved watertight connector to provide electrical continuity.
4. Except for approved spliced-in repair or replacement connections, trace wire shall be continuous and without splices from each trace wire access point.
5. Trace wire access points will be accessible at all automatic control valve locations.
6. Trace wire shall be protected from damage during the execution of the work. No cuts or breaks in the trace wire or trace wire insulation shall be permitted.
7. At each automatic control valve, a minimum of three feet of trace wire will be coiled and secured near the control valve.
8. Contractor shall perform a continuity test on all trace wire in the presence of the owner's representative. If the trace wire is found to be non-continuous after testing, the contractor shall repair or replace the failed segment of the wire.

Controllers

Manufacturers: Subject to compliance with requirements, provide products by the following:

1. For Systems greater than 100 zones: Baseline, BaseStation 3200; Description:
 - A. Display Features
 - 1) Screen size is 3.5 inches.
 - 2) Screen resolution is 320 x 240 at 65,536 colors.
 - 3) Screen LCD brightness is 200 lumens for easy viewing in direct sunlight.
 - B. Operating Features
 - 1) Supports up to 200 zones in any combination of two-wire and conventional wire.
 - 2) Supports up to 20 separate programs with overlapping run times.
 - 3) Supports up to 25 biSensor Soil Moisture Sensors.

- 4) Supports up to four flow sensors or meters, which manage and monitor flow across a site as independent or connected hydraulic systems.
- 5) Supports up to seven separate normally closed pause devices.
- 6) Concurrently operates up to 15 typical solenoids over two-wire or up to 6 typical solenoids over conventional wire.
- 7) Operates up to four normally open and normally closed master valves and/or pump starts for the entire system.
- 8) Maximizes watering efficiency and minimizes total irrigation time by using Intelligent Soak Cycles™ to prioritize cycles for zones that have already started to water over zones that have not started.
- 9) Automatically stacks overlapping programs. The system can run any number of programs concurrently if permitted by the zone concurrency settings.
- 10) Learns the actual flow for each zone when one or more flow meters are configured in the system.
- 11) Executes a high-flow or low-flow shutdown based on total system flow or on flow per flow meter.
- 12) Intelligently schedules watering based on available flow to maximize concurrent valve operation and minimize total water time.
- 13) Reads flow devices once every 15 seconds when watering.
- 14) Runs a diagnostic test weekly on normally open master valves to help prevent a normally open master valve from “sticking” open.
- 15) Detects and repairs all address conflicts for devices that are connected to the two-wire from the controller.
- 16) Supports two-way communication with two-wire decoders (biCoders) to gather information about the two-wire voltage and communication integrity, the solenoid voltage and current, and status (open circuit, short circuit, or ok).
- 17) Stores all program and history information in non-volatile memory.

C. Programmable Features

- 1) Program up to eight start times per program in 15-minute increments.
- 2) Program the run times for zones from one minute to 23.5 hours.
- 3) Program the day intervals in even days, odd days, or odd days excluding the 31st.
- 4) Create a custom seven-day calendar, and historical calendar with customizable half-months.
- 5) Program unique soak and cycle times (Intelligent Soak Cycles™) for each zone. Soak times can be programmed between 0 minutes and 23.5 hours.
- 6) Specify hours during each day of the week when water can or cannot be applied (Water Windows) in one-hour increments for each 24-hour period.
- 7) Assign an irrigation mode (such as timed, primary, soil moisture based, or linked) to each zone.
- 8) Manually enter a design flow for each zone, with or without an installed flow meter.
- 9) Manually or automatically configure soil moisture thresholds and make irrigation decisions based on those thresholds.
- 10) Adjust your water budget from 25% to 200% by program.
- 11) Schedule up to eight future dates when no watering will occur.
- 12) Manually operate one zone, all zones of a program, or all zones, with programmable run times, delay before starting first zone, and time between zones.
- 13) Search for and identify all devices connected to the two-wire and list them according to device type and serial number.
- 14) Address two-wire decoders (biCoders) by serial number by assigning each zone address a device serial number.
- 15) Re-address any two-wire decoder (biCoder) from the controller by re-assigning the device’s serial number to a new zone address.
- 16) Assign any station or terminal number on a multi-station biCoder from the controller to any zone address in any order.
- 17) Back up all programming and historical data with any USB flash drive.
- 18) Establish two levels of remote password protection: read only access and read/write access.
- 19) Configure pipe stabilization time for flow management.

D. Central Control and Remote Control

- 1) Connect the BaseStation 3200 to BaseManager™ central control software when configured with an approved communication module. Communication options include Ethernet, Wi-Fi, cellular modem, mesh radio, and serial connections.
- 2) Manually program and operate all configured zones from BaseManager central control software.
- 3) Receive email and text message alerts when connected to BaseManager central control software.
- 4) Perform manual operations remotely with Mobile Access™ when connected to BaseManager central control software.

E. Power Output

- 1) Station Output: 30 VAC RMS over two-wire.
- 2) Supports up to 1.45 amp output.
- 3) UL Listed
- 4) The controller powers down the two-wire after one minute of idle time.
- 5) Drive current to a decoder is 100 to 250 milliamps (depending on the solenoid).
- 6) Supports up to 110 device loads on a two-wire path;
 - a. 1, 2, and 4 station biCoders = 1 load
 - b. 12 to 24 station Powered biCoder = 2 loads
 - c. Soil Moisture Sensor = 1 load
 - d. Flow biCoder = 3 loads

F. Solenoid Specification

- 1) Requires a typical solenoid with approximately 400 milliamps of inrush current and approximately 200 milliamps holding current.

G. Surge

- 1) 10 levels of surge protection.
- 2) Up to 5 levels of surge protection built into the controller boards.
- 3) Minimum surge response time of 1 picosecond.

H. Enclosure Options

- 1) "C" Cabinet - Wall Mount Enclosure
- 2) Dimensions: 10.13"W x 12.00"H x 4.75"D
- 3) 16-gauge steel, powder-coated

2. For Systems greater than 48 but less than 100 zones: Baseline, BaseStation 3200; Description:

A. Display Features

- 1) Screen size is 3.5".
- 2) Screen resolution is 320 x 240 at 65,536 colors.
- 3) Screen LCD brightness is 200 lumens for easy viewing in direct sunlight.

B. Operating Features

- 1) Supports up to 100 zones in any combination of two-wire and conventional wire.
- 2) Supports up to 20 separate programs with overlapping run times.
- 3) Supports up to 25 biSensor Soil Moisture Sensors.
- 4) Supports up to four flow sensors or meters, which manage and monitor flow across a site as independent or connected hydraulic systems.
- 5) Supports up to seven separate normally closed pause devices.
- 6) Concurrently operates up to 15 typical solenoids over two-wire or up to six typical solenoids over conventional wire.
- 7) Operates up to four normally open and normally closed master valves and/or pump starts for the entire system.
- 8) Maximizes watering efficiency and minimizes total irrigation time by using Intelligent Soak Cycles™ to prioritize cycles for zones that have already started to water over zones that have not started.
- 9) Automatically stacks overlapping programs. The system can run any number of programs concurrently if permitted by the zone concurrency settings.
- 10) Learns the actual flow for each zone when one or more flow meters are configured in the system.
- 11) Executes a high-flow or low-flow shutdown based on total system flow or on flow per flow meter.
- 12) Intelligently schedules watering based on available flow to maximize concurrent valve operation and minimize total water time.
- 13) Reads flow devices once every 15 seconds when watering.
- 14) Runs a diagnostic test weekly on normally open master valves to help prevent a normally open master valve from "sticking" open.
- 15) Detects and repairs all address conflicts for devices that are connected to the two-wire from the controller.
- 16) Supports two-way communication with two-wire decoders (biCoders) to gather information about the two-wire voltage and communication integrity, the solenoid voltage and current, and status (open circuit, short circuit, or ok).
- 17) Stores all program and history information in non-volatile memory.

C. Programmable Features

- 1) Program up to eight start times per program in 15-minute increments.
- 2) Program the run times for zones from one minute to 23.5 hours.
- 3) Program the day intervals in even days, odd days, or odd days excluding the 31st.
- 4) Create a custom seven-day calendar, and historical calendar with customizable half-months.
- 5) Program unique soak and cycle times (Intelligent Soak Cycles™) for each zone. Soak times can be programmed between zero minutes and 23.5 hours.
- 6) Specify hours during each day of the week when water can or cannot be applied (Water Windows) in one-hour increments for each 24-hour period.
- 7) Assign an irrigation mode (such as timed, primary, soil moisture based, or linked) to each zone.
- 8) Manually enter a design flow for each zone, with or without an installed flow meter.
- 9) Manually or automatically configure soil moisture thresholds and make irrigation decisions based on those thresholds.
- 10) Adjust your water budget from 25% to 200% by program.
- 11) Schedule up to eight future dates when no watering will occur.
- 12) Manually operate one zone, all zones of a program, or all zones, with programmable run times, delay before starting first zone, and time between zones.
- 13) Search for and identify all devices connected to the two-wire and list them according to device type and serial number.
- 14) Address two-wire decoders (biCoders) by serial number by assigning each zone address a device serial number.
- 15) Re-address any two-wire decoder (biCoder) from the controller by re-assigning the device's serial number to a new zone address.
- 16) Assign any station or terminal number on a multi-station biCoder from the controller to any zone address in any order.
- 17) Back up all programming and historical data with any USB flash drive.
- 18) Establish two levels of remote password protection: read only access and read/write access.
- 19) Configure pipe stabilization time for flow management.

D. Central Control and Remote Control

- 1) Connect the BaseStation 1000 to BaseManager™ central control software when configured with an approved communication module. Communication options include ethernet, wi-fi, cellular modem, mesh radio, and serial connections.
- 2) Manually program and operate all configured zones from BaseManager central control software.
- 3) Receive email and text message alerts when connected to BaseManager central control software.
- 4) Perform manual operations remotely with Mobile Access™ when connected to BaseManager central control software.

E. Power Output

- 1) Station Output: 30 VAC RMS over two-wire.
- 2) Supports up to 1.45 amp output.
- 3) UL Listed
- 4) The controller powers down the two-wire after one minute of idle time.
- 5) Drive current to a decoder is 100 to 250 milliamps (depending on the solenoid).
- 6) Supports up to 110 device loads on a two-wire path;
 - a. 1, 2, and 4 station biCoders = 1 load
 - b. 12 to 24 station Powered biCoder = 2 loads
 - c. Soil Moisture Sensor = 1 load
 - d. Flow biCoder = 3 loads

F. Solenoid Specification

- 1) Requires a typical solenoid with approximately 400 milliamps of inrush current and approximately 200 milliamps holding current.

G. Surge

- 1) 10 levels of surge protection.
- 2) Up to five levels of surge protection built into the controller boards.
- 3) Minimum surge response time of one picosecond.

H. Enclosure Options

- 1) "C" Cabinet - Wall Mount Enclosure
- 2) Dimensions: 10.13"W x 12.00"H x 4.75"D
- 3) 16-gauge steel, powder-coated

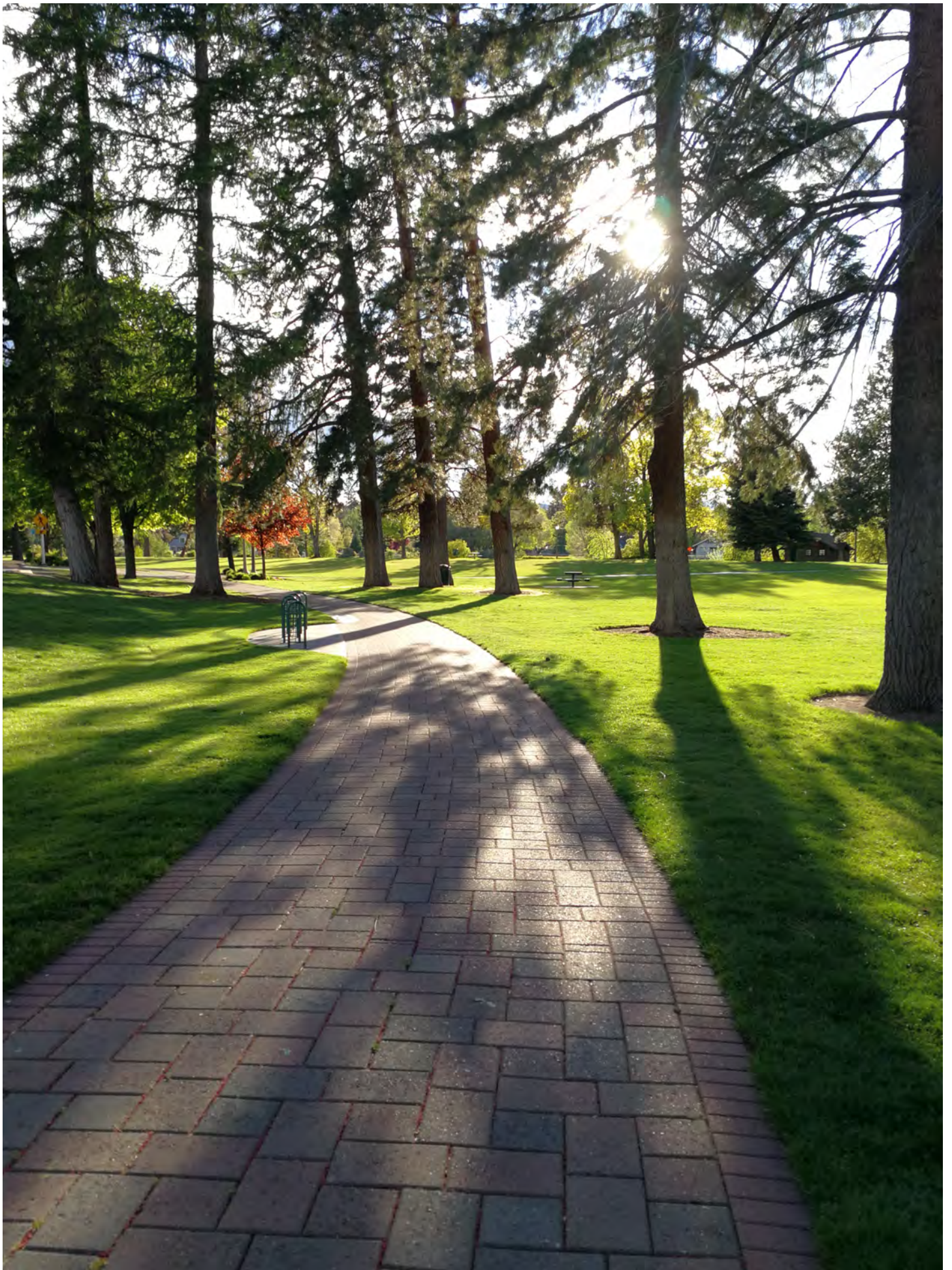
3. For Systems greater than 24 zones up to 48 zones: Weathermatic, SmartLine Solar System 48 Zones; model SLSO LAR-48.
Description:
 - A. Exterior Control Enclosures: NEMA 250, Type 4, weatherproof, with locking cover and two matching keys; include provision for grounding.
 - 1) Body Material: powder coated metal enclosure with matching pedestal.
 - 2) Mounting: Freestanding type for concrete base.
 - B. Control Transformer: 24-V secondary, with primary fuse.
 - C. Timing Device: Adjustable, 24-hour, 14-day clock, with automatic operations to skip operation any day in timer period, to operate every other day, or to operate two or more times daily.
 - 1) Manual or Semiautomatic Operation: Allows this mode without disturbing preset automatic operation.
 - 2) Nickel-Cadmium Battery and Trickle Charger: Automatically powers timing device during power outages.
 - 3) Surge Protection: Metal-oxide-varistor type on each station and primary power.
 - D. Moisture Sensor: Adjustable from one to seven days, to shut off water flow during rain.
 - E. SmartLink Aircard: Shall be model as manufactured by Weathermatic Sprinkler Division of Telsco Industries. Package to be available with flow monitoring by amending the model to include FLOW. AIRCARDS must be compatible for use with SmartLine irrigation controls.
 - F. Flow Sensor: Tee Type PVC Flow Sensor, the flow sensor shall consist of a custom molded tee shaped body with socket ends conforming to PVC pipe dimensions, a flow sensor housing containing the electronic circuitry and carrying the spinning impeller and a retaining nut, compatible with controller.
 - G. Wiring: UL 493, Type UF multiconductor, with solid-copper conductors; insulated cable; suitable for direct burial.
 - H. Feeder-Circuit Cables: No. 12 AWG minimum, between building and controllers.
 - I. Low-Voltage, Branch-Circuit Cables: No. 14 AWG minimum, between controllers and automatic control valves; color-coded different from feeder-circuit-cable jacket color; with jackets of different colors for multiple-cable installation in same trench.
 - J. Splicing Materials: Manufacturer's packaged kit consisting of insulating, spring-type connector or crimped joint and epoxy resin moisture seal; suitable for direct burial.
4. For Systems up to 24 zones: Weathermatic, Smartline model SL1624. Description:
 - A. Exterior Control Enclosures: NEMA 250, Type 4, weatherproof, with locking cover and two matching keys; include provision for grounding.
 - 1) Body Material: powder coated metal enclosure with matching pedestal
 - 2) Mounting: Freestanding type for concrete base
 - B. Control Transformer: 24-V secondary, with primary fuse.
 - C. Timing Device: Adjustable, 24-hour, 14-day clock, with automatic operations to skip operation any day in timer period, to operate every other day, or to operate two or more times daily.
 - 1) Manual or Semiautomatic Operation: Allows this mode without disturbing preset automatic operation.
 - 2) Nickel-Cadmium Battery and Trickle Charger: Automatically powers timing device during power outages.
 - 3) Surge Protection: Metal-oxide-varistor type on each station and primary power.
 - D. Moisture Sensor: Adjustable from one to seven days, to shut off water flow during rain.
 - E. SmartLink Aircard: Shall be model as manufactured by Weathermatic Sprinkler Division of Telsco Industries. Package to be available with flow monitoring by amending the model to include FLOW. AIRCARDS must be compatible for use with SmartLine irrigation controls.
 - F. Flow Sensor: Tee Type PVC Flow Sensor, the flow sensor shall consist of a custom molded tee shaped body with socket ends conforming to PVC pipe dimensions, a flow sensor housing containing the electronic circuitry and carrying the spinning impeller and a retaining nut, compatible with controller.
 - G. Wiring: UL 493, Type UF multiconductor, with solid-copper conductors; insulated cable; suitable for direct burial.
 - H. Feeder-Circuit Cables: No. 12 AWG minimum, between building and controllers.
 - I. Low-Voltage, Branch-Circuit Cables: No. 14 AWG minimum, between controllers and automatic control valves; color-coded different from feeder-circuit-cable jacket color; with jackets of different colors for multiple-cable installation in same trench.
 - J. Splicing Materials: Manufacturer's packaged kit consisting of insulating, spring-type connector or crimped joint and epoxy resin moisture seal; suitable for direct burial.
5. For Weathermatic systems in a solar application:
 - A. Solar Battery Assembly shall be model SOLARBATT-48 as assembled by Weathermatic Sprinkler Division of Telsco Industries, or approved equal.
 - 1) Construction: SOLARBATT-48 shall be an American made GEL maintenance free deep cycle battery. The GEL battery case shall be a shock absorbent thick wall polypropylene. The charging grid shall be a high purity lead calcium-tin alloy. The battery shall be non-spillable and be a recombination reaction (recombinant battery) which prevents escape of hydrogen and oxygen gases. The battery may be operated in virtually any position except upside-down.

- 2) Electric: SOLARBATT-48 shall have the following electrical specifications:
 - a. Nominal Voltage: 12V
 - b. Amp Hour Capacity @ 20 hr rate: 97.6 a/h
 - c. Reserve Capacity @ 25-amp discharge rate: 190 mins
 - d. BCI Group Size: 30H
 - e. Marine Cranking Amps @ 32* F: 640 amps
 - f. Cold Cranking Amps @ 0* F: 450 amps
 - g. Terminal Type: dual terminal
 - 3) Warranty: SOLARBATT-48 shall have a manufacturer's limited warranty of one year.
- B. Solar Charge Control Box Assembly: shall be model SOLARCHG as assembled by Weathermatic Sprinkler Division of Telsco Industries, or approved equal. SOLARCHG shall consist of a digital meter, voltage inverter, and fuse box.
- 1) Operation: The SOLARCHG digital meter shall be a universal, four-digit display with custom icons that is compatible with several Morningstar controllers and inverters. The digital meter shall display voltage, current, temperature, logged data, settings, alarms and error reporting. The digital meter shall display this data as present, cumulative and maximums/minimums measurements. The digital meter shall also display battery level and operating state. The digital meter's icons and units indicators shall be displayed to indicate whether the numerical information relates to solar, load, battery 1 or 2, options, errors or self-test. The digital meter shall have three soft buttons to allow for navigation of the meter menus. The unit shall also have custom icons and back lighting. The digital meter shall be designed for low self-consumption to avoid draining the system batteries. Self-consumption shall be 6 mA with back light off and 15 mA with backlight on. The temperature may be displayed in either Celsius or Fahrenheit, the backlight timer may be adjusted for desired running time and the amp-hours and minimum/maximum values may be reset.
 - 2) The SOLARCHG voltage inverter shall be a pure sine wave inverter designed specifically for electrification requiring AC power using solar. The pure sine wave design shall provide an AC equivalent to grid power. The unit shall utilize a toroidal transformer design to generate a stable wave form throughout the range of input voltages. The voltage inverter shall handle a 200% surge during load start-up to a maximum of 600 watts. Self-consumption shall be 450mA while powering loads and automatically powers down to stand-by mode during no load conditions. The unit shall have electronic protections that will automatically protect against faults and user mistakes such as short circuit, overload, high temperature and low voltage disconnect. Recovery from most faults shall be automatic.
 - 3) Warranty: SOLARCHG shall have a manufacturer's limited warranty of one year.
- C. Solar Panels shall be model SOLARPAN-50 as assembled by Weathermatic Sprinkler Division of Telsco Industries, or approved equal.
- 1) Construction: SOLARPAN-50 shall be high quality industrial solar modules that have a low iron high-transmission 3.2mm tempered glass front that is impact resistant. The panel frames shall be constructed from clear anodized extruded aluminum. The units shall have pre-drilled holes for easy mounting to mounting frame. Each panel shall have TPT/TPE Tedlar backsheet. The solar cells shall be encapsulated in EVA and bonded to the Tedlar backsheet. Each panel unit shall consist of 36 solar cells that are connected in series. A weatherproof junction box shall be mounted to each panel to allow for connection with a waterproof strain relief connectors and conduits or weather resistant output cables.
- D. Controller(s) shall be model PL4800TW as manufactured by Weathermatic Sprinkler Division of Telsco Industries. Controller(s) shall be a four-program controller with SLM48DM module to allow three two-wire path operation up to 48 zones.
- 1) Operation: Controller shall be capable of standard timed watering or auto adjust watering times when equipped with an optional SLW weather monitor manufactured by Weathermatic. Auto Adjust watering shall be based on real time, on-site weather data and system audit data entered by the user. Auto adjust timing shall be based on the Hargreaves ET calculation formula. Controller shall provide reviewable watering deficits, scheduled run times by zone and a total run time recap for each zone which is resettable by the user. A more or less function shall be provided to allow run time adjustment by zone for shade/sunlight, system efficiency and other local factors. Auto adjust mode shall also include automatic calculation of run/soak times based on both soil type and zone elevation.
 - a. Each program shall have eight independent start times, calendar schedules, watering budgets by month and a soak/cycle for varying soil percolation rates.
 - b. Controller shall have a pump start/master valve position which shall be programmable to operate on demand from any selected zone. A programmable safety delay shall be included for zone to zone delay and master valve to zone delay for opening and closure.
 - c. Controller shall have input for rain and freeze sensor devices. Use of the optional SLW weather monitor shall incorporate the rain and freeze shutdown functions and shall incorporate a 48-hour delay after closure of the rain sense switch.

- d. Controller shall have self-diagnostic capabilities to detect “short” or “open” zones and the ability to display lists of faults on an LCD display for the user. Diagnostics shall also include LCD display of volt/amp readings by zone and for transformer output as well as backup battery reading. A chatter function shall also be provided to assist in locating buried valves. The controller shall automatically prevent master valve opening or pump start when the valve locator diagnostic is used.
 - e. Display shall be backlit for clear viewing in all lighting conditions. Zone timing shall be settable from one minute to nine hours and 55 minutes.
 - f. Program D shall operate concurrently with programs A, B and C. Programs A, B and C shall stack in sequence of start time operation.
 - g. Program schedules shall include options for days of the week, odd date, even date or an interval of one to 30 days. A ‘no water’ window shall be available to inhibit daily operations of a program between two selected times on a given day; omission of up to seven specified calendar dates or specific days of the week. Adjustments for leap year shall be automatic.
 - h. Manual operation shall be provided by program, by station, or on a programmable test program with durations from ten seconds to ten minutes. The programmable test program shall also check for short and open conditions on each zone each time it is run.
 - i. Non-volatile memory shall retain all programming and real-time clock shall be provided to maintain date and time.
- 2) Construction: Controller shall be enclosed in a U.L., CE and C-Mark Listed rainproof plastic enclosure with optional key lock. The enclosure shall be rated for outdoor or indoor use. Enclosure shall be a wall mount (pedestal mount) model with removable knockouts on the lower side and back of the housing for choice of wiring location. The operating panel shall be a totally enclosed module that is removable from the housing for programming at a separate location. A test post for 24V a.c. operation shall be accessible with or without the operating panel. Zone modules (SLM12) shall be self-contained modules that can be installed without turning off power to the unit and programming of new zones shall not be required. Module wiring connections shall be of the type that allows insertion of solid wires without any tool. Each module shall contain its own surge protection.
- 3) Electric: Controller shall be completely electric in operation. Controller shall be installed and wired in accordance with manufacturer’s published instructions. Controller shall be capable of operating from an independent power supply. Primary shall be 115V a.c. 60hz or 230V, 50hz.
- 4) Warranty: Controller shall have a manufacturer’s limited warranty of two years.
- E. Stainless Steel Pedestal Enclosure shall be model SLPED-ENC as manufactured by Weathermatic Sprinkler Division of Telsco Industries.
- 1) Construction: Pedestal enclosure shall be fabricated from 16-gauge stainless steel with a brushed finish. The enclosure shall be NEMA type 3R rated weather-resistant with filtered side louvers for cross-ventilation. A removable stainless steel door shall be mounted to the front of the enclosure and include a cam style key-lock to restrict access to the enclosure. Enclosure shall measure 19 ¾” wide x 24” high x 15” deep.
- 2) Pedestal enclosure shall be powder coated, RAL 8028, Terra Brown.
- 3) The cabinet shall be fabricated from 16-gauge stainless steel with a brushed finish. The cabinet shall be NEMA type 3R rated weather-resistant. A removable stainless steel door shall be mounted to the front of the cabinet and include a cam style key-lock to restrict access to the cabinet. The cabinet shall measure 19 ½” wide x 19 ½” high x 9” deep.
- 4) Warranty: Enclosure shall have a manufacturer’s limited warranty of two years.

Cleanup and Final Inspection

1. Replace all permanent features disturbed by the installation.
2. Demonstrate the entire system to owner, showing the remote-control valves are properly balanced, the heads are properly adjusted for radius and arc coverage, and the installed system is working properly. Demonstrate head adjustment, controller and valve operation, and winterization procedures.



7.0 Planting

PLANTING

Soil Preparation

1. Testing Requirements
 - A. General: Perform tests on soil samples.
 - B. Physical Testing
 - C. Chemical Testing
 - D. Fertility Testing: Soil-fertility analysis according to standard laboratory protocol of SSSA NAPT WERA-103.
 - E. Organic-Matter Content.
 - F. Recommendations: Based on the test results, state recommendations for soil treatments and soil amendments to be incorporated to produce satisfactory planting soil suitable for healthy, viable plants indicated. Include, at a minimum, recommendations for nitrogen, phosphorous, and potassium fertilization, and for micronutrients.
 - 1) Fertilizers and Soil Amendment Rates: State recommendations in weight per 1000 square feet for six-inch depth of soil.
 - 2) Soil Reaction: State the recommended liming rates for raising pH or sulfur for lowering pH according to the buffered acidity or buffered alkalinity in weight per 1000 square feet for six-inch depth of soil.
2. Organic Soil Amendments
 - A. Compost: Well-composted, stable, and weed-free organic matter produced by composting feedstock, and bearing USCC's "Seal of Testing Assurance," and as follows:
 - 1) pH of 5.5 to 8.
 - 2) Moisture Content: 35 to 55% by weight.
 - 3) Organic-Matter Content: 30 to 40% of dry weight.
 - 4) Particle-size requirement: $\frac{3}{4}$ inch (19 millimeter).
 - 5) Particle Size: Minimum of 98% passing through a one-inch sieve.
3. Submittals
 - A. Qualification Data: For landscape installer. Include list of similar projects completed by installer demonstrating installer's capabilities and experience. Include project names, addresses, and year completed, and include names and addresses of owners' contact persons.
 - B. Product Certificates: For each type of manufactured product, from manufacturer, and complying with the following:
 - 1) Manufacturer's certified analysis of standard products.
 - 2) Analysis of other materials by a recognized laboratory made according to methods established by the Association of Official Analytical Chemists, where applicable.
 - C. Pesticides and Herbicides: Product label and manufacturer's application instructions specific to project.
 - D. Sample Warranty: For special warranty.
 - E. Maintenance Data: Recommended procedures to be established by owner for maintenance of plants during a calendar year. Submit before expiration of required maintenance periods.
4. Quality Assurance
 - A. Installer Qualifications: A qualified landscape installer whose work has resulted in successful establishment of plants.
 - 1) Professional Membership: Installer shall be a member in good standing of either the Professional Landcare Network or the American Nursery and Landscape Association.
 - 2) Experience: Five years of experience in landscape installation in addition to requirements in Section 014000 "Quality Requirements."
 - 3) Installer's Field Supervision: Require installer to maintain an experienced full-time supervisor on project site when work is in progress.
 - 4) Pesticide Applicator: State licensed, commercial.
 - B. Provide quality, size, genus, species, and variety of plants indicated, complying with applicable requirements in ANSI Z60.1.
 - C. Measurements: Measure according to ANSI Z60.1. Do not prune to obtain required sizes.
 - 1) Trees and Shrubs: Measure with branches and trunks or canes in their normal position. Take height measurements from or near the top of the root flare for field-grown stock and container-grown stock. Measure main body of tree or shrub for height and spread; do not measure branches or roots tip to tip. Take caliper measurements six inches above the root flare for trees up to four-inch caliper size, and 12 inches above the root flare for larger sizes.
 - 2) Other Plants: Measure with stems, petioles, and foliage in their normal position.
 - D. Plant Material Observation: Owner's representative may observe plant material either at place of growth or at site before planting for compliance with requirements for genus, species, variety, cultivar, size, and quality. Owner's representative may also observe trees and shrubs further for size and condition of balls and root systems, pests, disease symptoms, injuries, and latent defects and may reject unsatisfactory or defective material at any time during progress of work. Remove rejected trees or shrubs immediately from project site.
 - 1) Notify owner's representative of sources of planting materials seven days in advance of delivery to site.

5. Delivery, Storage, and Handling

- A. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of compliance with state and federal laws if applicable.
- B. Bulk Materials:
 - 1) Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
 - 2) Provide erosion-control measures to prevent erosion or displacement of bulk materials; discharge of soil-bearing water runoff; and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
 - 3) Accompany each delivery of bulk materials with appropriate certificates.
- C. Deliver bare-root stock plants within 24 hours of digging. Immediately after digging up bare-root stock, pack root system in wet straw, hay, or other suitable material to keep root system moist until planting. Transport in covered, temperature-controlled vehicles, and keep plants cool and protected from sun and wind at all times.
- D. Do not prune trees and shrubs before delivery. Protect bark, branches, and root systems from sun scald, drying, wind burn, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of plants during shipping and delivery. Do not drop plants during delivery and handling.
- E. Handle planting stock by root ball.
- F. Store bulbs, corms, and tubers in a dry place at 60 to 65 F until planting.
- G. Apply antidesiccant to trees and shrubs using power spray to provide an adequate film over trunks (before wrapping), branches, stems, twigs, and foliage to protect during digging, handling, and transportation.
 - 1) If deciduous trees or shrubs are moved in full leaf, spray with antidesiccant at nursery before moving and again two weeks after planting.
- H. Wrap trees and shrubs with burlap fabric over trunks, branches, stems, twigs, and foliage to protect from wind and other damage during digging, handling, and transportation.
- I. Deliver plants after preparations for planting have been completed and install immediately. If planting is delayed more than six hours after delivery, set plants and trees in their appropriate aspect (sun, filtered sun, or shade), protect from weather and mechanical damage, and keep roots moist.
 - 1) Heel-in bare-root stock. Soak roots that are in less than moist condition in water for two hours. Reject plants with dry roots.
 - 2) Set balled stock on ground and cover ball with soil, peat moss, sawdust, or other acceptable material.
 - 3) Do not remove container-grown stock from containers before time of planting.
 - 4) Water root systems of plants stored on-site deeply and thoroughly with a fine-mist spray. Water as often as necessary to maintain root systems in a moist, but not overly wet condition.

6. Plant Material

- A. General: Furnish nursery-grown plants true to genus, species, variety, cultivar, stem form, shearing, and other features indicated in plant list, plant schedule, or plant legend indicated on drawings and complying with ANSI Z60.1; and with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock, densely foliated when in leaf and free of disease, pests, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.
 - 1) Nursery grown plants shall be grown locally or be acclimatized to the High Desert region for a minimum of 90 days before delivery to site.
 - 2) Trees with damaged, crooked, or multiple leaders; tight vertical branches where bark is squeezed between two branches or between branch and trunk ("included bark"); crossing trunks; cut-off limbs more than $\frac{3}{4}$ inch in diameter; or with stem girdling roots are unacceptable.
 - 3) Collected Stock: Do not use plants harvested from the wild, from native stands, from an established landscape planting, or not grown in a nursery except as harvested from site.
- B. Provide plants of sizes, grades, and ball or container sizes complying with ANSI Z60.1 for types and form of plants required. Plants of a larger size may be used if acceptable to owner's representative, with a proportionate increase in size of roots or balls.
- C. Root-Ball Depth: Furnish trees and shrubs with root balls measured from top of root ball, which begins at root flare according to ANSI Z60.1. Root flare shall be visible before planting.
- D. Labeling: Label at least one plant of each variety, size, and caliper with a securely attached, waterproof tag bearing legible designation of common name and full scientific name, including genus and species. Include nomenclature for hybrid, variety, or cultivar, if applicable for the plant.

7. Sod

- A. Sod shall be locally grown Kentucky Bluegrass (60%), Perennial Ryegrass (40%) Blend. Species composition may vary based on seasonal availability. Blend by local Central Oregon Grower. Exact sod composition to be approved by Owner's Representative.
 - 1) Sod shall have no net or netting to remain in or under sod after installation.
 - 2) Sod shall be dense, lush, healthy, uniform and free of weeds, including weed grasses.
 - 3) Sod shall be cut not less than 1/2" thick.

8. Mulches

- A. Compost Mulch: Well-composted, stable, and weed-free organic matter, pH of 5.5 to 8; moisture content 35 to 55% by weight; 100% passing through a one-inch sieve; soluble-salt content of 2 to 5 dS/m; not exceeding 0.5% inert contaminants and free of substances toxic to plantings; and as follows:
 - 1) Organic Matter Content: 50 to 60% of dry weight.
 - 2) Feedstock: Agricultural, food, or industrial residuals; bio solids; yard trimmings; or source-separated or compostable mixed solid waste.

9. Preparation

- A. Protect structures, utilities, sidewalks, pavements, and other facilities and turf areas and existing plants from damage caused by planting operations.
- B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.
- C. Lay out individual tree and shrub locations and areas for multiple plantings. Stake locations, outline areas, adjust locations when requested, and obtain owner's representative's acceptance of layout before excavating or planting. Make minor adjustments as required.

10. Planting Area Establishment

- A. Placing Planting Soil: Place and mix planting soil in-place over exposed subgrade. Amend soil as recommended by soil test to obtain Ph of 6.5 -7.0 in landscaped areas
- B. Before planting, obtain owner's representative's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

11. Excavation for Trees and Shrubs

- A. Planting Pits and Trenches: Excavate circular planting pits.
 - 1) Excavate planting pits with sides sloping inward at a 45-degree angle. Excavations with vertical sides are unacceptable. Trim perimeter of bottom leaving center area of bottom raised slightly to support root ball and assist in drainage away from center. Do not further disturb base. Ensure that root ball will sit on undisturbed base soil to prevent settling. Scarify sides of planting pit smeared or smoothed during excavation.
 - 2) Excavate approximately three times as wide as ball diameter for balled and burlapped stock.
 - 3) Excavate at least 12 inches wider than root spread and deep enough to accommodate vertical roots for bareroot stock.
 - 4) Do not excavate deeper than depth of the root ball, measured from the root flare to the bottom of the root ball.
 - 5) If area under the plant was initially dug too deep, add soil to raise it to the correct level and thoroughly tamp the added soil to prevent settling.
 - 6) Maintain angles of repose of adjacent materials to ensure stability. Do not excavate subgrades of adjacent paving, structures, hardscapes, or other new or existing improvements.
 - 7) Maintain supervision of excavations during working hours.
 - 8) Keep excavations covered or otherwise protected after working hours.
 - 9) If drain tile is indicated on drawings or required under planting areas, excavate to top of porous backfill over tile.
- B. Backfill Soil: Subsoil and topsoil removed from excavations may be used as backfill soil unless otherwise indicated.
- C. Obstructions: Notify owner's representative if unexpected rock or obstructions detrimental to trees or shrubs are encountered in excavations.
- D. Fill excavations with water and allow to percolate away before positioning trees and shrubs.

12. Plant Maintenance

- A. Maintain plantings by pruning, cultivating, watering, weeding, fertilizing, mulching, restoring planting saucers, adjusting and repairing tree-stabilization devices, resetting to proper grades or vertical position, and performing other operations as required to establish healthy, viable plantings.
- B. Fill in, as necessary, soil subsidence that may occur because of settling or other processes. Replace mulch materials damaged or lost in areas of subsidence.
- C. Apply treatments as required to keep plant materials, planted areas, and soils free of pests and pathogens or disease. Provide and install tree trunk/tree wrap protection on newly planted deciduous trees. Use integrated pest management practices when possible to minimize use of pesticides and reduce hazards. Treatments include physical controls such as hosing off foliage, mechanical controls such as traps, and biological control agents.

13. Repair and Replacement

- A. General: Repair or replace existing or new trees and other plants that are damaged by construction operations, in a manner approved by owner's representative.
 - 1) Submit details of proposed pruning and repairs.
 - 2) Perform repairs of damaged trunks, branches, and roots within 24 hours, if approved.
 - 3) Replace trees and other plants that cannot be repaired and restored to full-growth status, as determined by owner's representative.
 - 4) Areas damaged due to the work are to be repaired or replaced per the irrigation and landscape drawings and specifications, or if areas damaged due to the work are not described in the drawings or specifications or are outside of the limits of work or are in protected areas, these areas are to be restored per the Restoration Schedule and maintained until Substantial Completion, including providing water or temporary irrigation until the landscape restoration is established.
- B. Remove and replace trees that are more than 25% dead or in an unhealthy condition before the end of the corrections period or are damaged during construction operations that owner's representative determines are incapable of restoring to normal growth pattern.

13. Protection

- A. During planting, keep adjacent paving and construction clean and work area in an orderly condition. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.
- B. Remove surplus soil and waste material including excess subsoil, unsuitable soil, trash, and debris and legally dispose of them off owner's property.
- C. Protect plants from damage due to landscape operations and operations of other contractors and trades. Provide and install tree trunk/tree wrap protection on newly planted deciduous trees. Maintain protection during installation and maintenance periods. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.
- D. After installation and before substantial completion, remove nursery tags, nursery stakes, tie tape, labels, wire, burlap, and other debris from plant material, planting areas, and project site.
- E. At time of substantial completion, verify that tree-watering devices are in good working order and leave them in place. Replace improperly functioning devices.

Chapter 4

9.0 Signs



9.0 Signs

Introduction

Effective communication requires the clear and concise delivery of a coherent message. Signs are an important means to communicate information to the public about park properties owned and operated by BPRD. The Park & Trails Sign Program Guide assists district personnel in the proper use of signs to facilitate the public's enjoyment of parks and trails, foster safety and stewardship, provide learning opportunities, and enhance experiences. Facility signage is not covered in this document.

Currently, many locations include a collection of signs from various generations of managers and sign designers resulting in a variety of formats, styles, colors, and text. As these existing signs are replaced, they are to adhere to the information contained in this document. This guide defines how signs are developed and procured, graphics and materials used, installation standards and methods, and describes sign locations and grouping. Wayfinding, informational, interpretive, regulatory, and behavior encouragement signs are generally custom designs with predetermined sizes, shapes, fonts, colors, materials, layout, and installation standards as set forth in this guide. To assure compliance with regulatory requirements and district best practices, all signs purchased and installed on park properties are to comply with the specifications contained within this guide.

The district utilizes custom designs as well as commercially available signage for parks, trails, parking lots and roadways. New and replacement signs for existing park and trails are to follow the specifications defined in this guide. Certain signs such as ADA, fire lane, and other MUTCD signage for streets and parking areas shall be purchased commercially to assure correct regulatory messaging and compliance. In select locations, unique sign graphics and installations may be preferred over the standard custom design and commercially available signs. Certain existing parks have their own unique sign graphics and therefore do not follow the standard specifications directive within this document. The guide separates the sign specifications for these unique locations into individual sections. The planning and development department shall determine the specific sign package to be used for new park and trail developments.

Members of the sign committee are primarily responsible for oversight of the park and trails sign program, purchasing of signs, and the maintenance of this guide. Other staff involved in the program includes the executive director, deputy executive director, superintendent of park services, fleet/shop manager, facilities manager, development manager, project managers, and manager of communications and community relations. This sign guide is reviewed and updated every three years or as needed.

SIGN DEVELOPMENT & PROCUREMENT PROCESS

During the course of work, district staff may determine the need for signage to communicate information to patrons. To assure best messaging and to prevent excessive and haphazard signage, the district has processes and standards for procurement, design development, and installation. By following these processes, signs will be efficiently and correctly developed, purchased, and installed to successfully achieve the goals of the signage. Signs that do not follow this process are considered out of compliance and shall be removed.

Existing Parks and Trails

1. The park services department manages signs in existing parks and trails once development has been completed. Signs for existing locations are paid for using general funds.
2. New sign requests shall be made through the requestor's department manager. The requestor should seek input from other associated or affected district staff as needed. The request shall include:
 - A. the specific issue to be addressed
 - B. the intended communication
 - C. specific location for the sign
 - D. intended duration of the sign
3. Sign requests are sent by the department manager via email to the superintendent of park services for approval. Other district management staff may be contacted for review.
4. If the request is approved by the superintendent of park services, the request is then routed to sign committee members for development of a graphic mock-up to be reviewed by superintendent and requestor.
5. If the mock-up is approved, a sign committee member
 - A. orders the sign and manages payment
 - B. submits a work order request for the installation of the sign following installation specifications, and
 - C. works with the fleet/shop manager on custom mounting material needs.
6. Installations of signs in existing parks or trails are generally accomplished by park services staff including facilities, trails, and landscaping divisions.

New Parks and Trails

1. The planning & development department manages signs for new construction projects. Signs for new parks and trails are generally paid for through project funding.
2. The project manager determines sign needs (wayfinding, regulatory, traffic control, informational, and interpretive). Determining locations for signs may include other staff. The deputy executive director determines if a location warrants a unique look or district standard signs as defined in this guide.
3. The project manager itemizes sign needs and locations within the new development for order placement and manages the work to develop mock-ups for review.
4. When approved, the project manager manages the procurement of the sign and custom mounting materials with the fleet/shop manager if needed.
5. The project manager also updates the sign committee members of new signage.
6. Permitting for new park entry signs is coordinated by the project manager.
7. BPRD-supplied signage is generally installed by contractor or planning & development staff.
8. While new parks and trails are in the development phase, the district will install a 4" x 6" plywood "We See Fun Coming Your Way" sign.

SIGN MESSAGE & CONTENT READABILITY

Sign content should convey the intended message clearly, concisely, and consistently throughout the district. Excessive dialog diminishes the message and confuses the reader. To the right is an example of an old sign that demonstrates excessive dialog. Complete words should be used; abbreviations are used only when necessary and cannot be misunderstood. Pictographic symbols are encouraged to supplement the English word message provided they clearly convey the intended message. Consider the use of bilingual signs where the situation warrants.



When composing a single-message sign, consider the following guidelines (example of suitable message):

- For single-message signs, use no more than four words per message or line, except where the proper name of a destination is more than four words long. (Example to the left)
- Use as few word lines as possible. A maximum of three lines of directions is recommended. Do not use more than five lines of text on a sign.
- Keep messages short by using certain commonly recognized abbreviations (e.g., "Rd" for "Road," "Mt" for "Mount," "Pt" for "Point," or "St" for "Street"). **DO NOT** abbreviate historic proper names

Signs can be either landscape or portrait oriented with varying dimensions depending upon the application, location, desired viewing distance, and mounting/installation specification. Where the length of time to read the sign is short such as when one is driving, the message must be short and confined to the essentials. Reading distance from the sign determines the size of the font.

Distance Legibility Chart



Distance Legibility Chart

Determining the size of any sign begins with selection of a font and determining the size of copy needed. The chart below will give you a good idea of the minimum copy size for signs.

Letter Height	Legible Viewing Distance	Letter Height	Legible Viewing Distance
5/16"	7'	9"	300' (Football field length)
1/2"	12'	12"	395'
3/4"	18'	14"	440'
1"	25'	18"	560'
1-1/2"	36'	24"	750'
2"	49'	36"	1130' (1/5 of a mile)
3"	74'	48"	1500'
4"	113'	72"	2230'
6"	150'	96"	3000' (3/5 of a mile)

ADA REQUIREMENTS FOR PARKS & TRAILS SIGNAGE

Like all public facilities, parks and trails must comply with ADA regulations. Though each developed location is unique, all parking lots and restroom facilities are to include signs compliant with these regulations. The planning & development department is responsible for determining these rules and implementing sign development to meet regulations.

(see Accessibility Guidebook for Outdoor Recreation - 2012 and the Quick Reference Guide to ADA Signage)

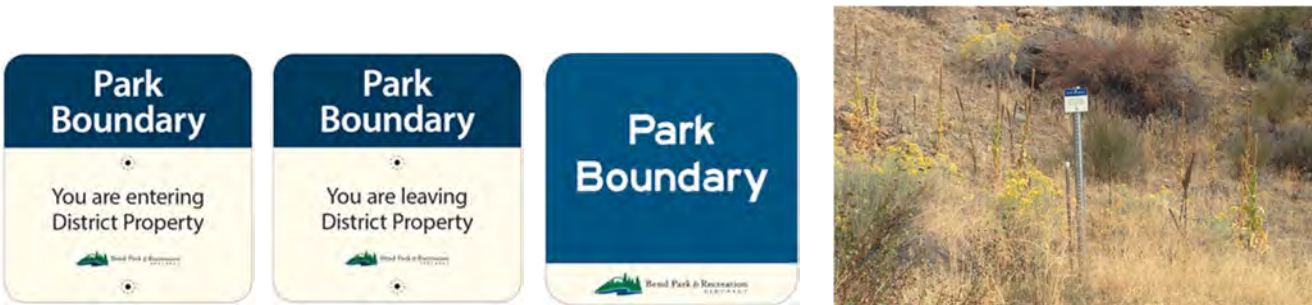
PARK & TRAILS SIGN BASICS

Below are examples of the basic styles and graphics that characterize park and trail signage. Generally, park and trail signs are one of three basic layouts:

1. The brown top bar is the template when a key word or phrase identifies the purpose of the sign. These signs can be portrait or landscape oriented with the color logo in horizontal orientation centered at the bottom.



2. Park boundary signs have a blue (PMS 302) top bar that is more visible in an earth-tone landscape.



3. Some signs have a bottom bar which includes additional information, and/or critical messaging.



With Pictograph/No Top-Bar (blank template & examples):

1. These signs can be portrait or landscape oriented with the color logo in horizontal orientation centered at the bottom. Pictographs with succinct text are the primary means to convey messages using this style. See **Pictographs** section for common and unique sign images.



No Pictograph/No Top-Bar (examples):

1. Occasionally, pictographs are unavailable or not desired. These signs allow for larger font size when reading distance is a factor. With few words, the message is quickly understood. These signs can be portrait or landscape oriented with the color logo in horizontal orientation centered at the bottom.



2. Have either rounded or squared corners depending on mounting frame, installation location, and method. Colors for sign graphics and installation materials are specified by PMS or RAL color matching systems. The district's color logo in horizontal orientation is located at the bottom of the sign. The choice of layout style for new signs should clearly convey the message and be consistent with other park locations.
3. Park entry signs, which identify the park from the street, are slightly different and described in greater detail in the **Park Entry Signs Specifications Sheets** section.

Fonts

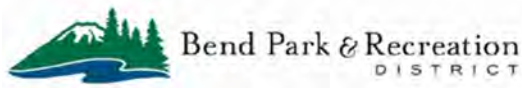
1. The standard park and trails sign font is Myriad Pro. (Note: some older sign images in this guide were developed prior to the establishment of Myriad Pro as the standard and are included here for reference only).
2. Park entry signs utilize Century for the name of the park, and the address font is Highway Gothic Expanded.
3. Key words are capitalized with lower case letters using a specified font. Short words (coordinating conjugations) less than five letters are not capitalized. This capitalization style has been shown to improve readability and enhance understanding. ALL-CAPITAL lettering is only used in limited situations.
4. Certain locations with unique sign packages may utilize a font and format other than the above.
 - A. See **Unique Sign Package Locations** section for font information of these specific locations.

Colors

PMS 476 - Brown	Top bar, backside vinyl on most signs
PMS 7499 - Cream at 50% screen	Main body of signs
PMS 3425 - Green	BPRD logo, trail arrows
PMS 302 - Blue	BPRD logo and top bar
Black	BPRD logo, pictograph icons and border, font on light backgrounds
White	Font on dark backgrounds
RAL 8028 - Terra brown	New park standard for sign posts, frames, crossbars, mounting plates, etc.

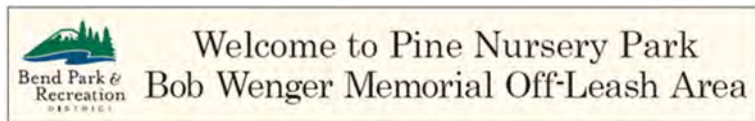
Logos

- Other than MUTCD signage, signs on district property should include the logo that identifies the sign and location as belonging to the district. Refer to the ***BPRD Play for Life Style Guide*** for detailed information regarding the district's horizontal logo. Most sign applications include a light colored (cream) background. In these instances, the logo should be the standard specified PMS colors:



Green PMS 3425
Blue PMS 302
Black
White

- Off-leash kiosk sign below utilizes the vertical logo format.



(Note: this image was created before the current sign font standards were established and is included as reference only)

- On signs which include a dark background, the logo shall be white:



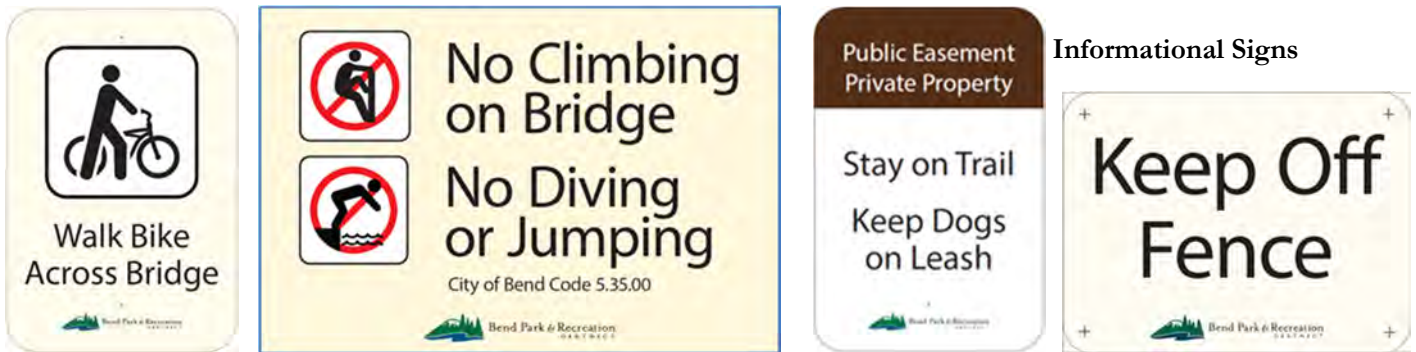
- Park entry signs, which identify the park from the street, are slightly different and described in greater detail in the ***Park Entry Signs Specifications Sheets*** section.

SIGN TYPES AND PURPOSE

Regulatory Signs

- Regulatory signs are used to inform patrons of laws, regulations, district rules and policies, or requirements which apply either at all times or at specified times or places within a park, the disregard of which may constitute a violation. Successful regulatory signs should have a direct, clear and consistent message to communicate expectations, allowable uses, and boundaries of behaviors. These signs should be located where they are most likely to be seen such as parking lots, trailheads, entries, kiosks, drinking fountains, restrooms or places where behavior enhancement is needed. If a specific law applies to the sign, the code number shall be included on the sign. Park rules signs can be either double-sided or single-sided with a brown vinyl back. Specification sheets for these and more are found in the ***Sign Guide Linked Documents*** section.

Examples of standard park regulatory signs:



1. Informational signs are used to define the purpose of an object or give instruction on the use of something. They generally utilize the top bar format, but these signs can also be individually unique as the “River Float People” example below. Detailed information can be found in the **Informational Sign Specifications Sheets** section.



Off-Leash Area Informational Signage & Kiosk

1. Dog Off-Leash Areas (OLAs) include a kiosk with a grouping of signs on one side which communicate numerous messages about the OLA and others around the district. These are located inside the OLA boundaries. The rear of the kiosk is to remain blank. See **OLA Signage** section for details. Note: these sign images were created before the current sign font standards were established and are included as reference only. Future and replacement OLA signs are to incorporate current standards, revised **Rules & Courtesies**, simplified **Safety Information**, new map imagery, and the “Don’t poo-lute...” bottom sign will be eliminated.



2. The map image for replacement and future developments has changed to the format and colors of the map from Rockridge Park below:



Small Dog OLAs

1. Small dog OLAs include a NOTICE sign on the entry gate and **Indigo**, a cartoon dog image that defines the maximum size of dog allowed inside. The NOTICE sign pictured below needs updating (delete top and bottom bar, change font to Myriad Pro, and replace logo with centered horizontal color logo).



Indigo is ordered from Max Manufacturing (Bend, OR) and is made using 11-gauge steel.

- A. Some OLAs also include a **Tilt Knee Sign** located outside the OLA primary entries. These sign images and mounting frames are also outdated and will be revised to include current standards currently in development at new locations and when replaced.



(The font in the examples above is out of date and should be changed to Myriad Pro)

WAYFINDING

Park Entry Signs

- These signs identify the park and are located nearest the main entry or along the street of the park's prescribed address. Graphics are unique but similar to park interior signs except the font used for the park name is Century Serif and the address and subtext is Highway Street Expanded.
 - Regional, community, and neighborhood parks are mainly differentiated by size and installation materials. See **Park Entry Sign Specifications** section for design and fabrication details.

Permitting

- Generally, signs within park boundaries and along trails do not require a city or county sign permit unless they are along a public right-of-way. Park entry signs require such permitting as they are located along city roadways. In these cases, a sign permit must be obtained when installing park entry signs. The permit shall include a site plan that defines the exact location and orientation of the sign. Refer to **Ponderosa Park Entry Sign Permit Application and Site Plan** and the **City of Bend Code – Signs 9.50** for City of Bend installations. For installations outside city limits, refer to **Deschutes County Sign Permit Application** for instructions.

Regional and Community Park Entry Signs

- These signs include a welded-tuft clad masonry monument base and steel frames that contain either single or double - sided sign panels.



- A. Some community parks such as Brooks Park are too small or have traffic issues which prevent them from having the community park standard sign with masonry base. In these situations, the entry sign can instead be the size and quality of the neighborhood park entry signs.

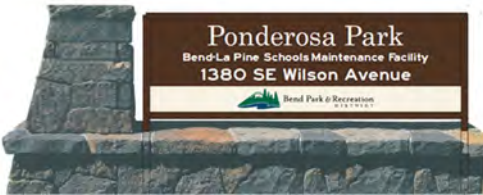
Neighborhood Parks

1. Entry signs for neighborhood parks are smaller than community park signs and do not include the masonry base, though some locations have these signs inserted into pre-existing masonry bases. In all other cases, the steel frames are buried directly into the ground with concrete spread footings (see ***Double Post Frame System Installation Specifications*** for details. Signs are either single or double-sided, depending on the location of the sign, traffic flow, and the signs orientation to the street.



A. In a few locations such as Hixon Park, the space is too small to include a typical neighborhood sign. In these situations, smaller signs can be designed to better fit the location.

2. Some parks include features or share a roadway which adds a line of text to the entry sign (examples below). In these situations, the second line is the same font as the address; Highway Street Expanded.

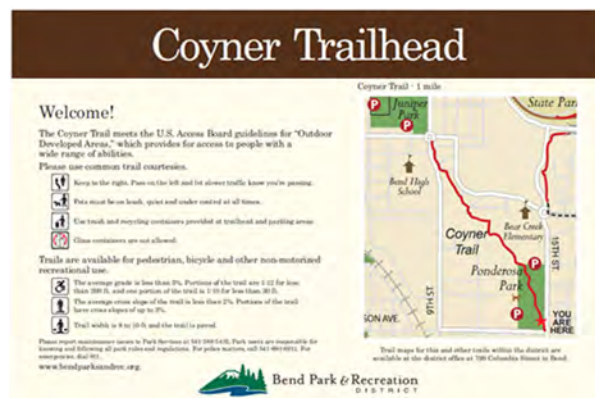


3. Many parks in the district have multiple entry points. Because parks are assigned only one single address, only the sign located along the assigned street should contain the address. The other signs can include the street name of that entry or exclude an address, such as described by the example below:



Trails Wayfinding Signage

1. Major trails which start within parks have a trailhead sign which contains relevant information regarding the trail, rules and courtesies, accessibility, district contact information, and a trail map



(The font in the example above is out of date and should be changed to Myriad Pro)

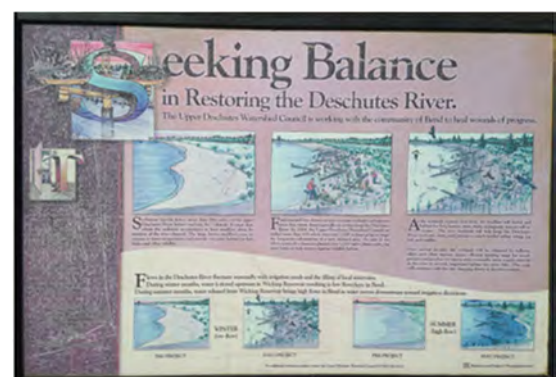
2. Reassurance markers are also included along major trails at key locations and intersections. The signs generally include park or trail name, and a white arrow with green background. However, each location and situation may require unique text and layout. These signs are mounted on 6" x 6" cedar wood posts and include an arrow as demonstrated below:



- A. The arrows intend to direct the user to or along the trail. The green is the same PMS 3425 as the logo. Arrows are normally used to point in three directions; straight ahead, left, and right. In some instances, an up-pointing arrow 45-degrees off vertical can be used. Arrows should never point downward. See *Trails Sign Specifications Sheets* section for details.

Interpretive Signs

1. Interpretive signs intend to communicate messages that reveal the meanings and relationships of our cultural and natural heritage to the public through first-hand involvement with objects, artifacts, landscapes, and sites. These messages can be written to change behavior, educate, or evoke an emotion in the reader that increases patron enjoyment through the appreciation and understanding of features, concepts, themes, and stories of the natural, cultural, created, managed, and historic environments. Using a combination of well-written text and professional graphics helps to catch the attention or arouse curiosity. Since each location and situation is unique, the district does not utilize a standard interpretive sign style. Instead, a variety of designs and styles exist throughout the district as these locations and features were developed. Some signs have been developed in conjunction with other organizations. The examples below are examples of existing signs and do not imply how future signs should be developed. In particular, the arched top shape should be avoided in favor of rectangular shapes to simplify installation. Community relations department collaborating with the planning and development department are responsible for determination and development of these signs.
2. Below are examples of current interpretive signs found around the district.



3. Below is an example of a recent interpretive sign that represents a style that the district now prefers:



Traffic Control (Roadway & Parking Lots)

1. Many district properties include private roadways or are adjacent to public roads where specific sign types and design are compulsory by regulatory requirement. The US Department of Transportation's **Manual on Uniform Traffic Control Devices (MUTCD)** defines the warning and regulatory signage for roadways and parking lots. These are purchased commercially from many locations and shall not be custom designed. These signs have specific installation standards for location and height from ground-to-bottom measure that shall be followed. These specifics are contained in the manual. MUTCD sign examples:

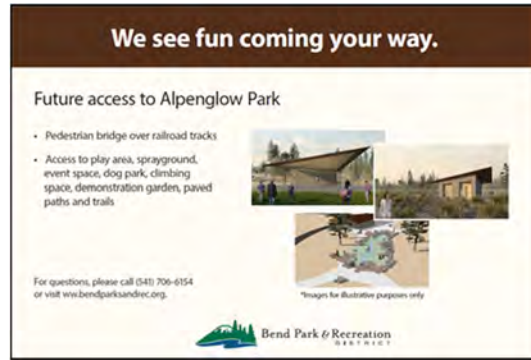


- A. **Traffic & Parking Sign Placement:** Most roadway signs should be located on the right side of the road unless specific standards require otherwise. Place signs where they are clearly visible and provide adequate time for reading. Consider factors such as vehicle speed, road conditions, intermediate intersections, sight distance, and alignment. Select locations that minimize viewing obstructions. If a sign is installed within the roadway clear zone, a breakaway sign post shall be used. Avoid locations such as:
 - 1) Dips in the road
 - 2) Just beyond the crest of a hill
 - 3) Where a sign could be obscured by other signs or objects
 - 4) Where the sign may interfere with the normal use of the road, bike lanes, and walkways
 - 5) Where vegetation could cover the sign
 - 6) Snow removal and disposal areas
- B. **Sign Face Orientation:** Signs are mounted at approximately right angles to oncoming traffic. It may be necessary to rotate a sign slightly off 90 degrees to avoid glare reflecting off the sign face directly into the driver's eyes.
- C. **Mounting Height:** Mounting height is measured from the ground surface to the bottom of the sign. Use a minimum of seven feet in areas with parking or pedestrians including sidewalks, and areas where the view of the sign may be obstructed.

NEW PARK & TRAIL DEVELOPMENT & CONSTRUCTION SIGNS

“We See Fun Coming Your Way”

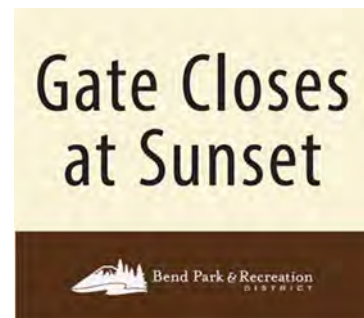
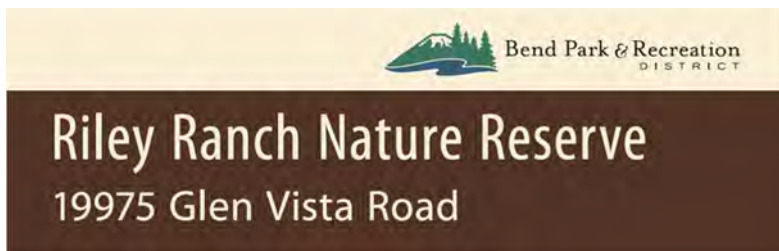
1. Personnel from the planning and development department are responsible for these temporary signs which are to be placed at the location of a new development several months prior to construction. These signs are 4' x 6' on MDO plywood. The sign should include the location name, *We See Fun Coming Your Way* text, bullet-point information about the project, project contact information, and the district web address. The specific message is unique depending upon the project. The *Play for Life* tagline should not be included on future signs.



UNIQUE LOCATIONS SIGN PACKAGES

Riley Ranch Nature Reserve

1. This park has a unique sign package with many similarities with the specifications within this guide. Details and production .ai files for future new and replacement signs are available in the ***Riley Ranch Nature Reserve/Riley Ranch Production*** file (available upon request). The park entry sign is similar to other district regional and community parks but maintains a unique appearance (see ***Riley Ranch Park Entry Sign*** for specifications).



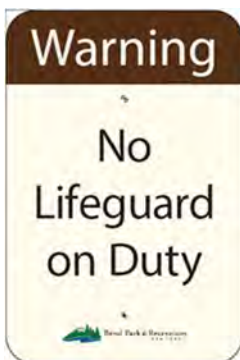
Shevlin Park

1. This park has a unique sign package with many similarities with the specifications within this guide. The park entry sign is mostly the same as other district regional and community parks, but its mounting method utilizes the existing masonry unique to the location (see *Shevlin Park Entry Sign* for specifications). Future new and replacement signs shall refer to the *Shevlin Park Signage Masterplan March 1, 2018* (available upon request).



Whitewater Park & River Float Corridor

1. The Bend Whitewater Park, and the stretch of the Deschutes River between Farewell Bend Park and Drake Park where floating occurs, are considered unique locations needing distinctive signs. Riverbend Park, Farewell Bend Park, and McKay Park have a variety of these signs installed, depending on the individual locations need to convey information relevant to the site. Other images can be found in the *Whitewater Park and Float Corridor Sign Specifications* (available upon request). Production files for these are available from the community relations department.



Marine Board Waterway Signage

1. Custom Marine Board signs are used in situations where persons using the Deschutes River within or adjacent to a district park need instruction or wayfinding information. The district is required to follow Oregon State Marine Board requirements for signage. These signs are very specific in their design, type, size, and location. Below are examples of signs the district has installed in accordance with the Marine Board's specifications. All such signs require Marine Board review and approval prior to fabrication and installation. Once approved, the district either purchases premade or utilizes local sign design and fabricators for production of custom signs. For further information on waterway signage, consult with the Oregon State Marine Board website:
<http://www.oregon.gov/OSMB/boater-info/Pages/Waterway-Markers.aspx>

Custom Marine Board Sign examples:



- A. The Marine Board sign specifications at the Whitewater Park can be provided up on request.

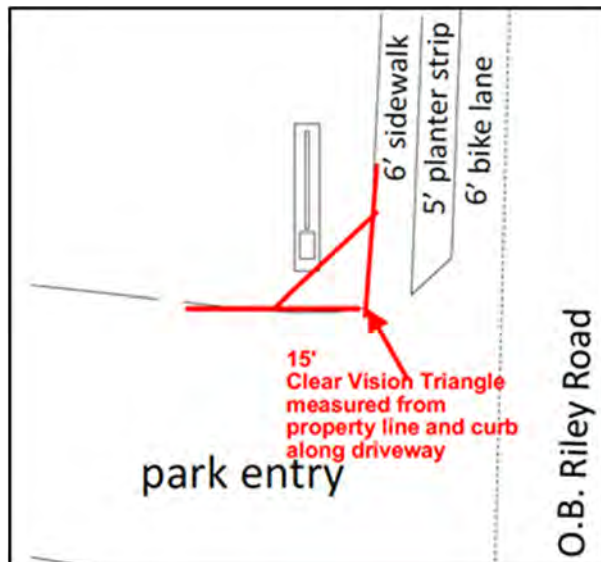
Temporary Signs

1. Temporary signs are used in district parks and trails to notify patrons of short-term projects, closures, hazards, and wayfinding. These signs are usually produced in-house, printed on paper and laminated to provide some protection from weather and irrigation. Reoccurring temporary signs can be made with more durable materials if warranted. Temporary signs are to adhere to the same design criteria as permanent signs that are defined in this guide. Installation of such signs should maintain a desirable appearance and not detract from the messaging.



Sign Locations, Placement, and Grouping

1. The correct location and placement of a sign should enhance readability, reduce risk, meet code and permitting requirements, and minimize view obstructions. Though the specific location and placement for every sign cannot be defined by this guide, the requestor and installer should study the location and situation the sign is attempting to address while determining sign placement. All new signs must comply with City of Bend Sign Code with particular attention to **General Requirements 9.50.100** and **Clear Vision Areas 3.1.500**.



2. New and replacement signs shall also consider their location and the presence of other signage in the immediate area. Too many signs in a single location (over-signing) and haphazard placement can significantly diminish a patron's understanding of the intended messages. Multiple signs in the same location can overload users with information, causing confusion and disregard of critical messages. Below are examples to avoid. In situations such as these, replacing the various signs with a single sign panel containing the various messages should be considered.



3. Grouping two signs together to share a frame or post should be avoided. Signs with different messages should be erected individually on separate posts or combined on the same sign panel. Below are examples of these types of sign groupings:



SIGN INSTALLATION SPECIFICATIONS

Installation of signs varies by sign type, location, and application. Park Rules and Trailhead signs are installed using a Double Post Frame with an open back, allowing for an optional double-sided sign. Traffic and other signs located near roadways are to be installed on knock-down (breakaway) posts and powder coated RAL 8028 Terra Brown. Trail reassurance markers are to be mounted on 8" x 8" rough-sawn Cedar Sign Posts. *Adopt-a-Park* and *Adopt-a-Trail* signs also have posts specific for their installation. See ***Sign Installation Specifications*** section for more information.



Signs located along trails and park walkways should be installed so that the nearest edge of the sign is at least three feet from the edge of the path to allow adequate clearance for bicycles and service vehicles.

A. BPRD Standard Drawings: D9.11D, D9.11E, D9.12D, D9.13A, D9.13B, D9.15B, D9.17A

Kiosks

1. Off-Leash Areas and many trailheads include kiosks that signs are mounted directly onto. Planning and development staff determine the location of these kiosks in new developments. Specifications for their fabrication can be found in ***Kiosk Fabrication Specifications***.
A. BPRD Standard Kiosk Drawing

Standard Park and Trail Sign Package

1. Planning and development staff shall develop a list of signs needed when designing and constructing new parks and trails, or renovate existing. The ***Park & Trail Signage Menu*** document provides a list of possible signs needed with graphic images. Some locations may require signs not included in this document. Some amenities such as bike courses or playgrounds are unique to the location and should be designed accordingly.

Sign Maintenance Standards

1. Perform maintenance on a regular and systematic basis to ensure signs and other traffic control devices are clean, undamaged, and functional. Use only those materials (paints, stains, sheeting, hardware, etc.) that comply with the original specifications for the sign. Evaluate the maintained product against the standard for materials and workmanship established for the original. Clear all trees, brush, and other vegetation that may obscure signs. Also make sure that fences or other objects do not obscure signs. Relocate signs if obstructions cannot be eliminated. Vandalized signs that cannot be cleaned or repaired should be replaced following the sign procurement process. Graffiti can be cleaned off many park signs since they are usually made with an anti-graffiti film.

Disposal of Excess, Obsolete, and Damaged Signs

1. Care must be taken to ensure that all signs removed from district properties are properly disposed of to prevent their misuse and misrepresentation. Damaged aluminum-backed signs should be recycled by placing it in the metal recycling bin at park services. If the aluminum and ply backing are not damaged or holes drilled for mounting, these can be returned to the sign maker for re-use. DiBond sign boards are not recyclable, and if not repurposed, should be disposed of in the trash.

Appendix



Appendix A

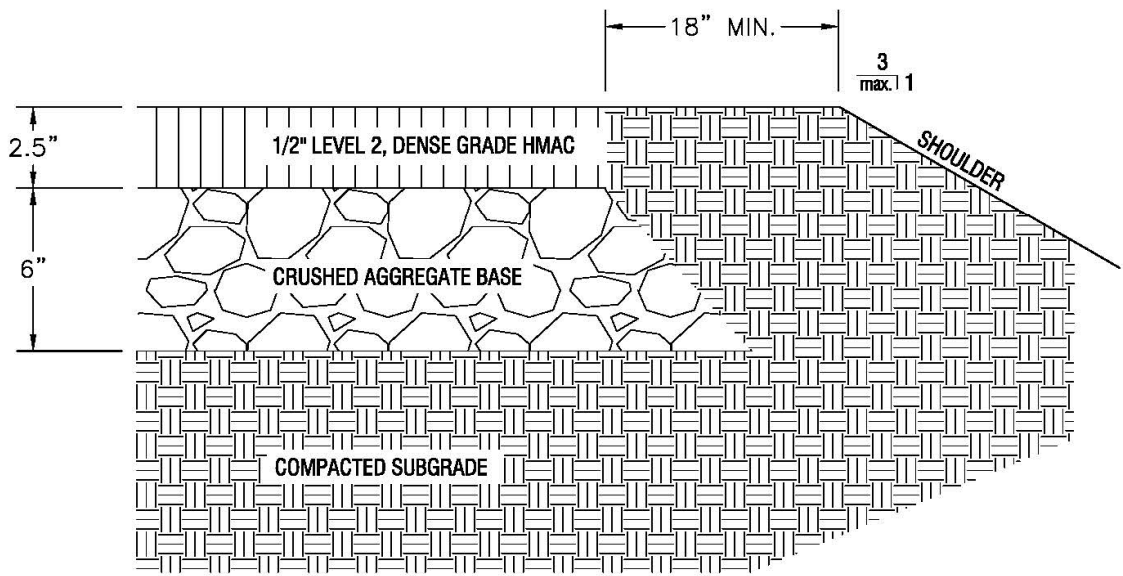
Specification Drawings

3.11A - Asphalt Surface Pedestrian Path
3.11B - Asphalt Surface Driving Surface
3.11C - Asphalt Surface Porous
4.41 - Direct Bury Pedestal Table
4.42 - Surface Mount Pedestal Table
4.44 - 4 Seat Tangent Table Ensemble with Sunshade A
4.45 - 6 Seat Tangent Table Ensemble with Sunshade B
4.51A - Park Bend on Concrete
4.51B - Park Bench on Pavers/Asphalt
4.51C - Park Bench on Lawn/Mulch
4.61A - Litter Receptacle Installation in Concrete
4.61B - Litter Receptacle Installation in Pavers/Asphalt
4.61C - Litter Receptacle Installation in Lawn/Mulch
4.63 - Doggie Station Installation
4.81 - Bicycle Rack
4.85 - Bottle Filler Installation
5.11 - Playground Chain Link Fencing
5.12 - Site Chain Link Fencing
5.14 - Gate Chain Child Fencing
5.15 - Split Rail Fencing
5.21 - Concrete Rail Fence
5.83 - Removable Round Bollard
5.84 - COHCT Trail Gate
5.85 - BPRD Vehicle Gate
5.86 - Magnetic Lock System
5.87 - Dog Off Leash Area Fencing
6.12 - Irrigation Box Setup
6.21 - Irrigation Falcon 6504
6.22 - Popup 5000
6.23 - Popup 3500
6.25 - Spray 1800
8.31 - Vertical Power Box Hinge Top
8.32A - 24 x 24 Dual Access Electrical Cabinet A
8.32B - 36 x 36 Dual Access Electrical Cabinet B
9.11D - 2 x 3 Large Knockdown Post
9.11E - 2 x 3 Chain Link Fence Mount
9.12D - 6 x 4.5 Ground Mount
9.13A - 12 x 18 Knockdown Sign Post
9.13D - 12 x 18 Metal Door Mount
9.15B - Neighborhood Entry Direct Bury
9.17A - 9 x 6 Ground Mount
L7.05 - Kiosks

Specification Drawings

NOTES

- (A) PATH WIDTH TO BE SPECIFIED ON SITE PLAN.
- (B) CROSS SLOPE NOT TO EXCEED 2%.
- (C) SPECIFICATIONS: SHALL CONFORM TO THE CURRENT OREGON STANDARD SPECIFICATIONS FOR CONSTRUCTION, AS MODIFIED OR SUPPLEMENTED BY THE CITY OF BEND SPECIAL PROVISIONS TO THE OREGON STANDARD SPECIFICATIONS.



A PEDESTRIAN PATH SECTION NTS

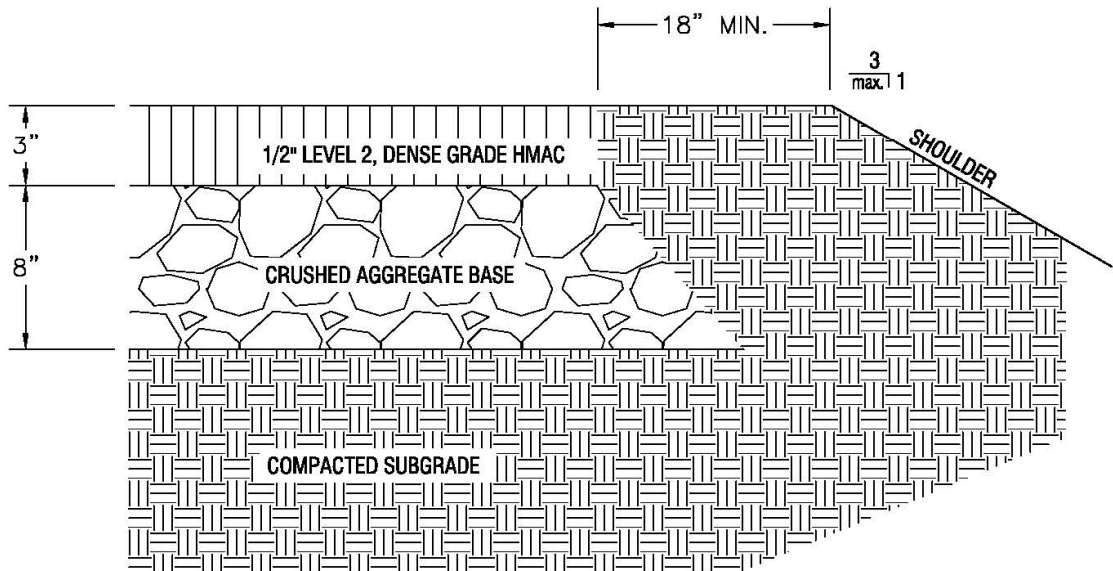
edited 08.17.18
approved 00.00.00

	ASPHALT SURFACE	D3.11 A
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Specification Drawings

NOTES

- (A) PATH WIDTH TO BE SPECIFIED ON SITE PLAN.
- (B) CROSS SLOPE NOT TO EXCEED 2%.
- (C) SPECIFICATIONS: SHALL CONFORM TO THE CURRENT OREGON STANDARD SPECIFICATIONS FOR CONSTRUCTION, AS MODIFIED OR SUPPLEMENTED BY THE CITY OF BEND SPECIAL PROVISIONS TO THE OREGON STANDARD SPECIFICATIONS.

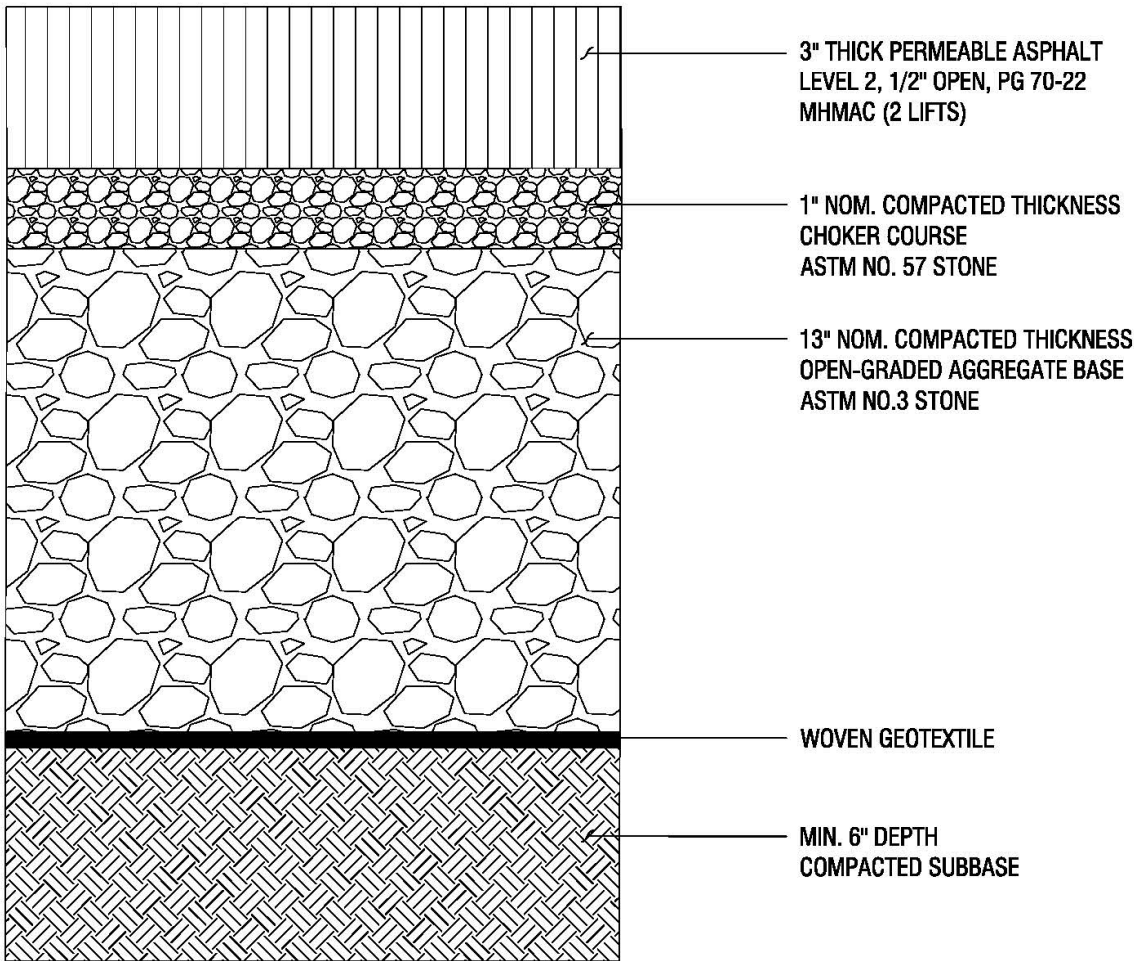


B DRIVING SURFACE SECTION
NTS

edited 08.17.18
approved 00.00.00

	ASPHALT SURFACE	D3.11 B
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Specification Drawings



C POROUS ASPHALT SECTION
NTS

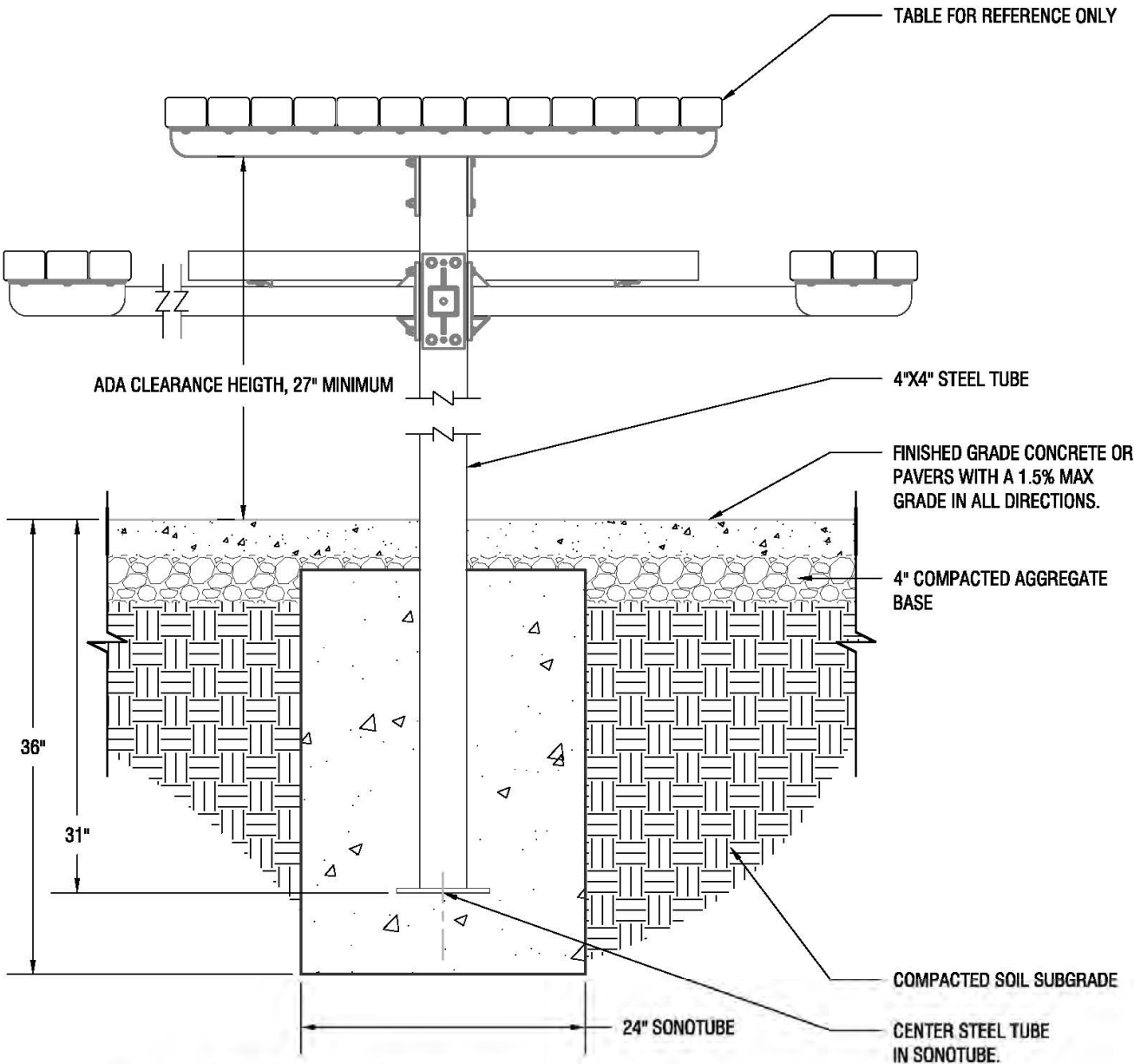
edited 06.14.18
approved 00.00.00

	<p>ASPHALT SURFACE</p>	<p>D3.11 C</p>
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Specification Drawings

NOTES

1. TABLE MUST MEET A.D.A. CLEARANCE REQUIREMENTS ONCE INSTALLED



A 4 SEAT & 3 SEAT ADA, SQUARE
NTS

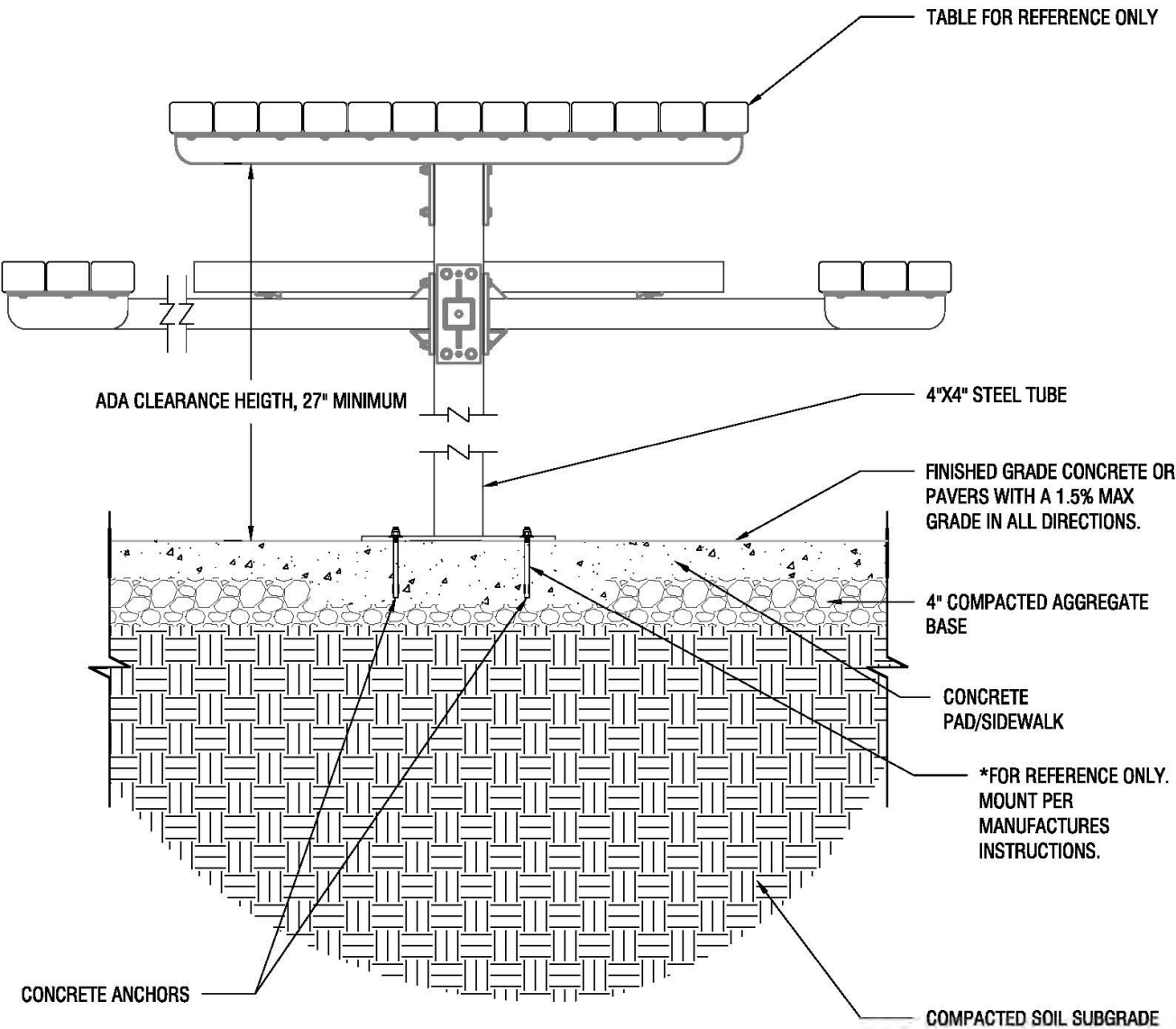
edited 05.03.18
approved 00.00.00

	DIRECT BURY PEDESTAL TABLE	D4.41
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Specification Drawings

NOTES

1. TABLE MUST MEET A.D.A. CLEARANCE REQUIREMENTS ONCE INSTALLED



A 4 SEAT & 3 SEAT ADA, SQUARE INSTALLATION
NTS

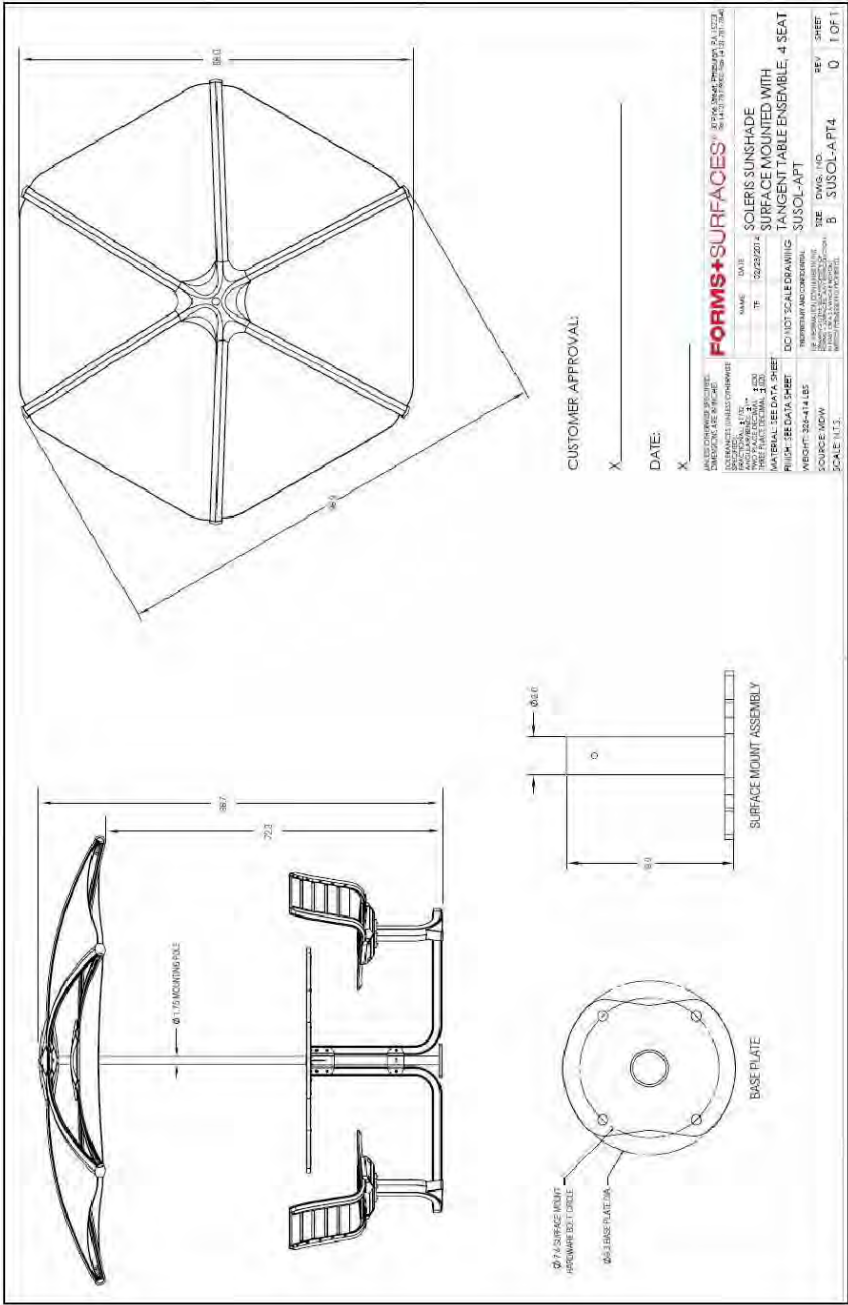
edited 05.03.18
approved 00.00.00

	SURFACE MOUNT PEDESTAL TABLE	D4.42
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Specification Drawings

NOTES

1. TABLE MUST MEET A.D.A. CLEARANCE REQUIREMENTS ONCE INSTALLED
2. SEE TANGENT TABLE ENSEMBLE AND SOLERIS SUNSHADE SURFACE MOUNT INSTALLATION INSTRUCTIONS FOR MORE DETAIL



edited 06.06.18
approved 00.00.00



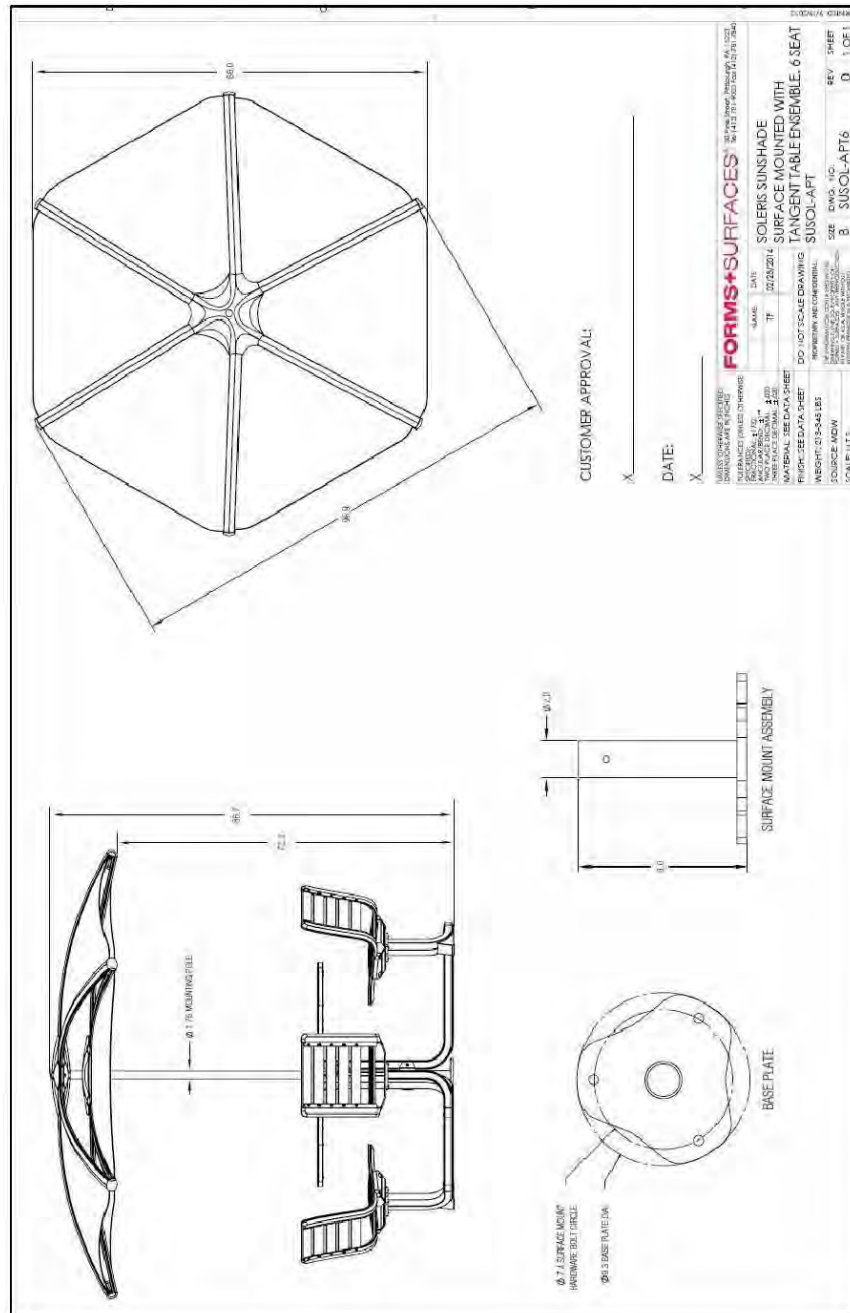
4 Seat Tangent Table Ensemble
w/ Soleris Sunshade

D4.44

Specification Drawings

NOTES

1. TABLE MUST MEET A.D.A. CLEARANCE REQUIREMENTS ONCE INSTALLED
2. SEE TANGENT TABLE ENSEMBLE AND SOLERIS SUNSHADE SURFACE MOUNT INSTALLATION INSTRUCTIONS FOR MORE DETAIL



edited 06.06.18
approved 00.00.00



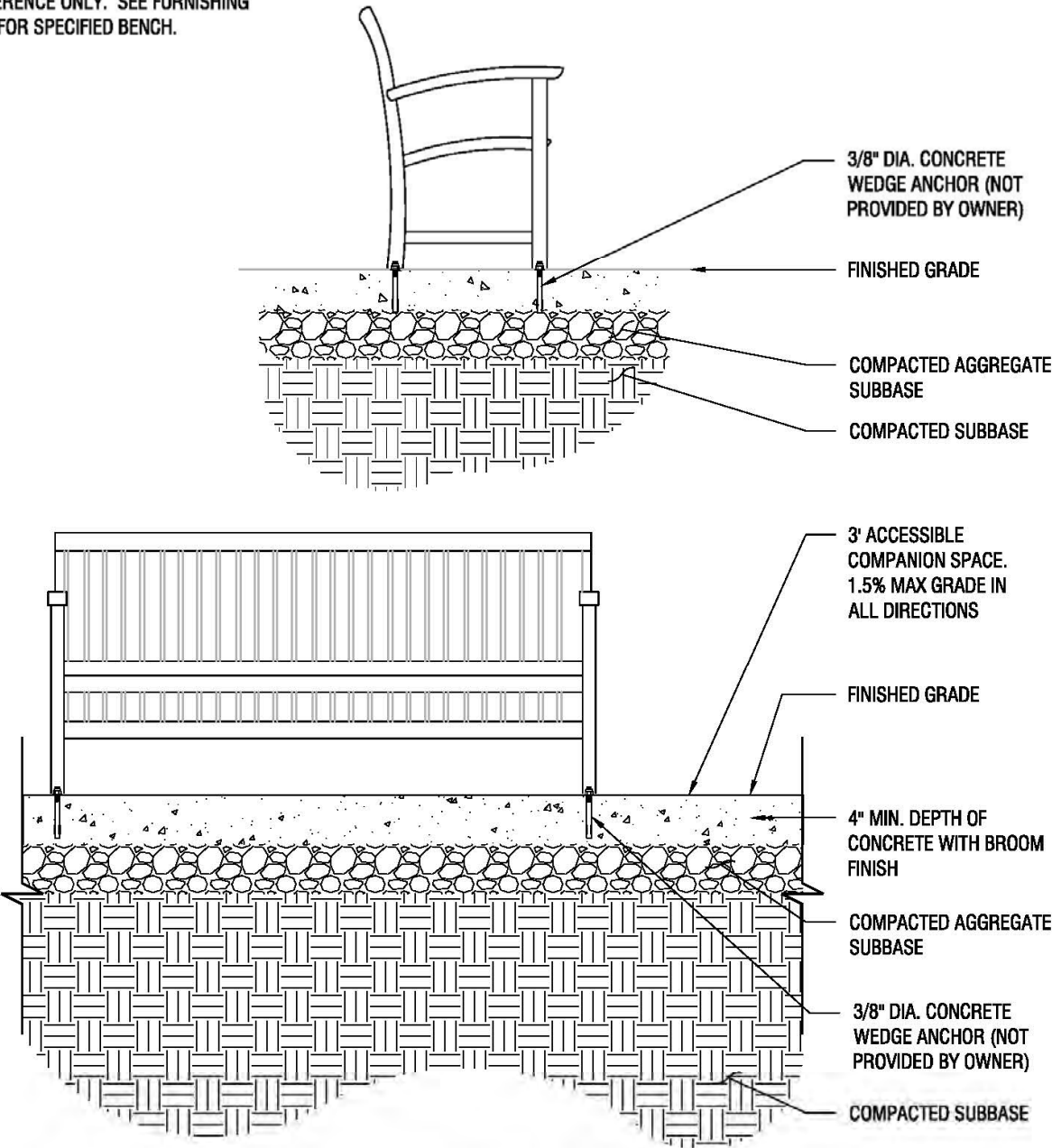
6 Seat Tangent Table Ensemble w/ Soleris Sunshade

D4.45

Specification Drawings

NOTES

1. BENCH PROVIDED BY OWNER
2. FOR REFERENCE ONLY. SEE FURNISHING SCHEDULE FOR SPECIFIED BENCH.



A BENCH INSTALLATION ON CONCRETE
NTS

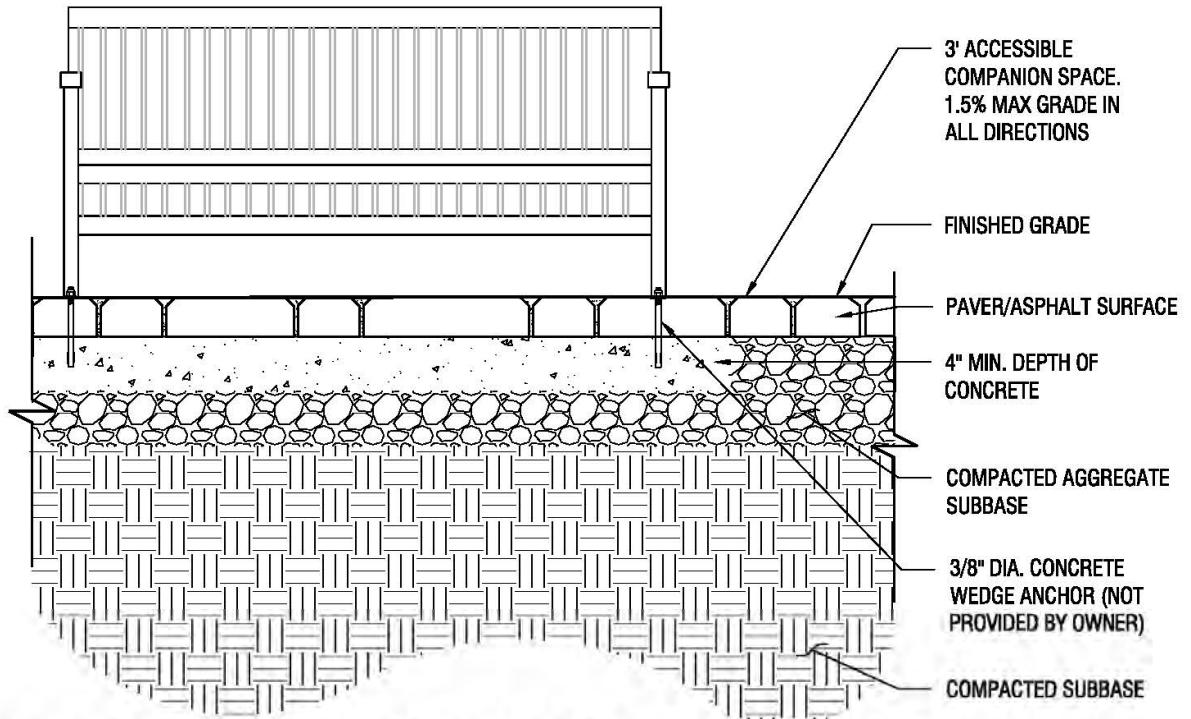
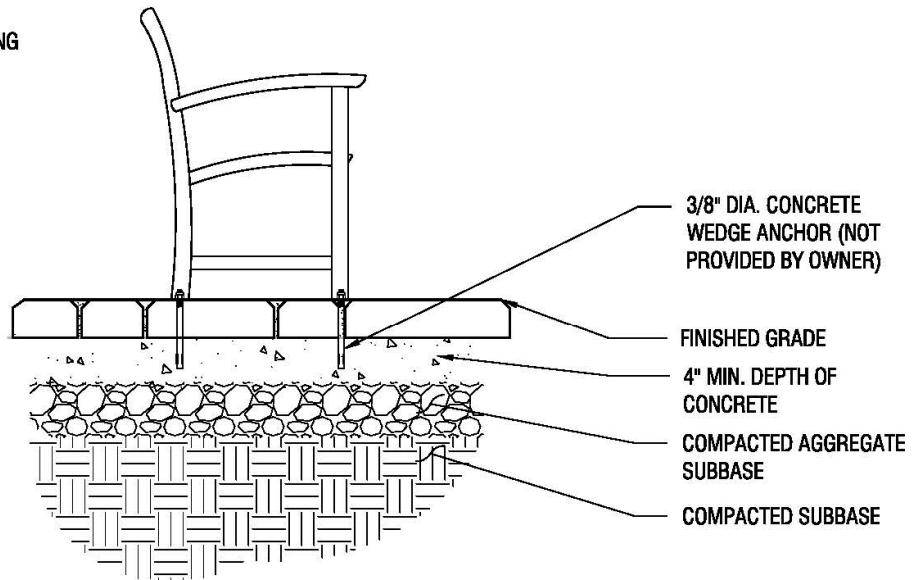
edited 06.06.18
approved 00.00.00

	PARK BENCH	D4.51 A
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Specification Drawings

NOTES

1. BENCH PROVIDED BY OWNER
2. FOR REFERENCE ONLY. SEE FURNISHING SCHEDULE FOR SPECIFIED BENCH.



B BENCH INSTALLATION ON PAVERS/ASPHALT
NTS

edited 06.06.18
approved 00.00.00



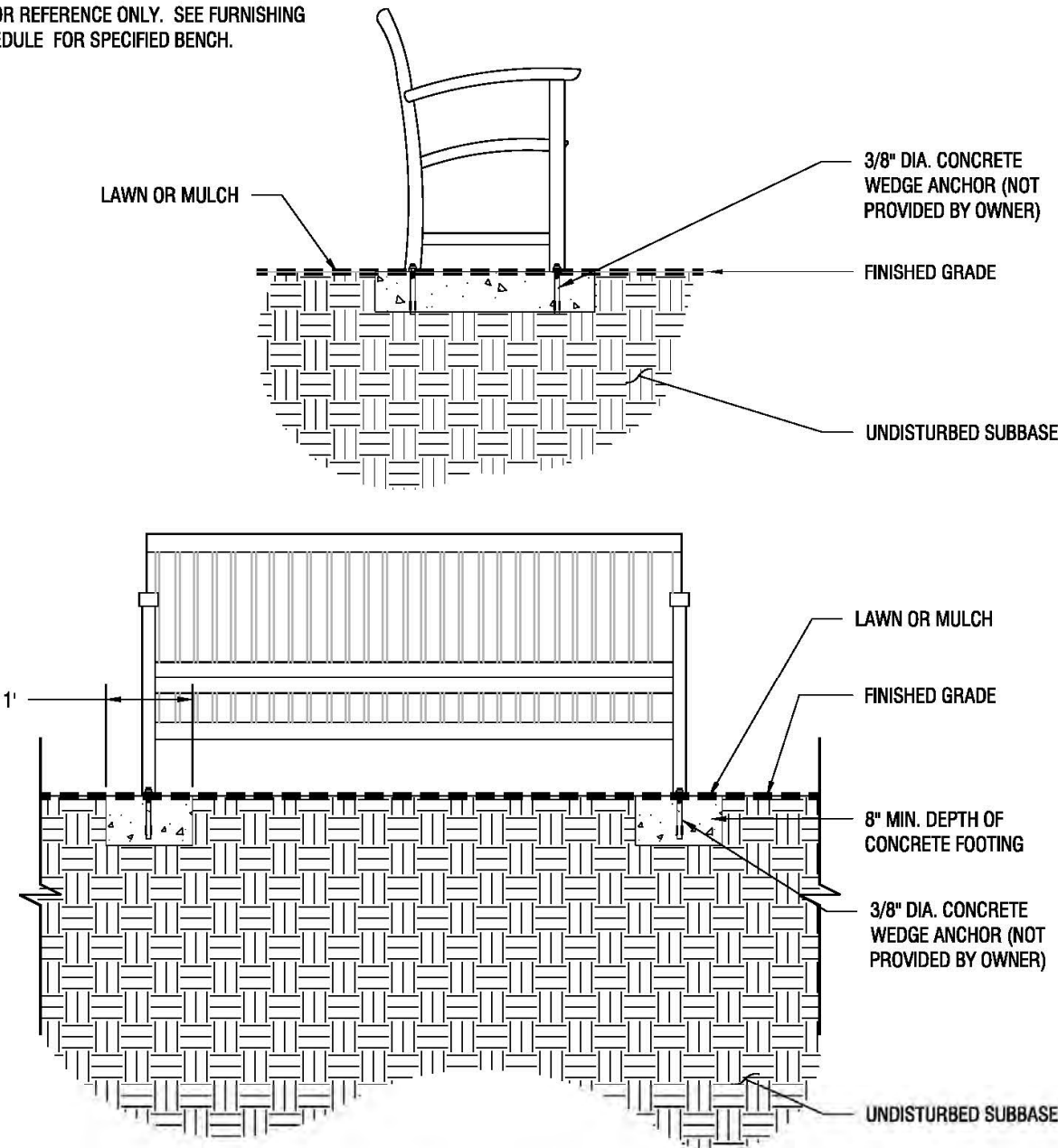
PARK BENCH

D4.51
B

Specification Drawings

NOTES

1. BENCH PROVIDED BY OWNER
2. FOR REFERENCE ONLY. SEE FURNISHING SCHEDULE FOR SPECIFIED BENCH.



C BENCH INSTALLATION ON LAWN/MULCH NTS

edited 06.07.18
approved 00.00.00



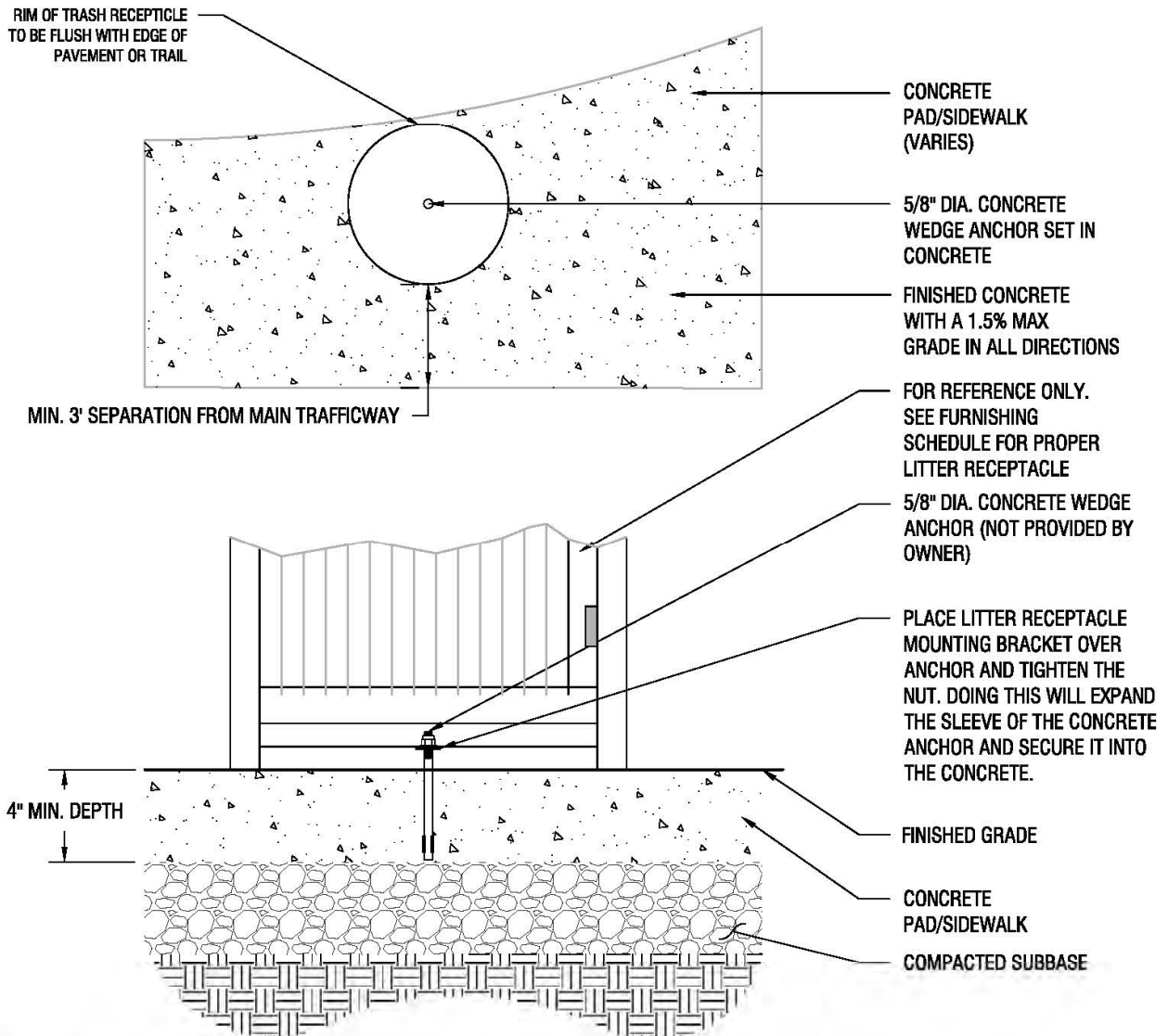
PARK BENCH

D4.51
C

Specification Drawings


NOTES

1. APRON APPROACHING LITTER RECEPTACLE MUST MEET ADA STANDARDS FOR LANDINGS.
2. LITTER RECEPTACLE PROVIDED BY OWNER.
3. CONCRETE MUST HAVE HAD SUFFICIENT TIME TO CURE BEFORE INSTALLATION OF ANCHOR.



A LITTER RECEPTACLE INSTALLATION IN CONCRETE NTS

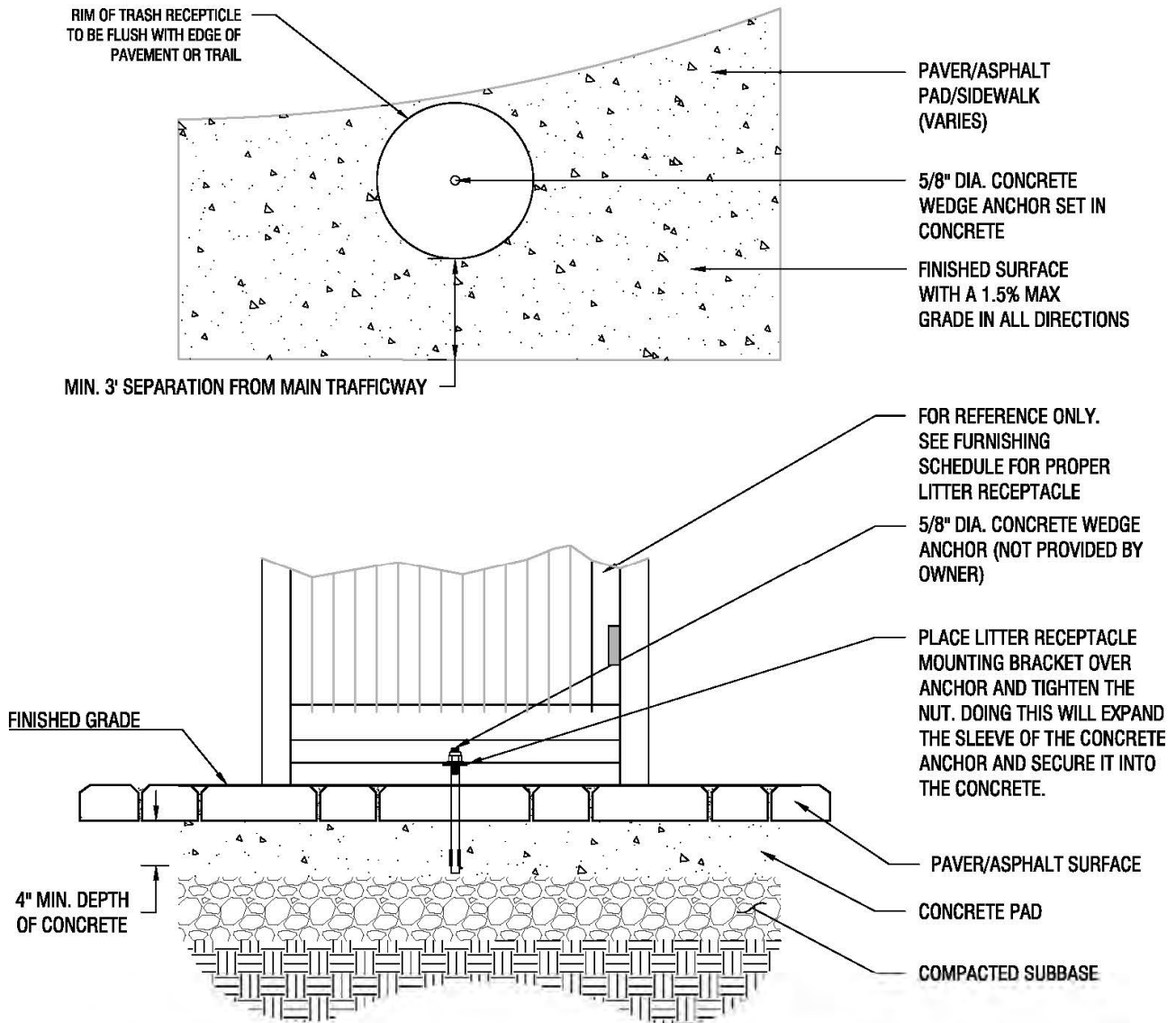
edited 07.18.18
approved 00.00.00

	<h3>LITTER RECEPTACLE</h3>	<h3>D4.61</h3> <p>A</p>
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Specification Drawings

NOTES

1. APRON APPROACHING LITTER RECEPTACLE MUST MEET ADA STANDARDS FOR LANDINGS.
2. LITTER RECEPTACLE PROVIDED BY OWNER.
3. CONCRETE MUST HAVE HAD SUFFICIENT TIME TO CURE BEFORE INSTALLATION OF ANCHOR.



B LITTER RECEPTACLE INSTALLATION IN PAVERS/ASPHALT NTS

edited 07.18.18
approved 00.00.00



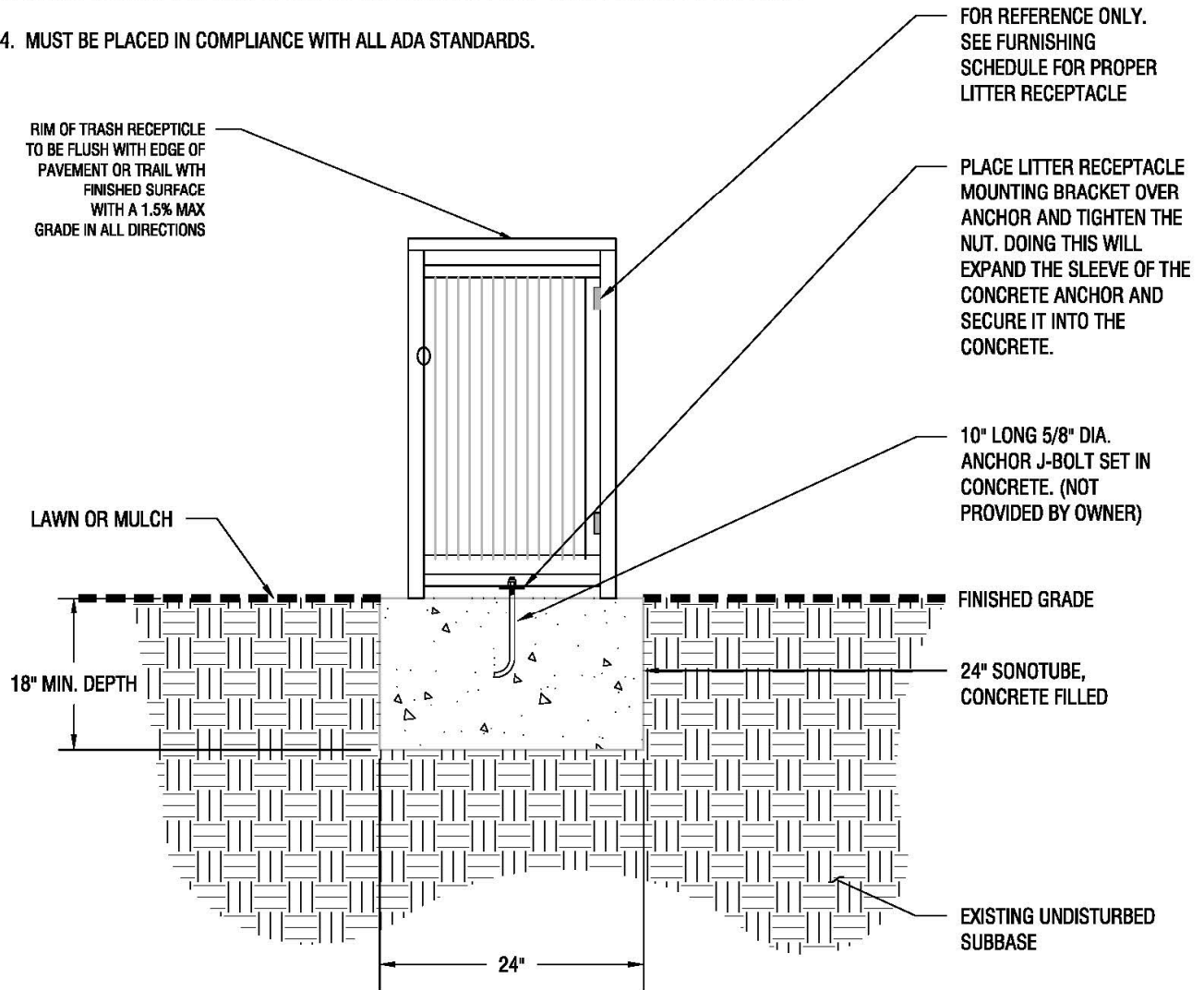
LITTER RECEPTACLE

D4.61
B

Specification Drawings


NOTES

1. J-BOLT TO BE PLACED IN THE CENTER OF THE SONOTUBE
2. LITTER RECEPTACLE PROVIDED BY OWNER.
3. CONCRETE MUST HAVE HAD SUFFICIENT TIME TO CURE BEFORE INSTALLATION OF RECEPTACLE.
4. MUST BE PLACED IN COMPLIANCE WITH ALL ADA STANDARDS.

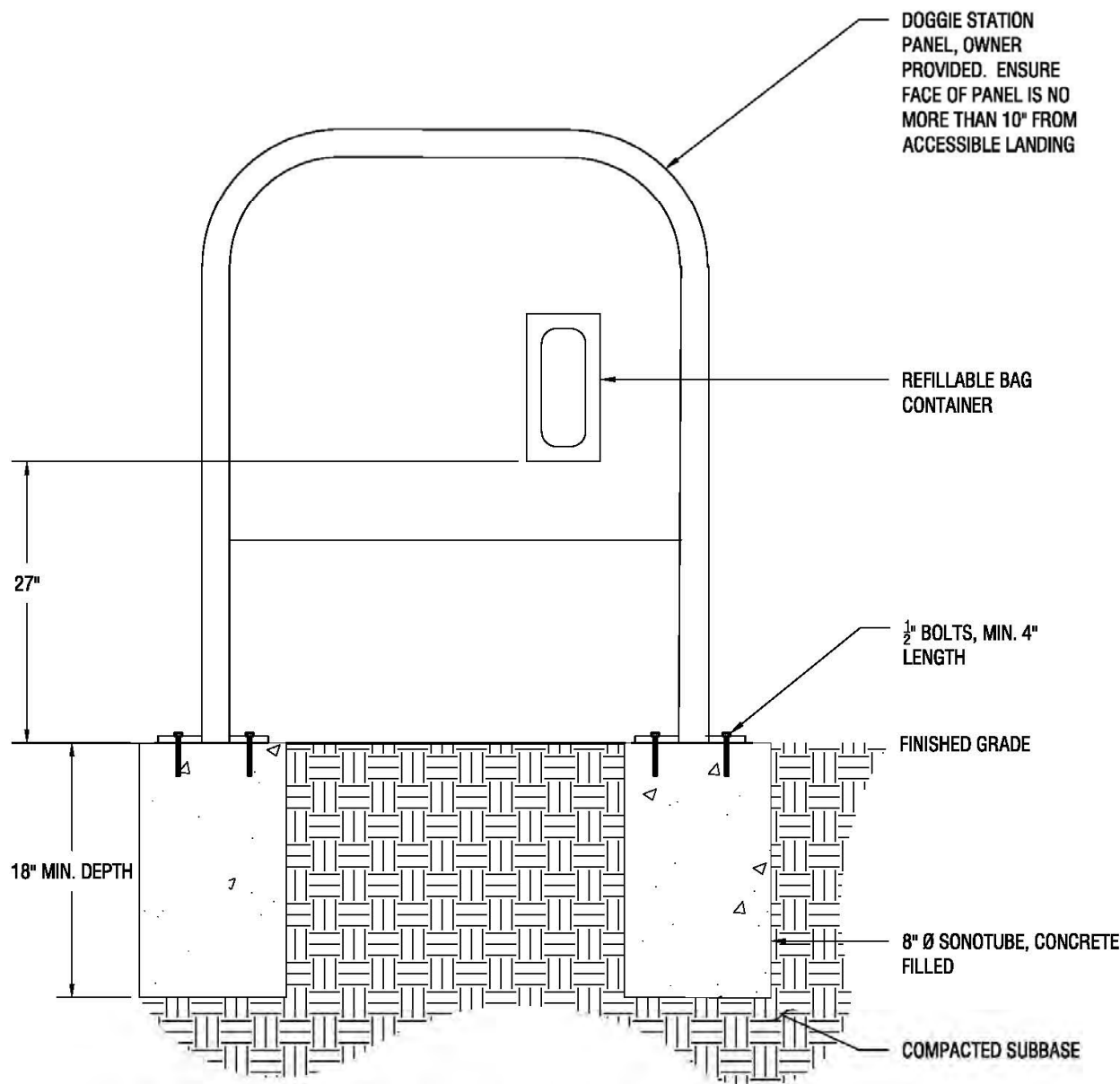


LITTER RECEPTACLE INSTALLATION IN LAWN/MULCH NTS

edited 07.18.18
approved 00.00.00

	<h3>LITTER RECEPTACLE</h3>	<h3>D4.61</h3> <p>C</p>
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Specification Drawings



A DOGGIE STATION INSTALLATION
NTS

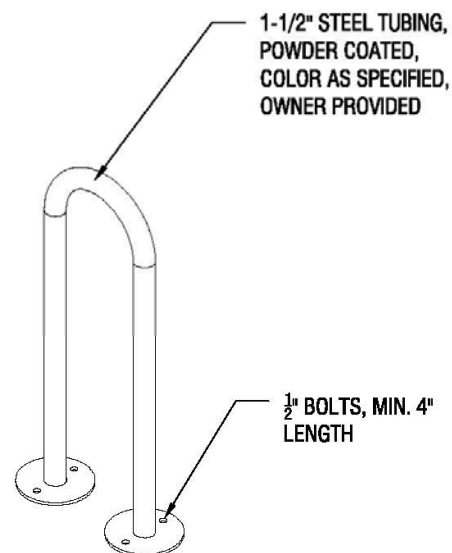
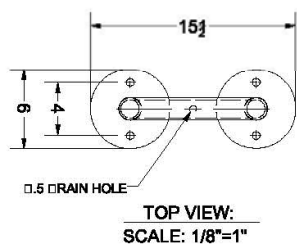
edited 04.18.19
approved 00.00.00



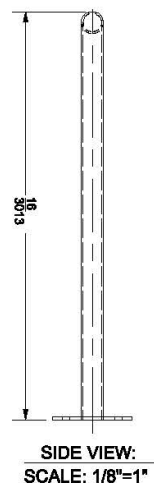
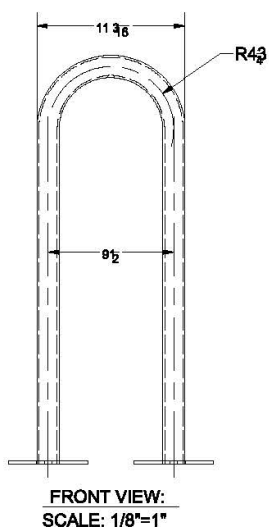
DOGGIE STATION

D4.63

Specification Drawings



ISOMETRIC VIEW: 718-021-006
BIKE RACK, U-SHAPED, 1 STALL, 9-1/2" CTR ON CTR, SURFACE MNTD
SCALE: 1/8"=1"



A BIKE RACK INSTALLATION NTS

edited 02.23.23
approved 00.00.00



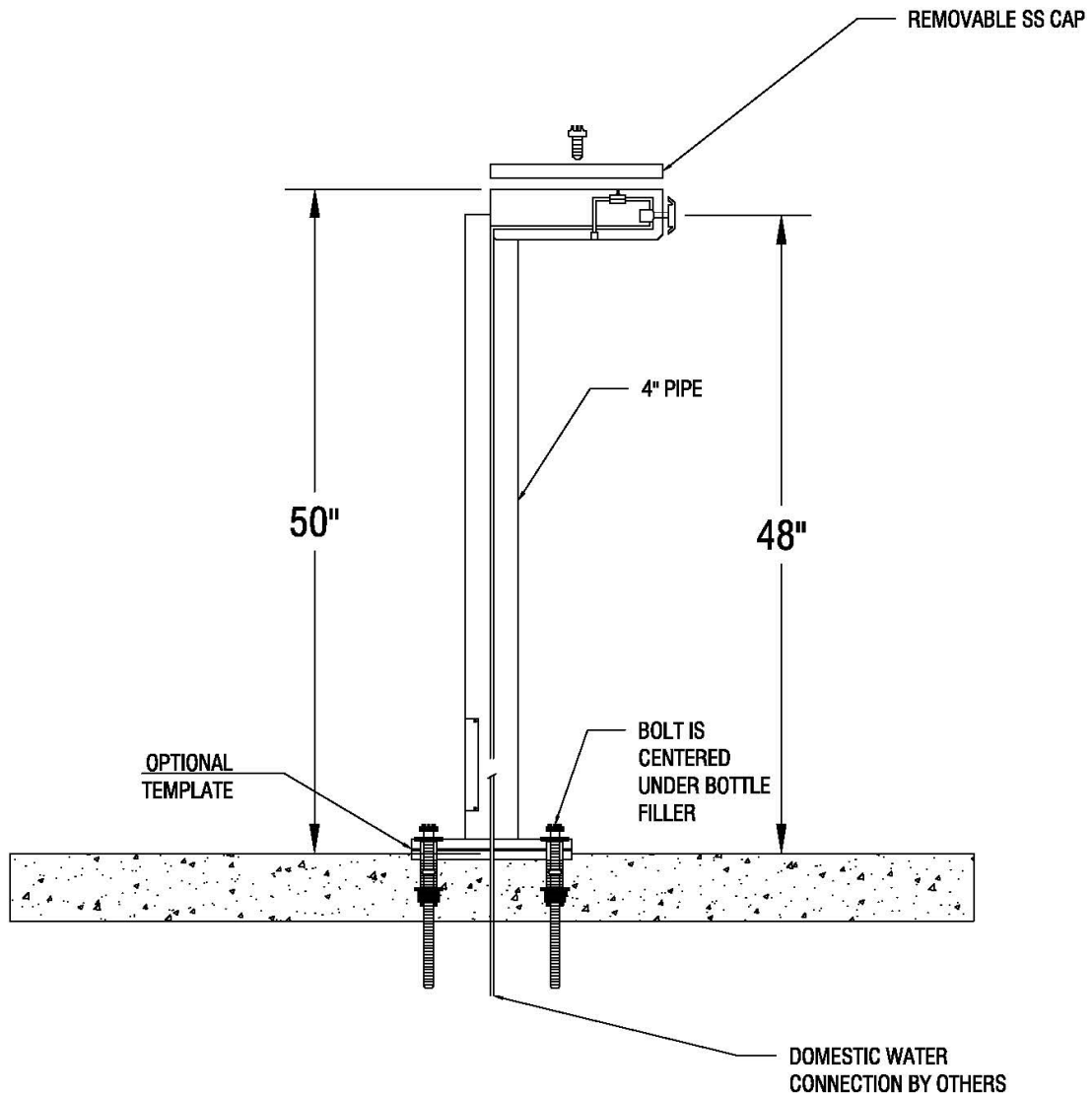
BICYCLE RACK

D4.81

Specification Drawings (4.85)

NOTES:

- REFER TO BPRD SHEET D8.21 FOR DOMESTIC WATER CONNECTION DETAIL



A BOTTLE FILLER INSTALLATION NTS

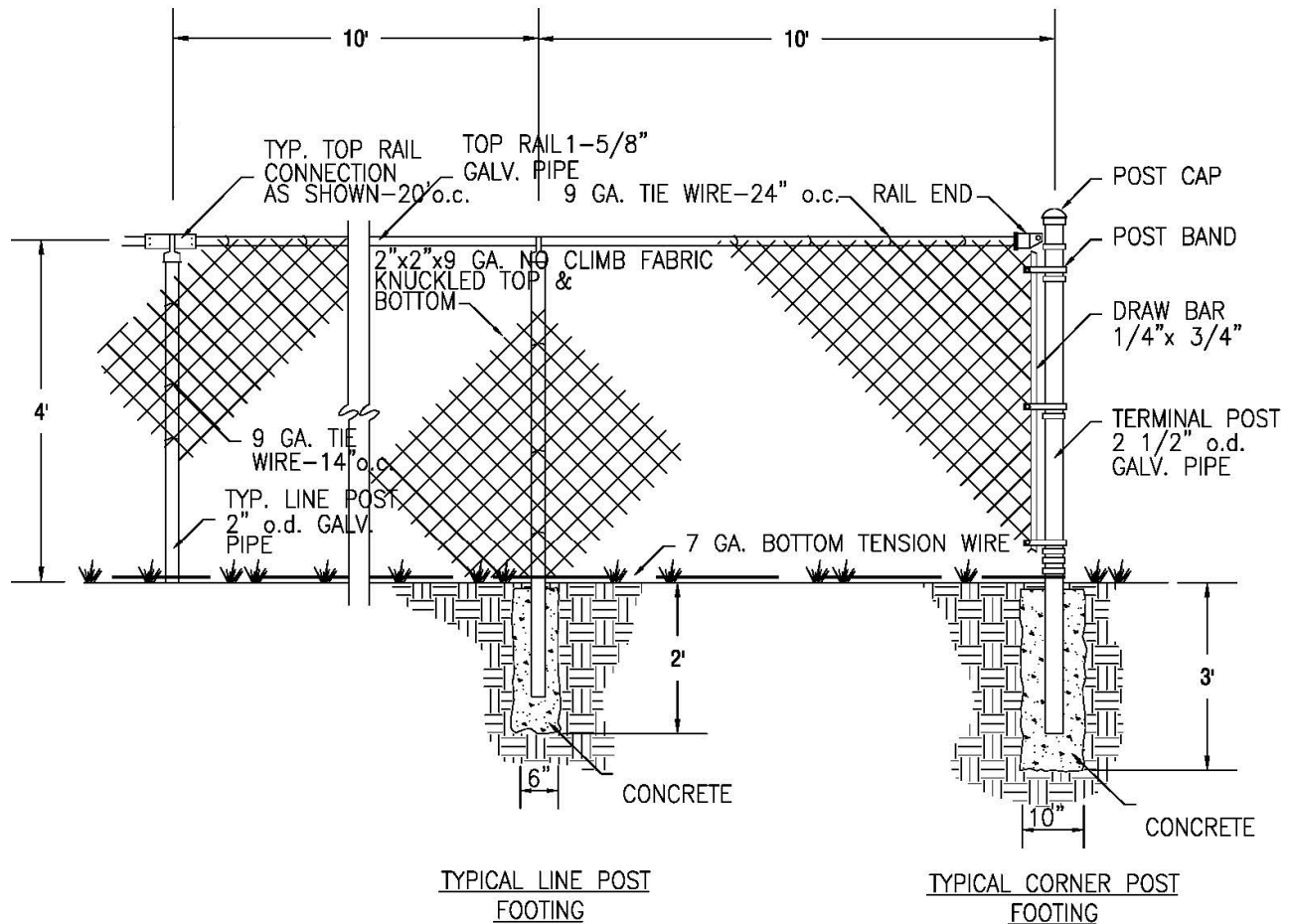
edited 04.21.23
approved 00.00.00

	<p>BOTTLE FILLER</p>	<p>D4.85</p>
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Specification Drawings

NOTES:

- ALL WIRE FABRIC AND FENCE HARDWARE SHALL BE GALVANIZED.
- FABRIC SHALL BE INSTALLED ON THE OUTSIDE.
- ALL MATERIAL MUST BE VINYL COATED BROWN.



PLAYGROUND 2'X2' NO CLIMB FENCE NTS

edited 08.07.18
approved 00.00.00



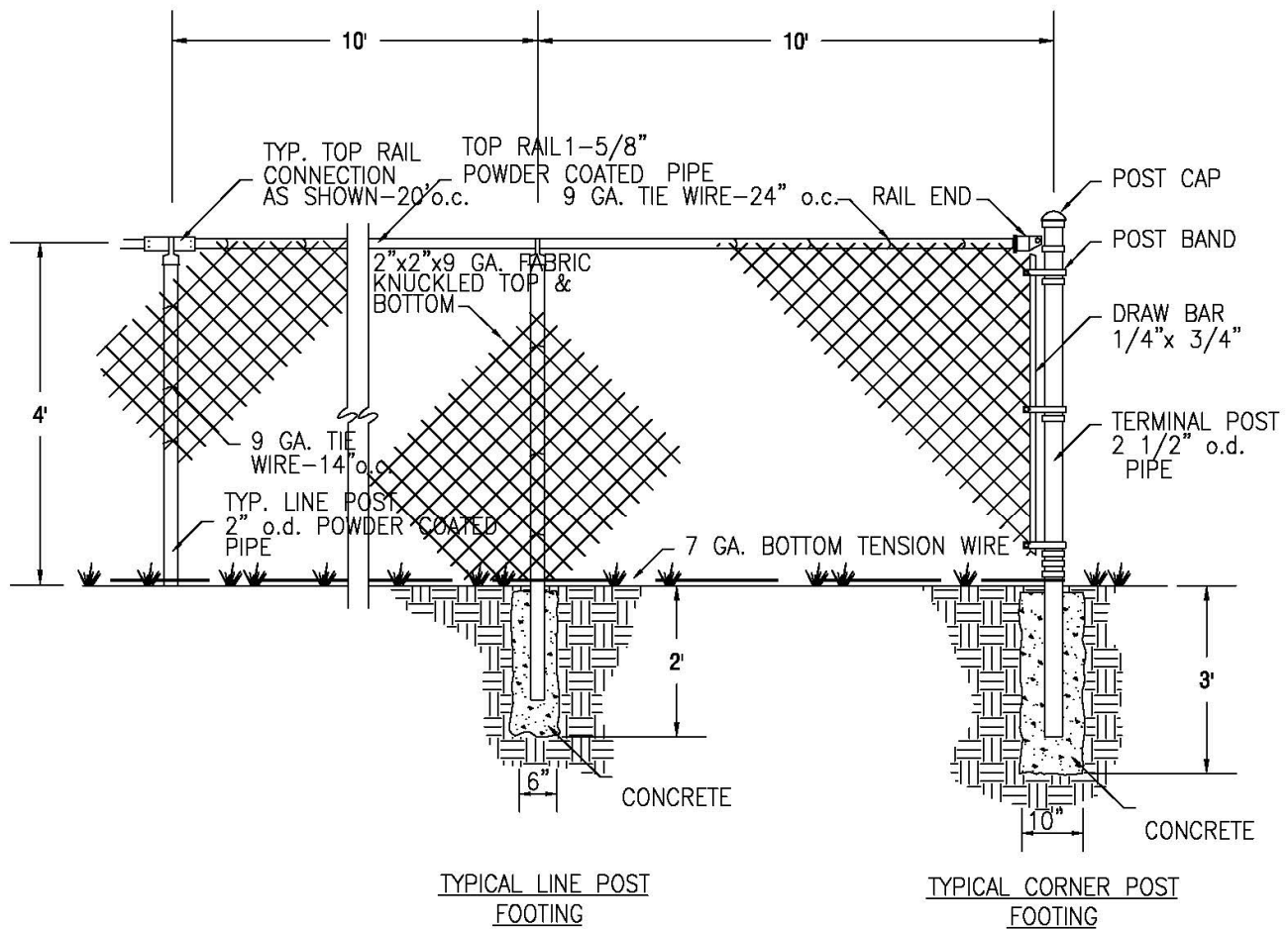
Chain Link Fencing

D5.11

Specification Drawings

NOTES:

- ALL WIRE FABRIC AND FENCE HARDWARE SHALL BE POWDER COATED GALVANIZED.
- FABRIC SHALL BE INSTALLED ON THE OUTSIDE.
- ALL MATERIAL MUST BE VINYL COATED/POWDER COATED BROWN.



A SITE FENCE
NTS

edited 02.07.23
approved 00.00.00



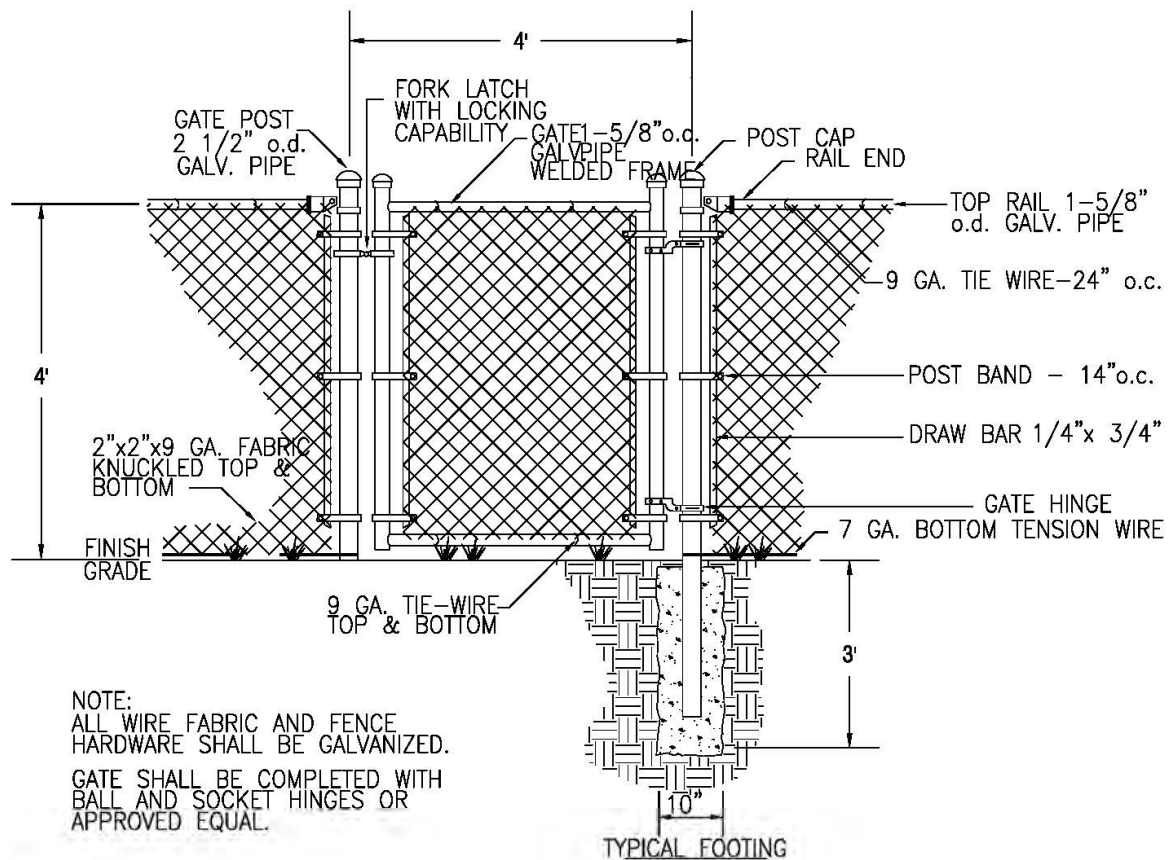
Chain Link Fencing

D5.12

Specification Drawings

NOTES:

- ALL WIRE FABRIC AND FENCE HARDWARE SHALL BE GALVANIZED.
- FABRIC SHALL BE INSTALLED ON THE OUTSIDE.
- ALL MATERIAL MUST BE VINYL COATED BROWN.



A Gate
NTS

edited 08.07.18
approved 00.00.00



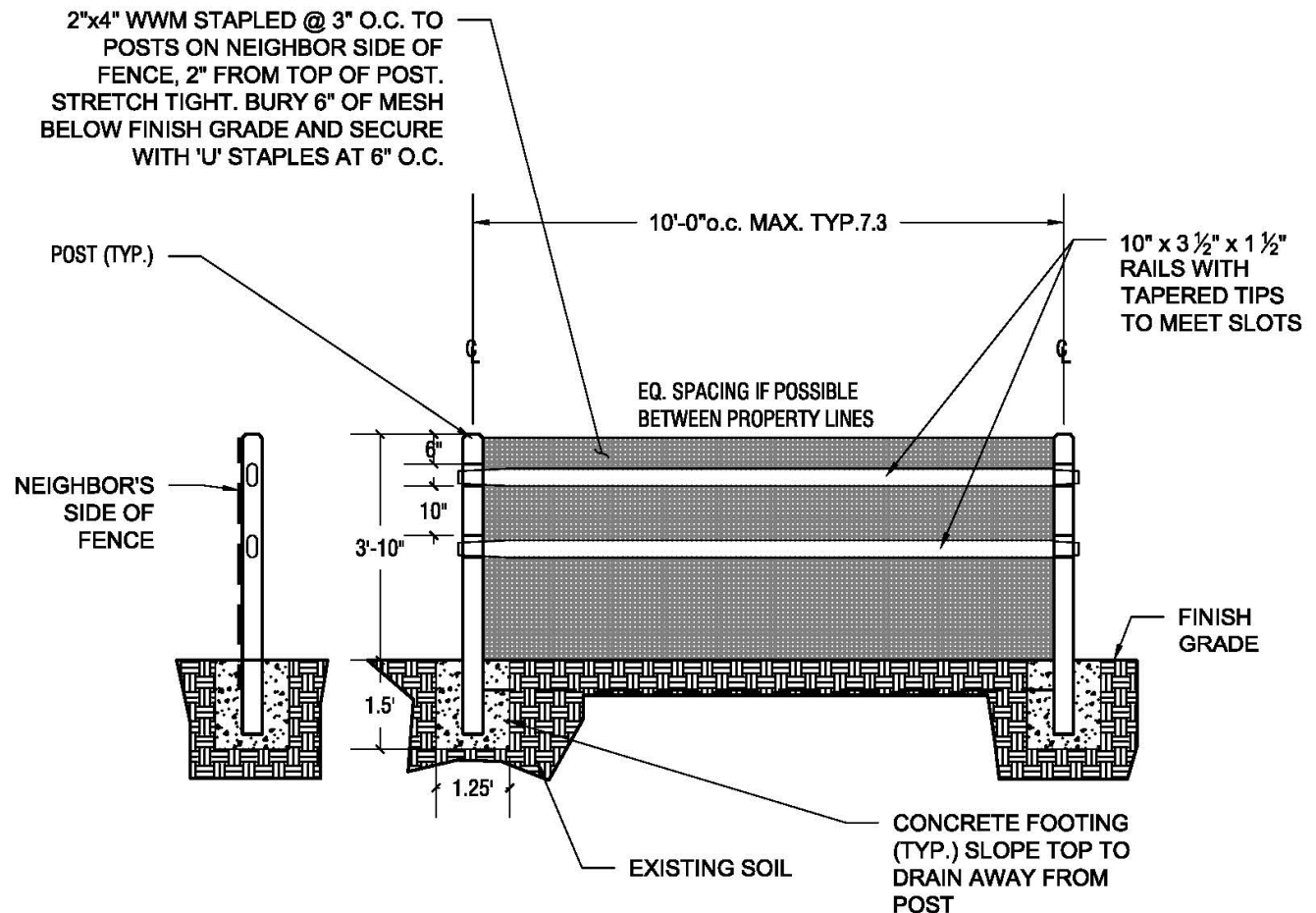
Chain Link Fencing

D5.14

Specification Drawings

NOTES:

- ALL WOOD FOR SPLIT RAIL FENCE TO BE CEDAR OR JUNIPER. SEE SPECS.
- END POST SHALL BE TERMINAL POST. ENLARGE FOOTING TO 1.5' DIA. AND 3.5' DEPTH.



A SPLIT RAIL WITH MESH NTS

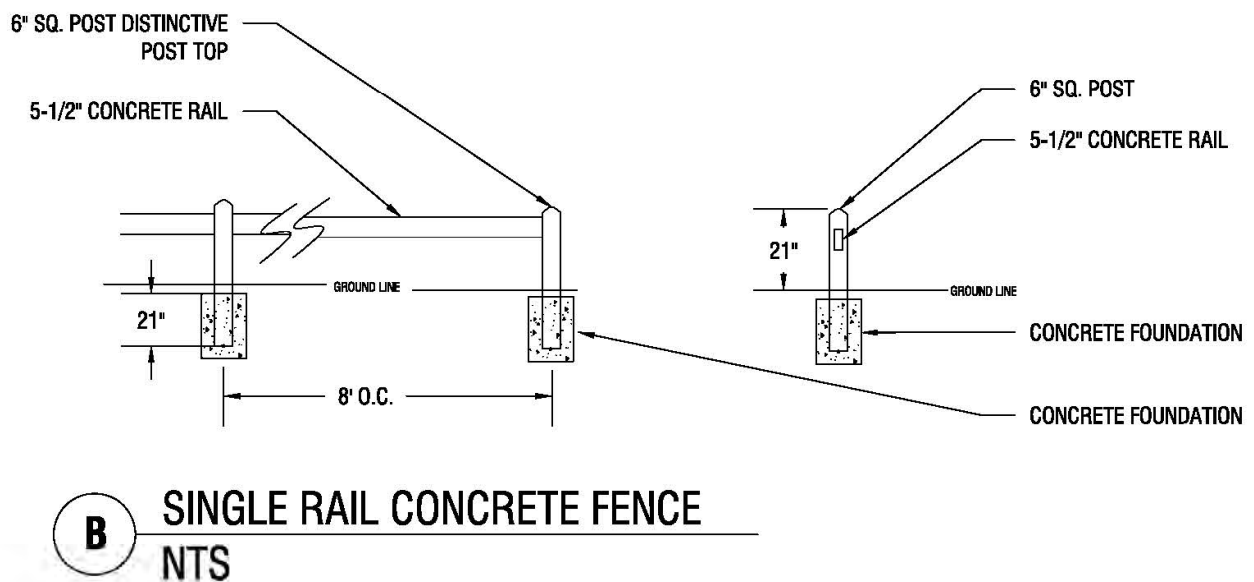
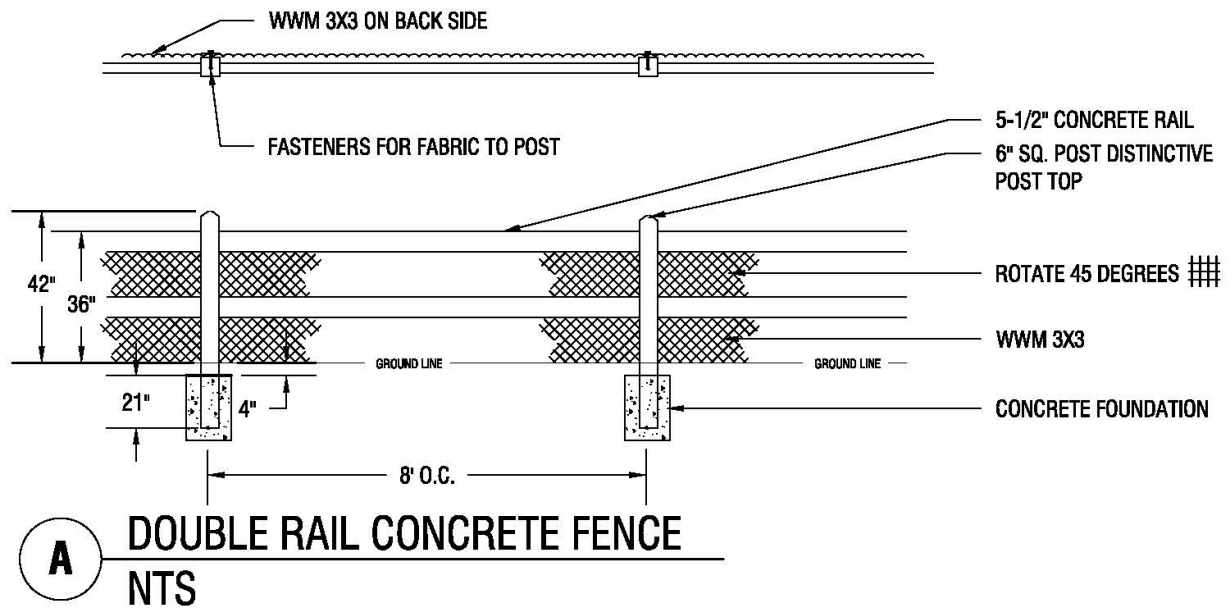
edited 07.16.19
approved 00.00.00



Split Rail Fencing

D5.15

Specification Drawings




MATERIALS:

Molds and materials are available at **Timbercreek Post and Fence Products** 541-447-4474, or approved equal.

SUBMIT SAMPLES OF CONCRETE POST AND RAIL MATERIALS TO BPRD

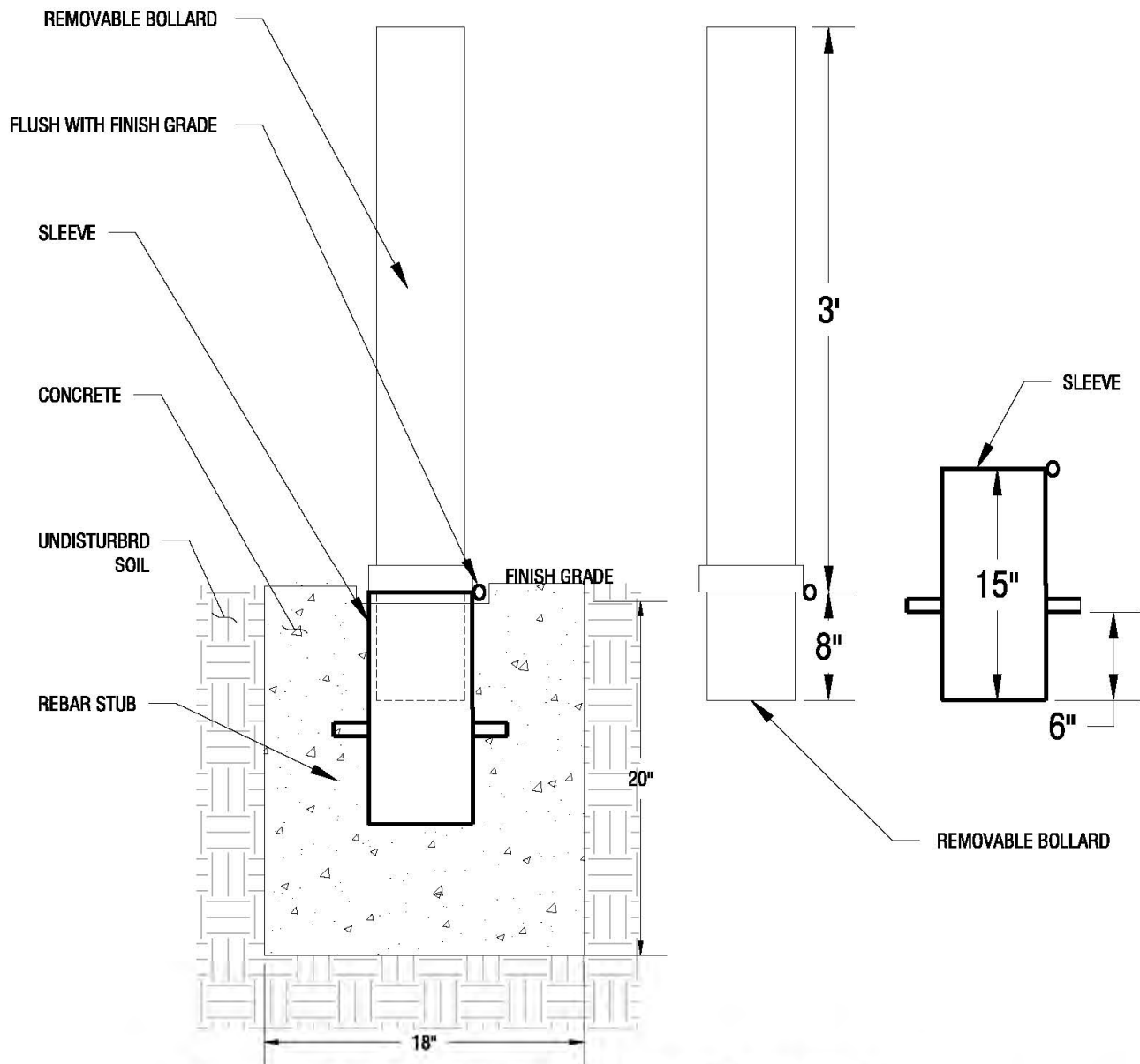
edited 06.07.18
approved 00.00.00

	<h2>Concrete Rail Fence</h2>	<h2>D5.21</h2>
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Specification Drawings

NOTES:

- 40" - 3.5" SCHEDULE 40 STEEL PIPE
- 15" - 4" SCHEDULE 40 STEEL PIPE SLEEVE WITH 2 REBAR DOG EARS WELDED 6" FROM BOTTOM
- 2" - 4" SCHEDULE 40 STEEL PIPE SECTION WELDED AS STOP ON BOLLARD POST 8"
- 2 CHAIN LOCK RINGS ($\frac{3}{16}$ "), ONE WELDED TO THE TOP OF THE SLEEVE, ONE WELDED TO THE BOTTOM OF THE BOLLARD POST (BE SURE TO WELD ENOUGH OVERLAP TO RECEIVE A LOCK)
- SET BOLLARD SLEEVE AND LOCK RING IN CONCRETE FOOTING MINIMUM 12"x18", PLUMB, AND FLUSH WITH FINISH GRADE



A REMOVABLE ROUND BOLLARD INSTALLATION
NTS

edited 12.23.19
approved 00.00.00

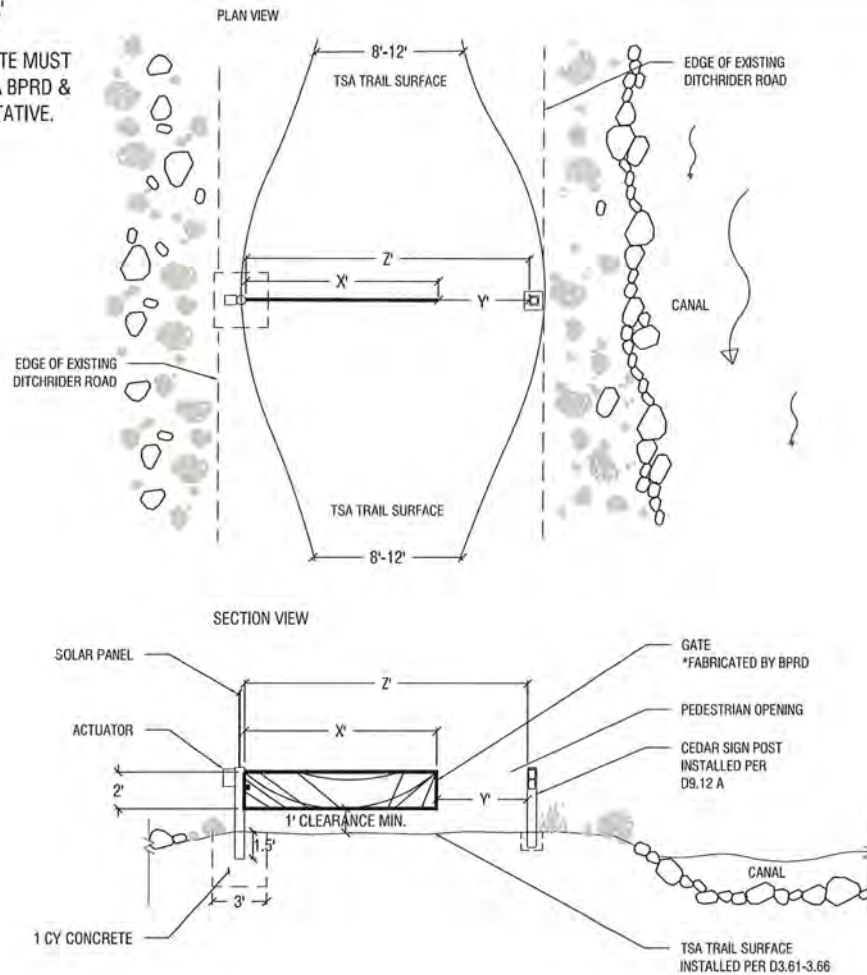
	REMOVABLE BOLLARD	D5.83
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Specification Drawings

NOTES:

- PEDESTRIAN OPENING MUST BE INSTALLED WITH A WIDTH OF 5'.
- GATE WIDTH WILL VARY BASED ON SITE SPECIFIC PARAMETERS. WIDTH MUST ALLOW FOR ALL SERVICE VEHICLES TO HAVE ACCESS.
- TOP OF GATE SHALL NOT EXCEED 3.5' IN HEIGHT.
- MUST MAINTAIN A 1' CLEARANCE FOR THE BOTTOM OF THE GATE.
- PEDESTRIAN OPENING IS TO BE LOCATED ON THE CANAL SIDE TRAIL UNLESS OTHERWISE NOTED.
- ACTUATOR IS TO BE INSTALLED ON OPPOSITE SIDE OF THE PEDESTRIAN OPENING.
- GATE AND POST TO BE FURNISHED BY BPRD.
- CEDAR SIGN POST TO BE FURNISHED BY BPRD.
- GATE AND POST FINISH TO BE DETERMINED BY BPRD.
- INSTALLATION MUST MEET BPRD AND COID STANDARDS.
- MAXIMUM Z = 16'
- MINIMUM Z = 12'
- OPTIMAL Z = 15'
- LOCATION OF GATE MUST BE VERIFIED BY A BPRD & COID REPRESENTATIVE.

CENTRAL OREGON IRRIGATION DISTRICT APPROVAL	
PRINT NAME	<u>RICK NICHOLS</u>
SIGNATURE	<u>Rick Nichols</u>
POSITION	<u>PROJECT MGR.</u>
DATE	<u>3/16/2018</u>



A COHCT GATE INSTALLATION
NTS

approved 00.00.00



CENTRAL OREGON HISTORIC
CANAL TRAIL GATE

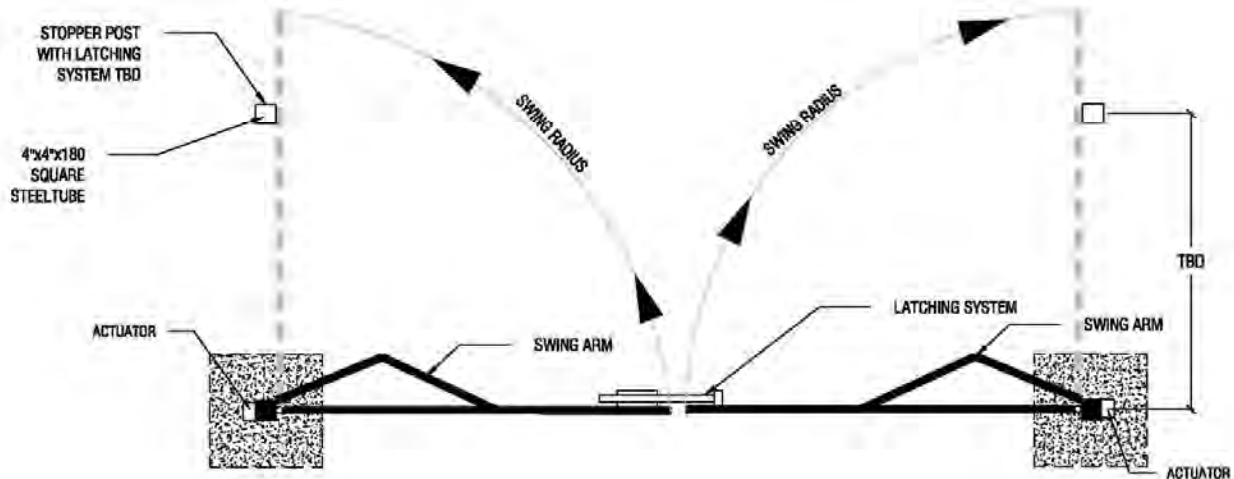
D5.84

Specification Drawings

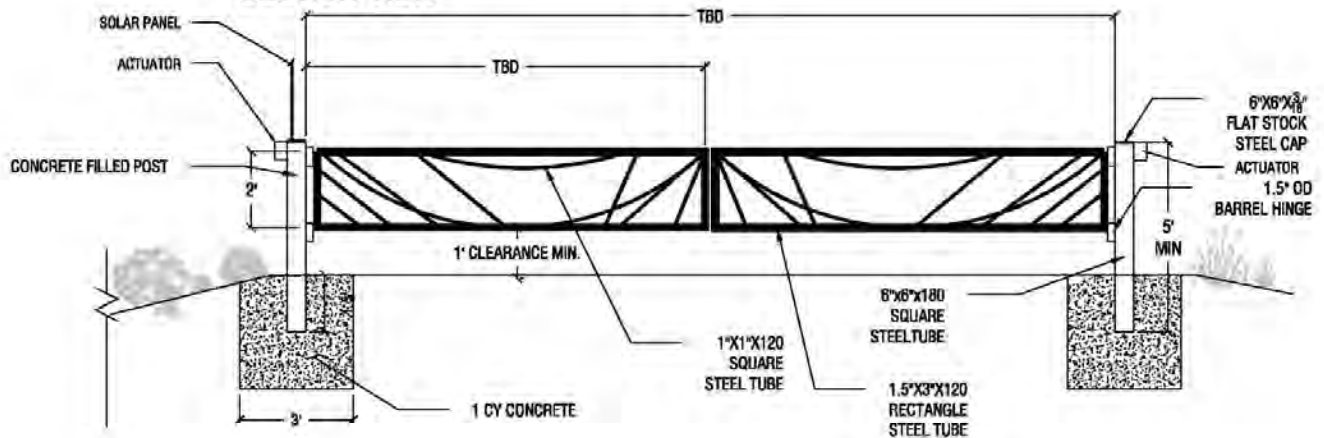
NOTES:

- GATE WIDTH WILL VARY BASED ON SITE SPECIFIC PARAMETERS.
- MUST MAINTAIN A 1' CLEARANCE FOR THE BOTTOM OF THE GATE.
- GATE FINISH TO BE DETERMINED BY BPRD.
- INSTALLATION MUST MEET BPRD STANDARDS.
- MUST PROVIDE SHOP DRAWING TO BPRD REPRESENTATIVE FOR APPROVAL.
- GATE OPENER SYSTEM MUST MEET THE SPECIFICATION FOUND IN THE BPRD DEVELOPMENT STANDARDS.

PLAN VIEW



SECTION VIEW



A BPRD VEHICLE GATE INSTALLATION
NTS

edited 01.05.23
approved 00.00.00



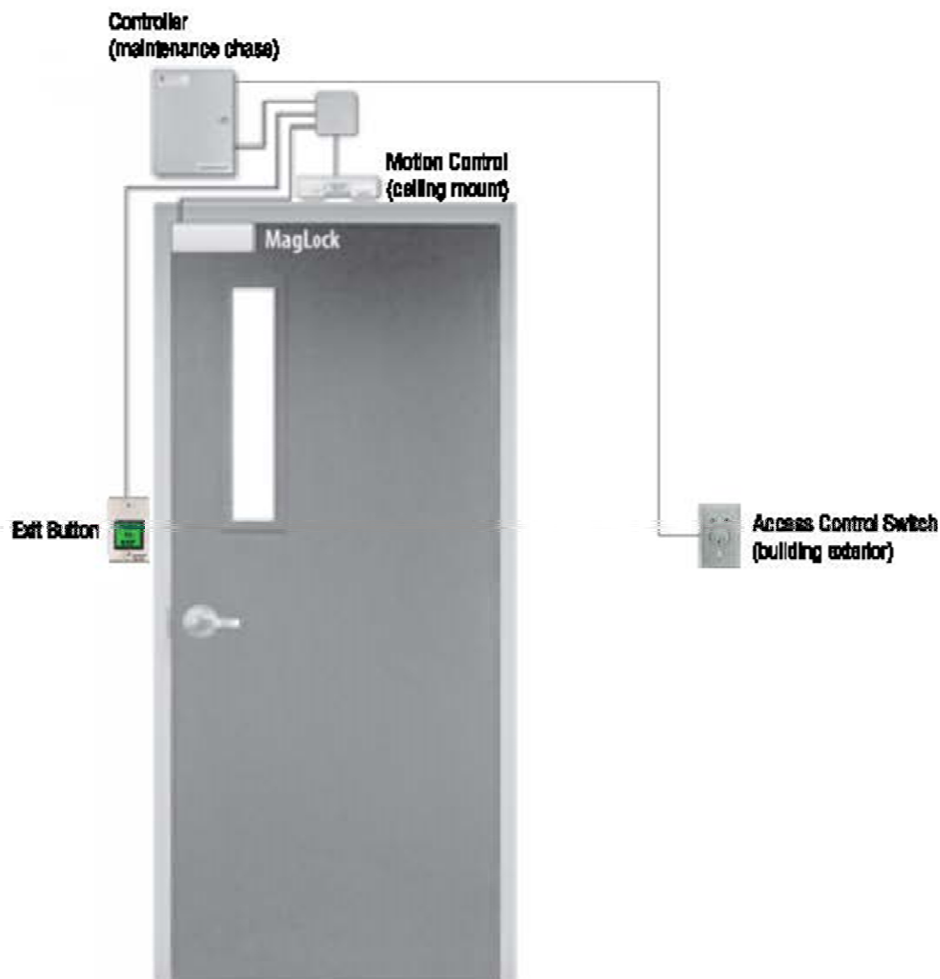
**BEND PARK & REC VEHICLE
GATE**

D5.85

Specification Drawings

NOTES:

- Controller: Altronix AL800ULX
- Magnetic Lock: Securiton M32 Magnalock
- Exit Button: Securiton EEB 3/30 Sec., Timer - Single Gang, SPST, Gny/Red/Handicap
- Motion Sensor: Securiton XMS Exit Motion Sensor
- Keyswitch: SCHLAGE - 653-04 SPDT maintained; L2 - Two LEDs, dual voltage; 630 Satin Finish; 7 Pin BEST core



A

INSTALL SCHEMATIC NTS

edited 01.28.22
approved 00.00.00



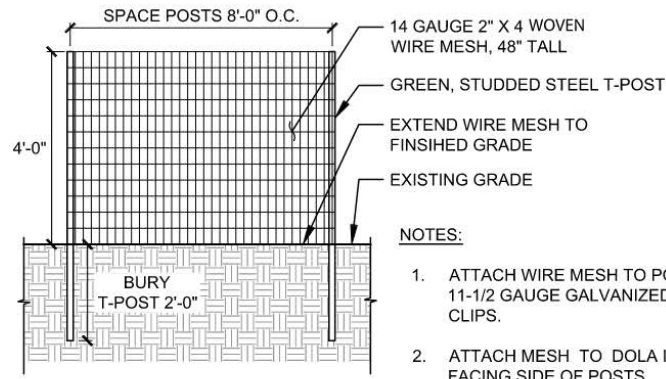
MAGNETIC LOCK SYSTEM

D5.86

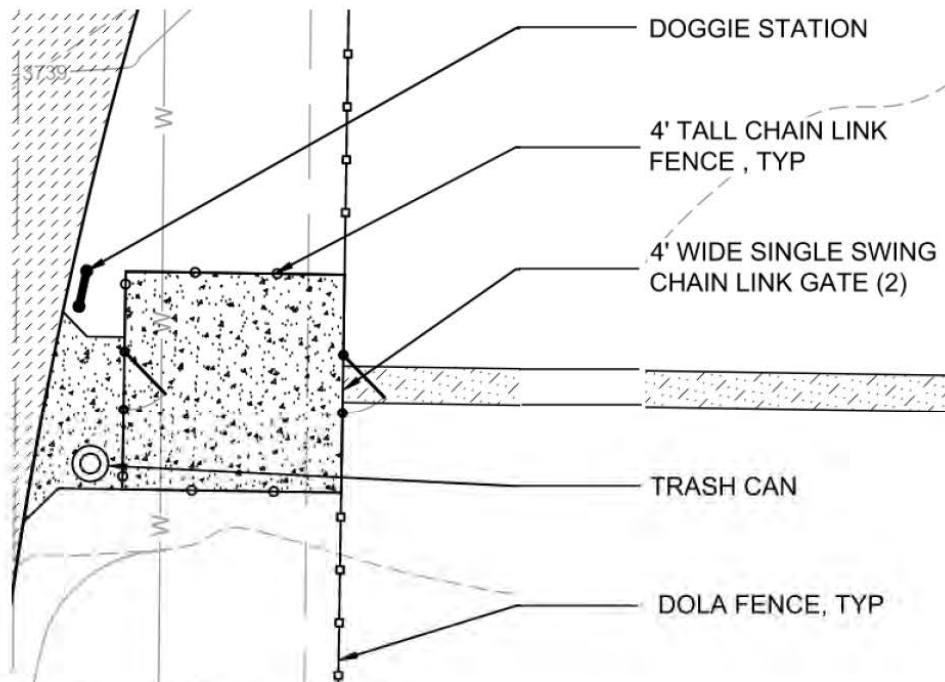
Specification Drawings

NOTES:

- See BPRD details D5.12 and D5.14 for chain link fencing and gate details.



A DOLA FENCE NTS



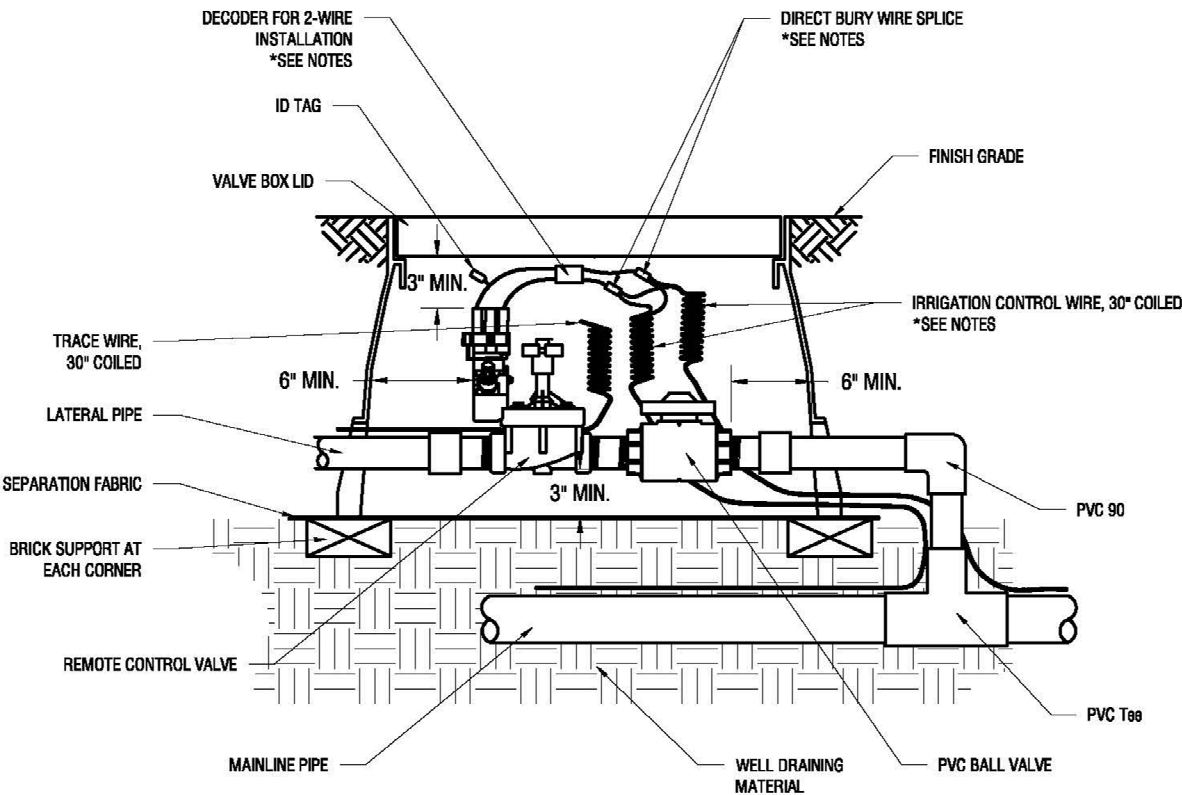
B DOLA ENTRY GATE NTS

edited 02.07.23
approved 00.00.00

	DOG OFF-LEASH AREA FENCING AND GATE	D5.87
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Specification Drawings

- NOTES:
- SEE PROJECT SPECIFICATIONS FOR ADDITIONAL INFORMATION
 - WHEN APPLICABLE, MOUNT DECODER TO SIDE OF VALVE BOX
 - MUST USE DBX/DBR KIT FOR WATERPROOF WIRE SPLICE CONNECTION
 - 2-WIRE OR CONVENTIONAL WIRE TO BE USED PER DESIGN



A IRRIGATION BOX SETUP
NTS

edited 01.26.21
approved 00.00.00

	<p>Irrigation</p>	<p>D6.12</p>
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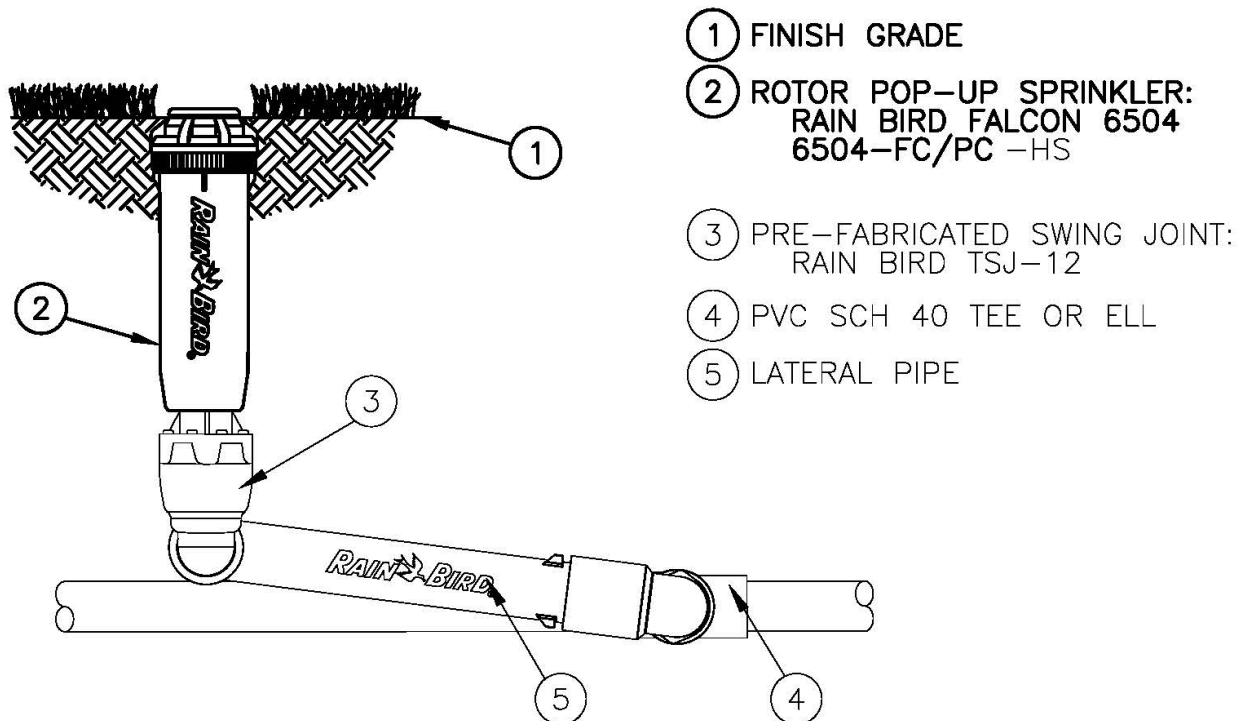
Specification Drawings

NOTES:

-SEE PROJECT SPECIFICATIONS FOR ADDITIONAL INFORMATION.

-The sprinkler shall have a screen attached to the drive housing to filter inlet water, protect the drive from clogging and simplify its removal for cleaning and flushing of the system. The sprinkler body shall have a double-wall construction 1" female NPT bottom inlet.

-The rotor sprinklers shall have a standard purple (non-potable) rubber cover which designates the full circle/part circle sprinkler from the top, as well as designates each adjustment opening from the top. The sprinkler shall have a factory installed nozzle as specified on the drawings. The angle of trajectory shall be 25 degrees from the horizontal.



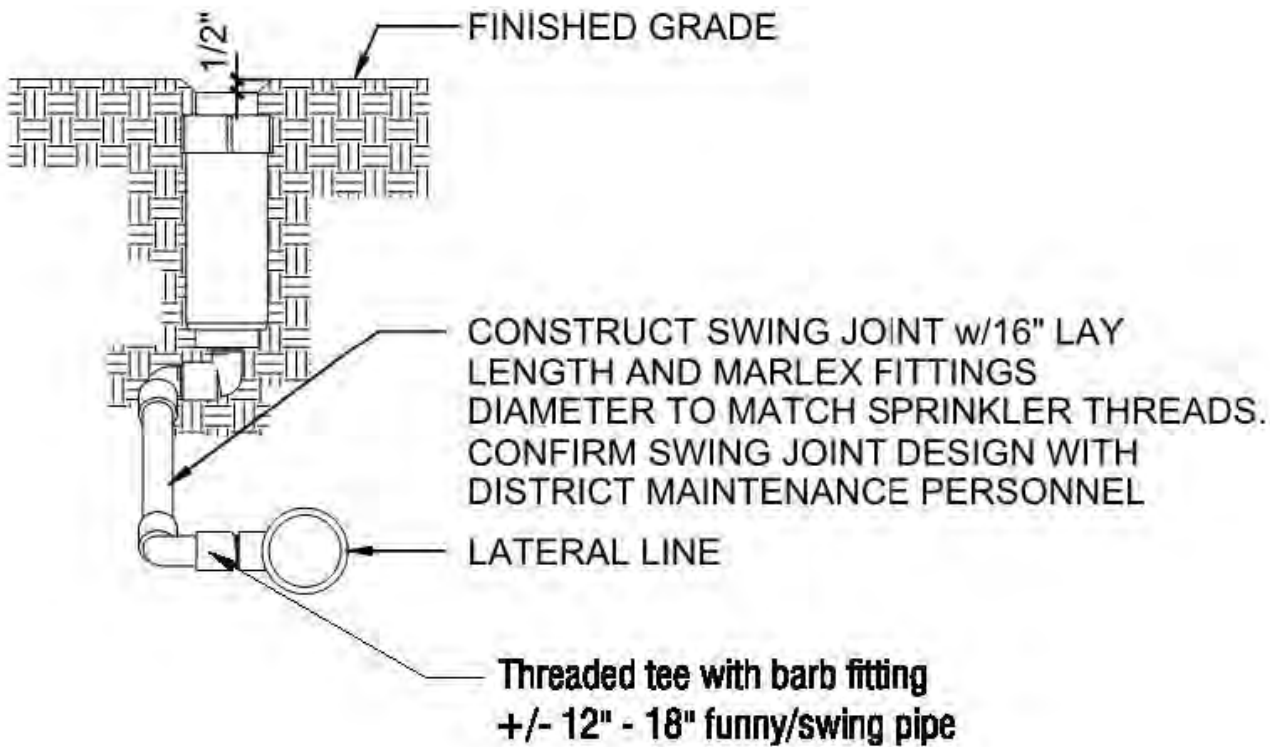
A HEAD - FALCON 6504
NTS

edited 08.21.18
approved 00.00.00

	<p>Irrigation</p>	<p>D6.21</p>
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Specification Drawings

NOTES:
 -SEE PROJECT SPECIFICATIONS FOR ADDITIONAL INFORMATION.



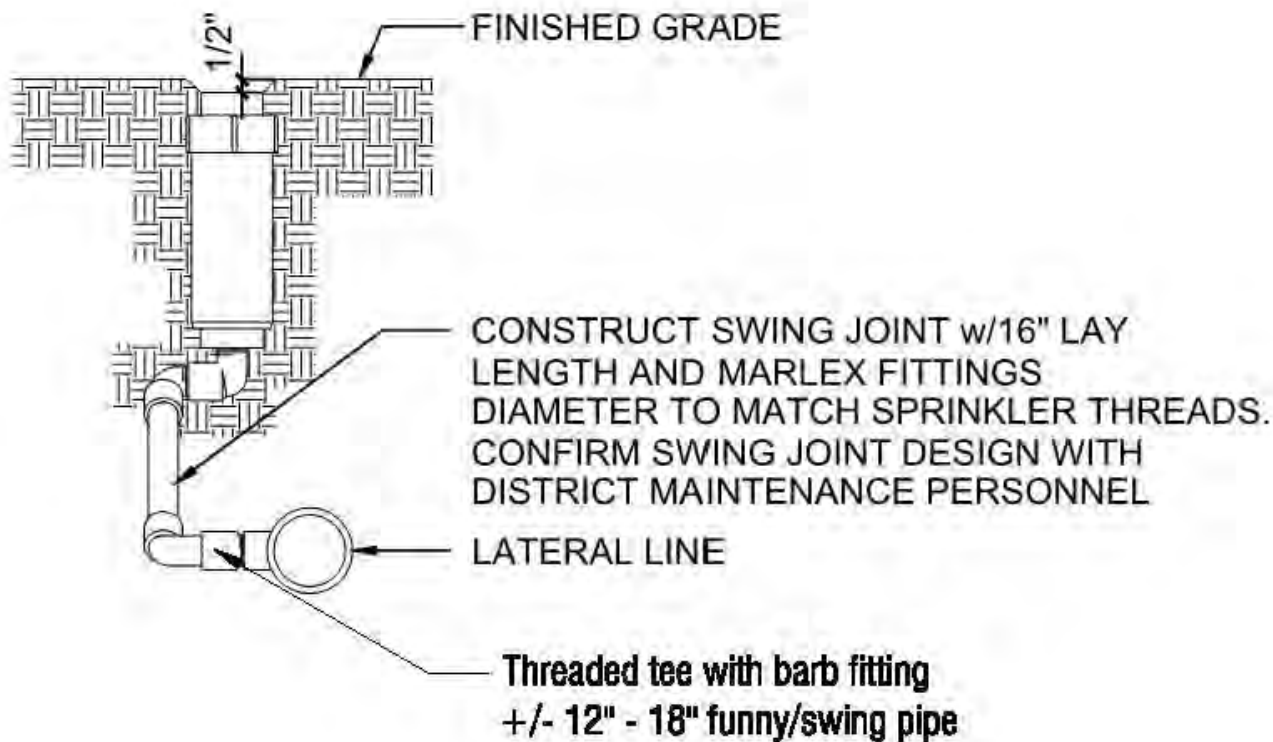
A HEAD - POP-UP 5000
 NTS

edited 01.26.21
 approved 00.00.00

	Irrigation	D6.22
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Specification Drawings

NOTES:
-SEE PROJECT SPECIFICATIONS FOR ADDITIONAL INFORMATION.



A

HEAD - POP-UP 3500
NTS

edited 01.26.21
approved 00.00.00

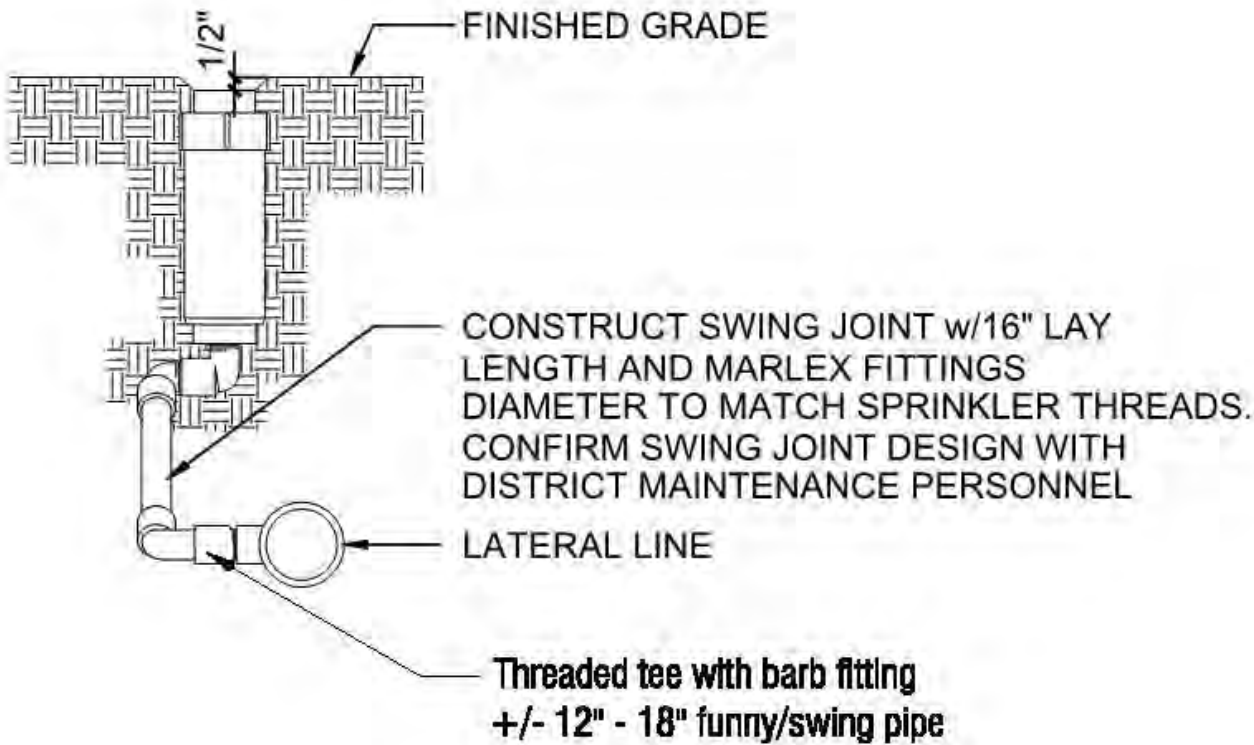


Irrigation

D6.23

Specification Drawings

NOTES:
-SEE PROJECT SPECIFICATIONS FOR ADDITIONAL INFORMATION.

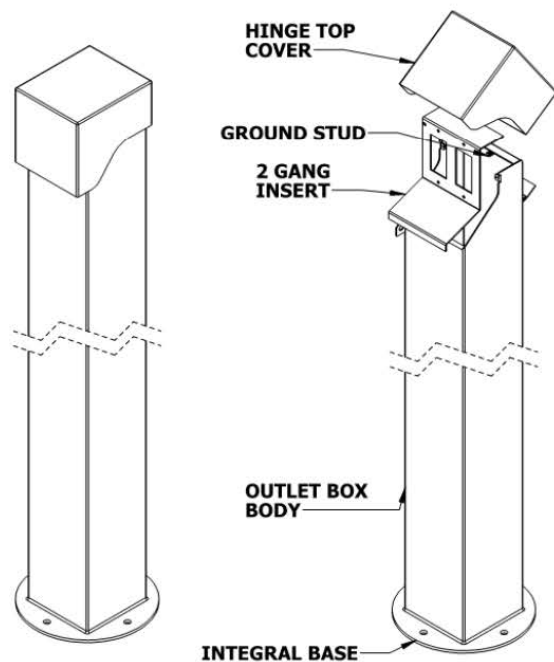
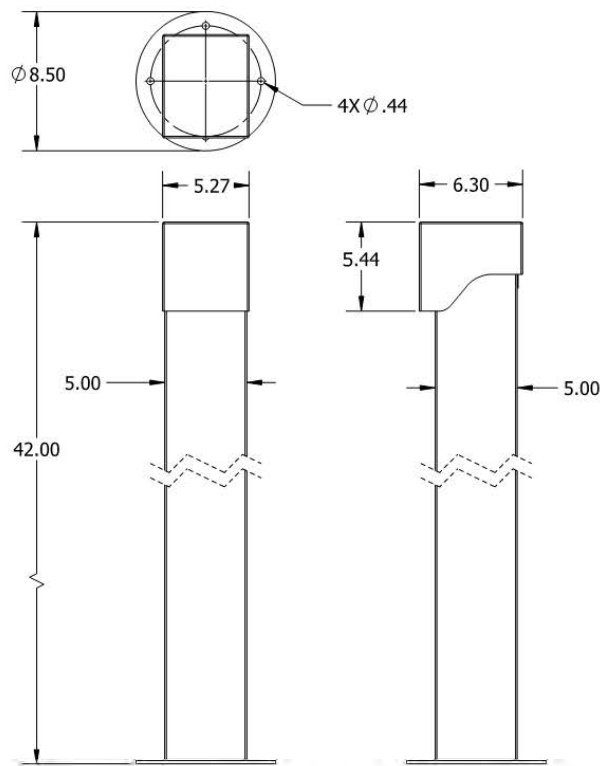


A HEAD - SPRAY 1800
NTS

edited 01.26.21
approved 00.00.00

	Irrigation	D6.25
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Specification Drawings



MATERIAL:
INTEGRAL BASE, 7GAUGE STAINLESS STEEL
BODY, COVER & INSERT 14GAUGE STAINLESS STEEL

A HINGE TOP OUTLET BOX NTS

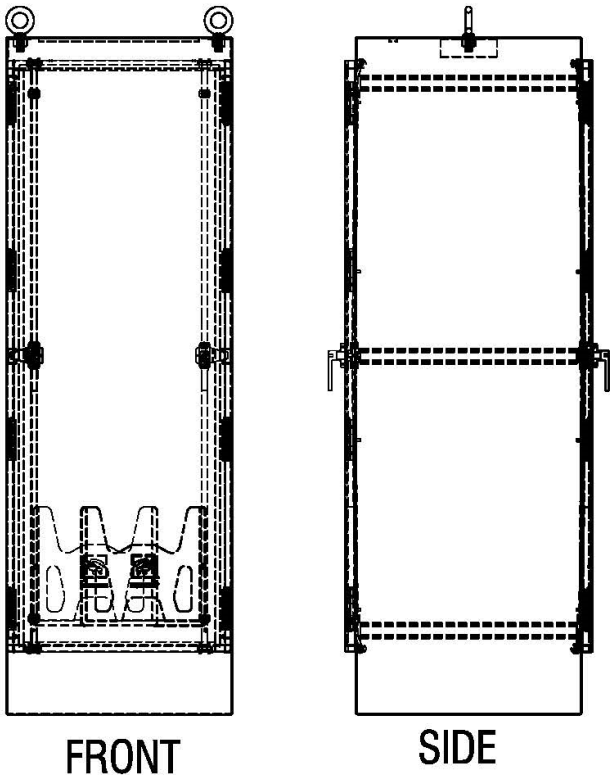
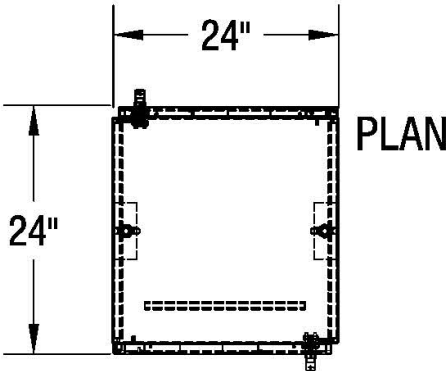
edited 02.19.19
approved 00.00.00



VERTICAL POWER BOX


D8.31

Specification Drawings

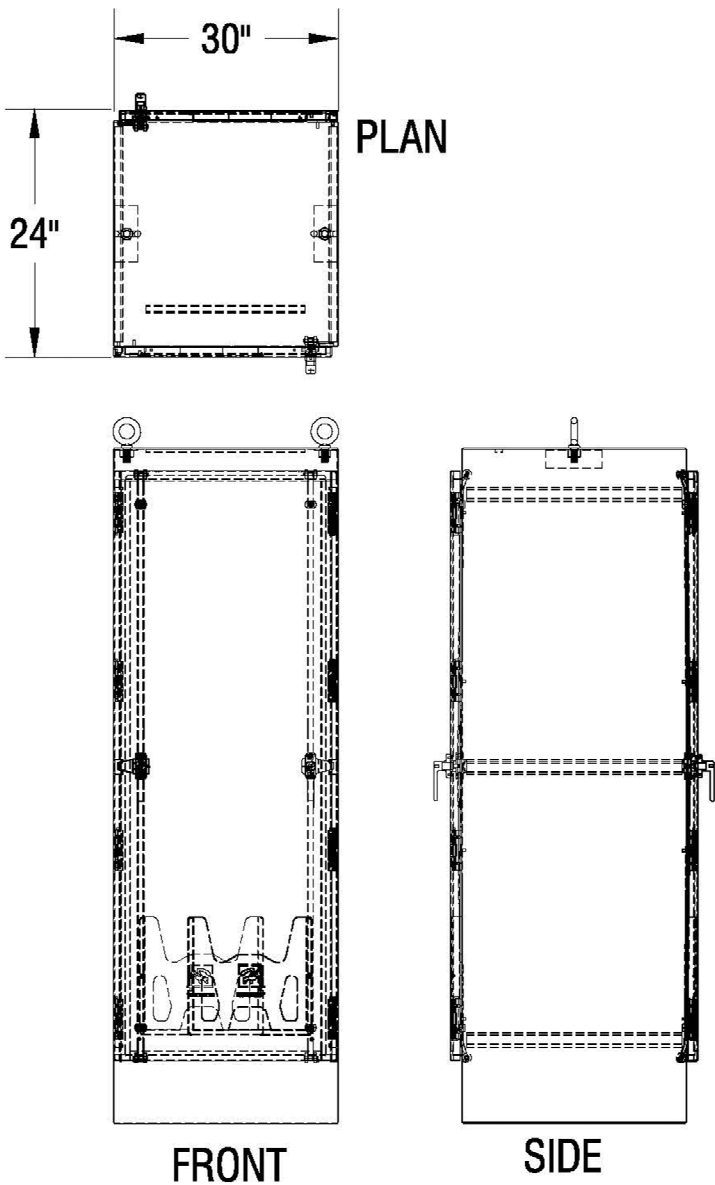


A 24" X 24" CABINET
NTS

edited 02.19.19
approved 00.00.00


	DUAL ACCESS ELECTRICAL CABINET	D8.32 A
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Specification Drawings



B 24" X 30" CABINET
NTS

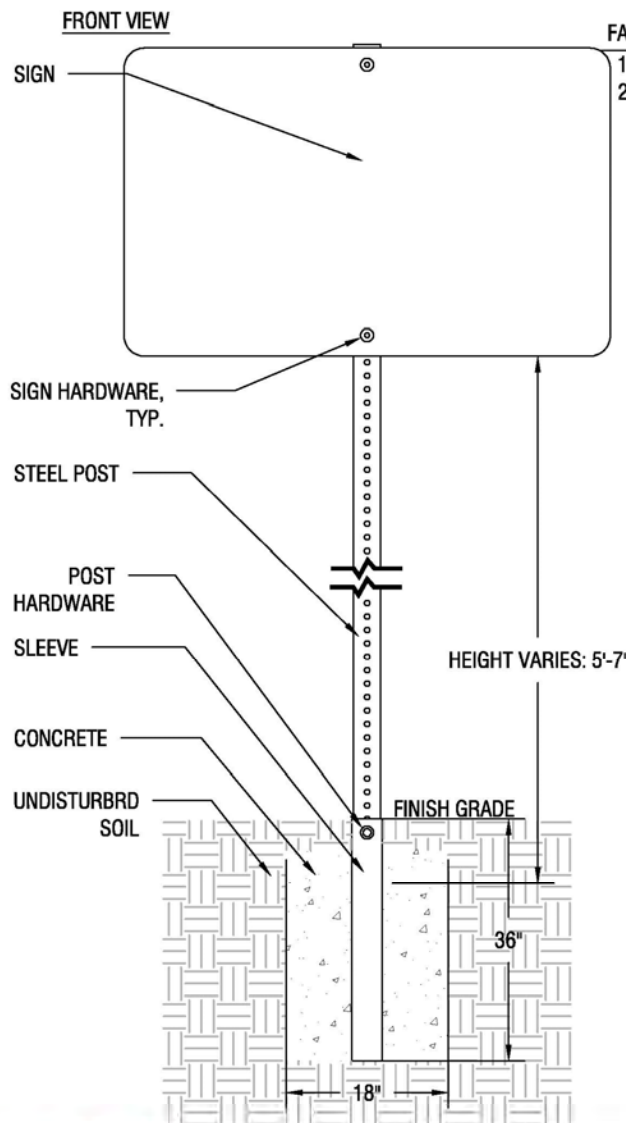
edited 12.11.19
approved 00.00.00

	DUAL ACCESS ELECTRICAL CABINET	D8.32 B
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Specification Drawings

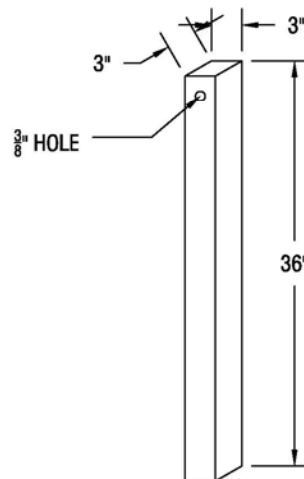
INSTALLATION SPECIFICATIONS

1. POWDER COATED (RAL 8028) $2\frac{1}{2}" \times 2\frac{1}{2}"$ 12 GAUGE PERFORATED TUBE STEEL SIGN POST IS TO BE MOUNTED INSIDE A SOLID TUBE STEEL SLEEVE.
2. DIG HOLE TO DIAMETER AND DEPTH INDICATED IN DETAIL BELOW. MOUNTING BOLT TO BE BELOW FINISH GRADE AND COVERED WITH SOIL.
3. 1 60 LB BAG OF CONCRETE TO BE USED TO INSTALL EACH SLEEVE.
4. DRILL PILOT HOLES, MARKED BY TARGETS, THROUGH SIGN USING A $\frac{3}{8}"$ DIA. DRILL BIT.
5. MOUNTING HARDWARE: SIGN TO SIGN POST- (2) $\frac{3}{8}" \times 1"$ STANDARD DRIVE RIVETS WITH BLACK PLASTIC WASHERS
PART #VCR221-Rivet, FROM THE TRAFFIC SIGN STORE (trafficsignstore.com)
SIGN POST TO SLEEVE- (1) $\frac{3}{8}"$ -16 x 3-1/2" ZINC FINISH HEX BOLT, PART #110120354 FROM FASTENAL
(2) $\frac{3}{8}" \times 1"$ ZINC FINISH FLAT WASHERS, PART #1133008 FROM FASTENAL
(1) $\frac{3}{8}"$ -16 ZINC FINISH NYLON LOCK NUT, PART #1137024 FROM FASTENAL
6. MOUNT SIGN TO SIGN POST WITH RIVETS PRIOR TO SLIDING INTO SLEEVE.
7. HEIGHT OF SIGN ABOVE FINISH GRADE TO BE SPECIFIED BY SUPERVISOR.
8. ALLOW CONCRETE AROUND SLEEVE TO CURE FOR AT LEAST 24 HRS BEFORE INSTALLING SIGN POST.

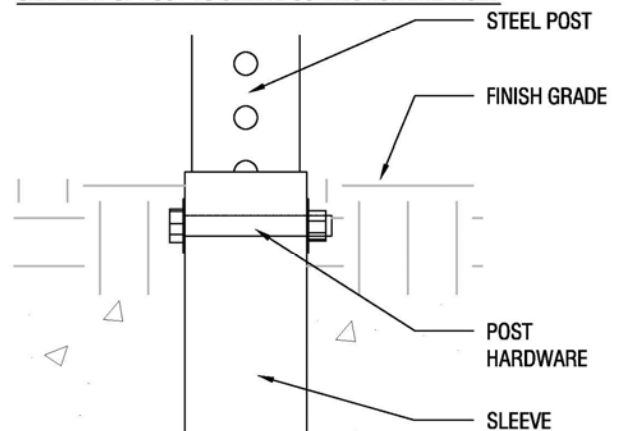


FABRICATION SPECIFICATIONS (SLEEVE ONLY)

1. BARE, SOLID TUBE STEEL SLEEVE
2. MATERIAL LIST- (1) $3" \times 3" \times 7ga \times 36"$ SQUARE TUBING



SIDE VIEW OF POST TO SLEEVE CONNECTION ENLARGED



edited 05.27.20
approved 00.00.00



**24" x 36" SIGN
LARGE KNOCKDOWN SIGN POST**

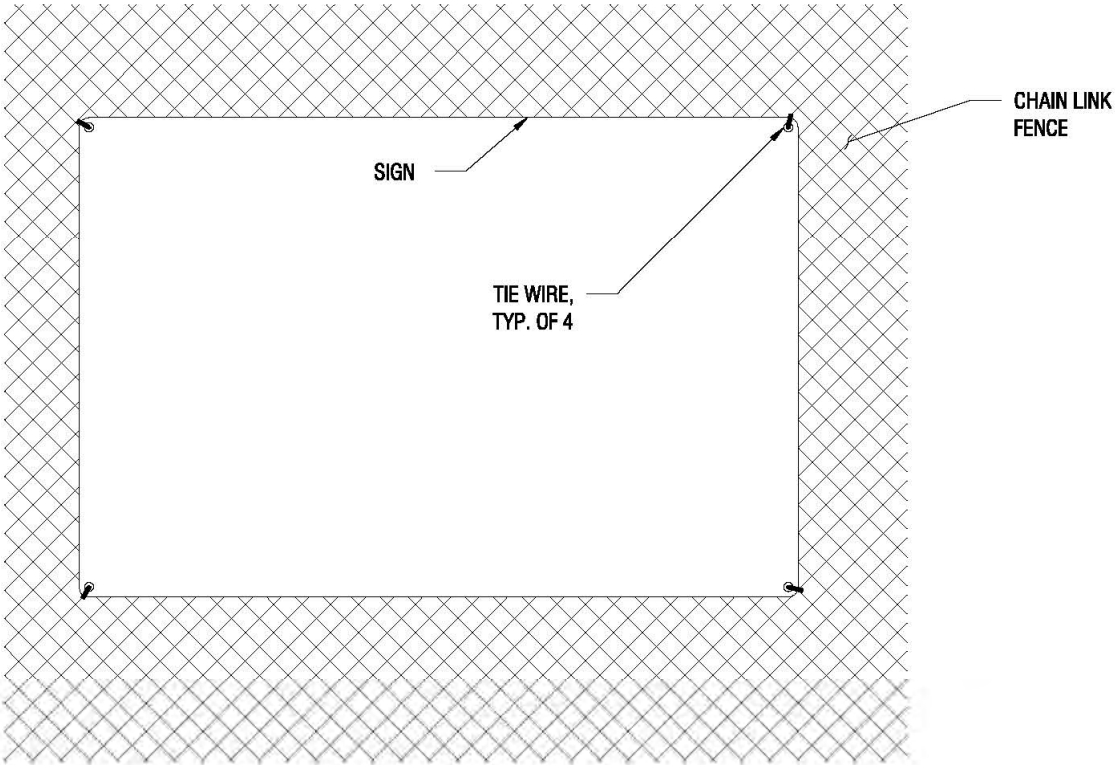
**D9.11
D**

Specification Drawings

INSTALLATION SPECIFICATIONS

1. DRILL PILOT HOLES, MARKED BY TARGETS, THROUGH SIGN USING A $\frac{1}{4}$ " DIA. DRILL BIT.
2. HOLD SIGN SQUARE AND PASS VINYL COATED (BROWN OR RAL 8028) TIE WIRE THROUGH PILOT HOLE.
3. ON BACK SIDE OF SIGN, TWIST TIE WIRE USING PLIERS, SUCKING SIGN TIGHT TO CHAIN LINK FENCE.
4. SNIP OFF ENDS OF TIE WIRE OR TWIST TO PREVENT A POKING HAZARD.

FRONT VIEW



edited 04.29.20
approved 00.00.00



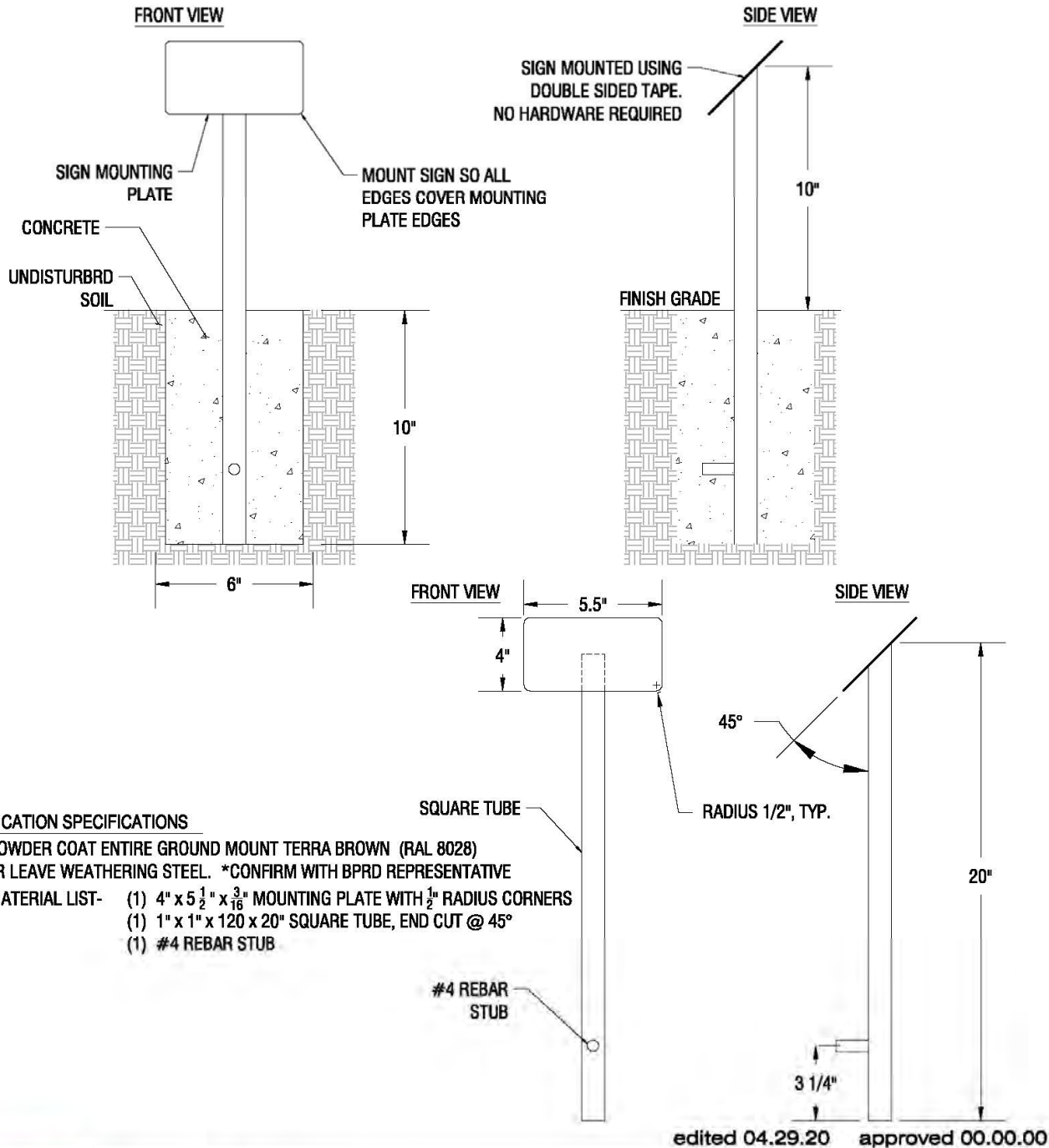
**2' x 3' SIGN
CHAIN LINK FENCE MOUNT**

**D9.11
E**

Specification Drawings

INSTALLATION SPECIFICATIONS

1. DIG HOLE TO DIAMETER AND DEPTH INDICATED IN DETAIL BELOW.
2. $\frac{1}{3}$ 60 LB BAG OF CONCRETE TO BE USED TO INSTALL EACH MOUNT.
3. MOUNTING PLATE MUST BE CLEAN AND DRY TO ENSURE A STRONG BOND WITH DOUBLE SIDED TAPE.
4. MOUNT SIGN TO MOUNTING PLATE USING DOUBLE SIDED TAPE, POLYESTER, 1 INCH, CLEAR. MANUFACTURER # 9088 (GRAINGER ITEM # 24A675)



FABRICATION SPECIFICATIONS

1. POWDER COAT ENTIRE GROUND MOUNT TERRA BROWN (RAL 8028) OR LEAVE WEATHERING STEEL. *CONFIRM WITH BPRD REPRESENTATIVE
2. MATERIAL LIST-
 - (1) 4" x 5 1/2" x 3/16" MOUNTING PLATE WITH 1/2" RADIUS CORNERS
 - (1) 1" x 1" x 120 x 20" SQUARE TUBE, END CUT @ 45°
 - (1) #4 REBAR STUB

edited 04.29.20 approved 00.00.00



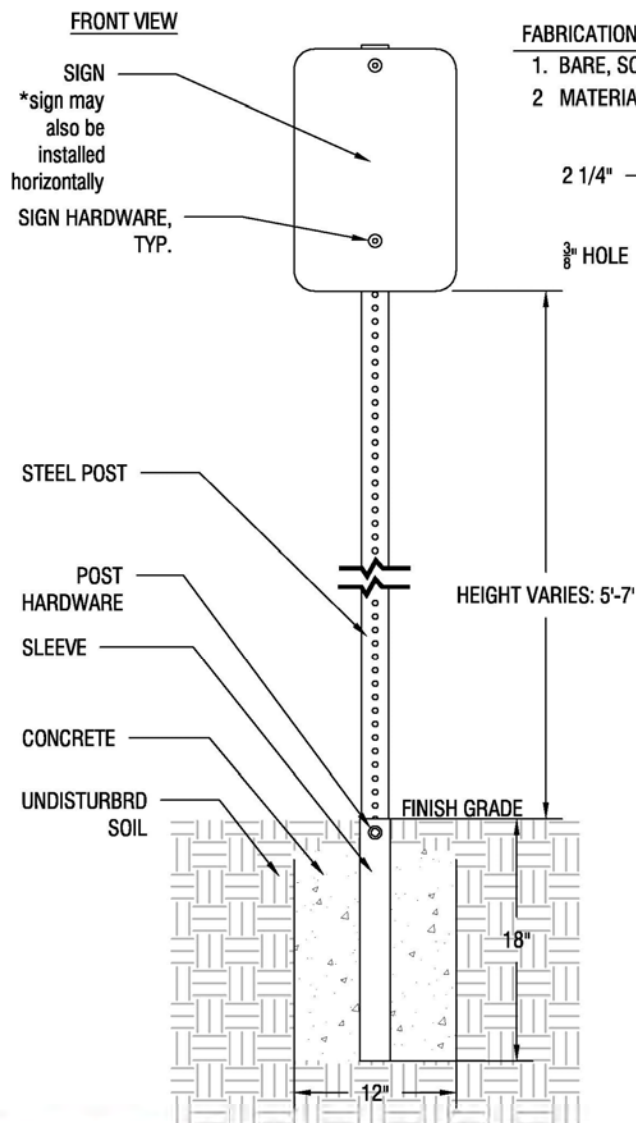
**6" X 4 1/2" SIGN
GROUND MOUNT**

**D9.12
D**

Specification Drawings

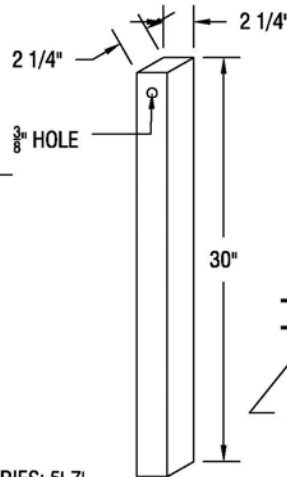
INSTALLATION SPECIFICATIONS

1. POWDER COATED (RAL 8028) 2" x 2" 14 GAUGE PERFORATED TUBE STEEL SIGN POST IS TO BE MOUNTED INSIDE A SOLID TUBE STEEL SLEEVE.
2. DIG HOLE TO DIAMETER AND DEPTH INDICATED IN DETAIL BELOW. MOUNTING BOLT TO BE BELOW FINISH GRADE AND COVERED WITH SOIL.
3. $\frac{1}{2}$ OF A 60 LB BAG OF CONCRETE TO BE USED TO INSTALL EACH SLEEVE.
4. DRILL PILOT HOLES, MARKED BY TARGETS, THROUGH SIGN USING A $\frac{3}{8}$ " DIA. DRILL BIT.
5. MOUNTING HARDWARE: SIGN TO SIGN POST- (2) $\frac{3}{8}$ " x 1" STANDARD DRIVE RIVETS WITH BLACK PLASTIC WASHERS
PART #VCR221-Rivet, FROM THE TRAFFIC SIGN STORE (trafficsignstore.com)
SIGN POST TO SLEEVE- (1) $\frac{3}{8}$ "-16 x 2 $\frac{3}{4}$ " ZINC FINISH HEX BOLT, PART #110120351 FROM FASTENAL
(2) $\frac{3}{8}$ " x 1" ZINC FINISH FLAT WASHERS, PART #1133008 FROM FASTENAL
(1) $\frac{3}{8}$ "-16 ZINC FINISH NYLON LOCK NUT, PART #1137024 FROM FASTENAL
6. MOUNT SIGN TO SIGN POST WITH RIVETS PRIOR TO SLIDING INTO SLEEVE.
7. HEIGHT OF SIGN ABOVE FINISH GRADE TO BE SPECIFIED BY SUPERVISOR.
8. ALLOW CONCRETE AROUND SLEEVE TO CURE FOR AT LEAST 24 HRS BEFORE INSTALLING SIGN POST.



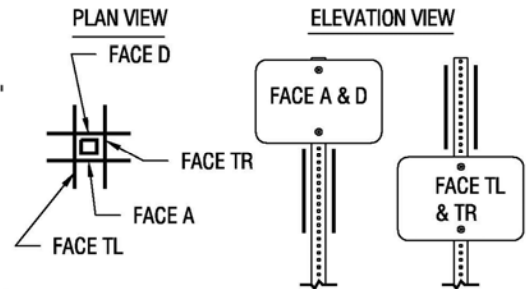
FABRICATION SPECIFICATIONS (SLEEVE ONLY)

1. BARE, SOLID TUBE STEEL SLEEVE
2. MATERIAL LIST- (1) 2 $\frac{1}{4}$ " x 2 $\frac{1}{4}$ " x 105 x 30" SQUARE TUBING

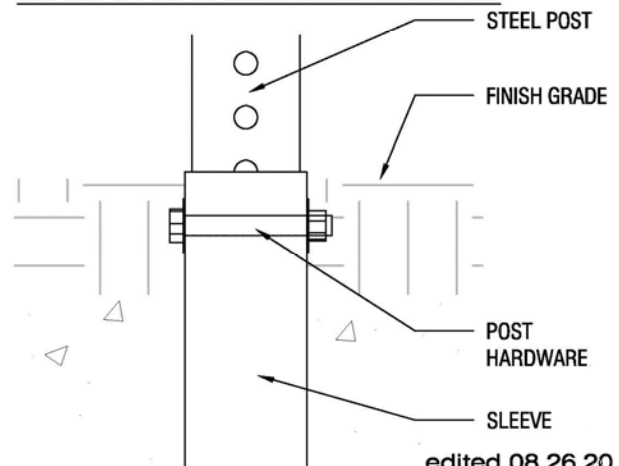


INSTALLATION OF MULTIPLE SIGNS ON SINGLE POST

*Where applicable, sign faces "A" and "D" are to be installed above sign faces "TL" and "TR".



SIDE VIEW OF POST TO SLEEVE CONNECTION ENLARGED



edited 08.26.20
approved 00.00.00



**12" x 18" SIGN
KNOCKDOWN SIGN POST**

**D9.13
A**

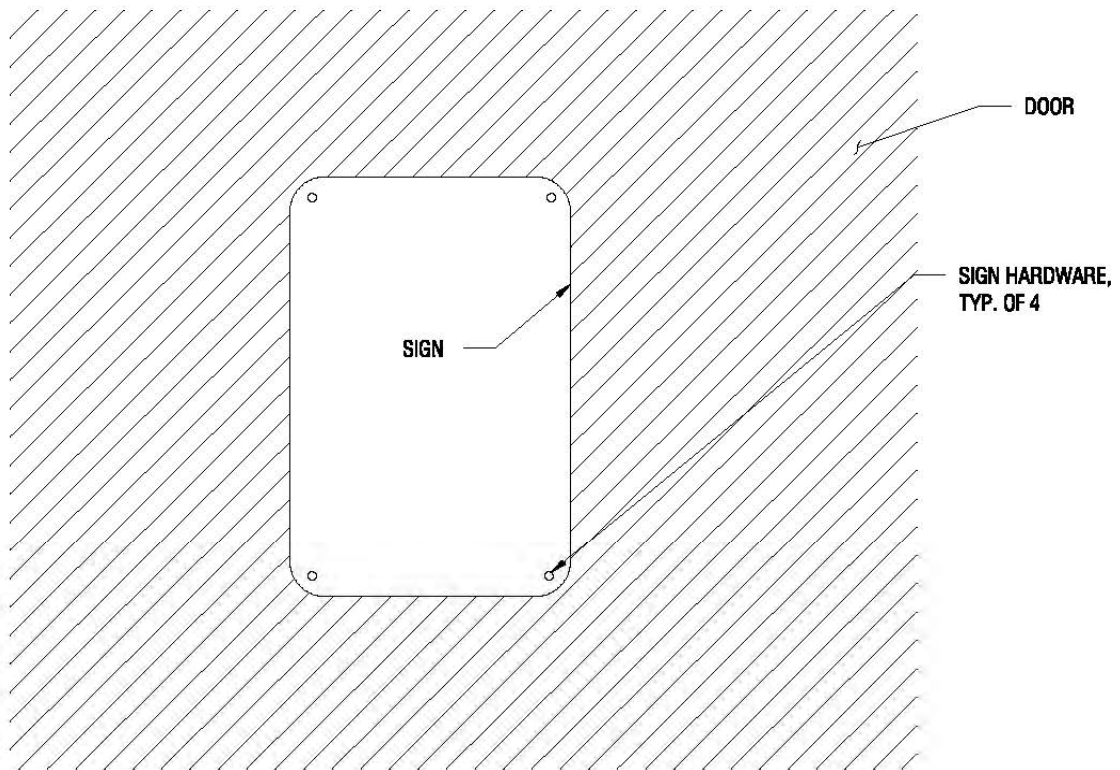
Specification Drawings

INSTALLATION SPECIFICATIONS

1. DRILL PILOT HOLES, MARKED BY TARGETS, THROUGH SIGN USING A $\frac{3}{16}$ " DIA. DRILL BIT. DO NOT DRILL PILOT HOLES INTO DOOR.
2. CENTER THE SIGN HORIZONTALLY ON DOOR. ATTACH SIGN TO DOOR USING MOUNTING HARDWARE.
3. MOUNTING HARDWARE: SIGN TO FRAME- (10) #12-14 x $\frac{3}{4}$ " HEX - UNSLOTTED DRIVE INDENTED HEX WASHER HEAD ZINC FINISH #3 POINT STEEL SELF-DRILLING SCREW. PART #1131817 FROM FASTENAL
REQUIRED DRIVE BIT- $\frac{5}{16}$ " HEX
4. SIGN ORIENTATION MAY VARY



FRONT VIEW



edited 04.29.20
approved 00.00.00



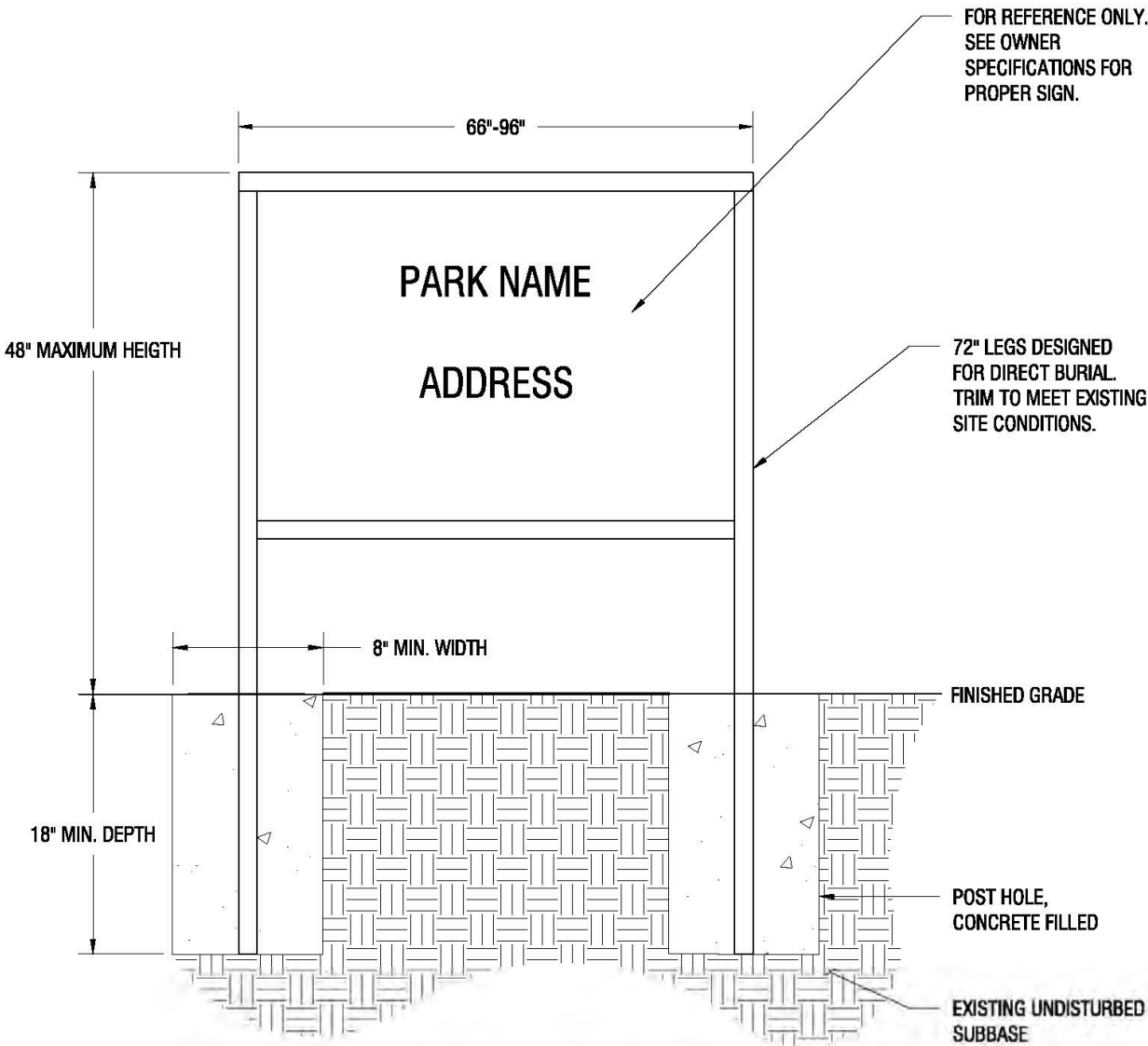
**12" x 18" SIGN
METAL DOOR MOUNT**

**D9.13
D**

Specification Drawings

NOTES

- PER NEIGHBORHOOD SIGN REGULATIONS, THE HEIGHT FOR THE TOP RAIL OF THE SIGN IS NOT TO EXCEED 48".
- SIGN PROVIDED BY OWNER.



B NEIGHBORHOOD PARK ENTRY SIGN INSTALLATION
NTS

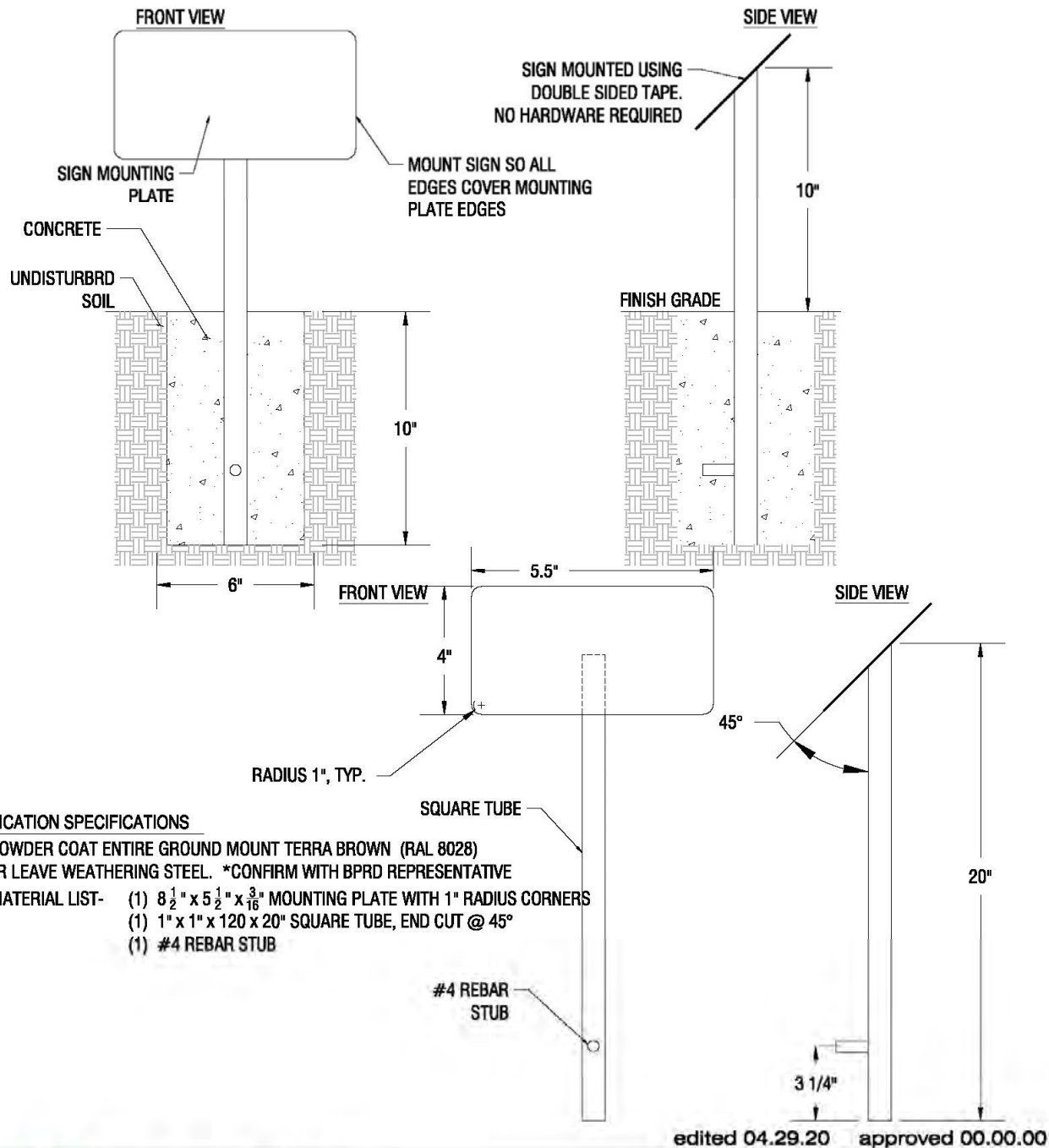
edited 04.29.20
approved 00.00.00

	Direct Bury	D9.15 B
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Specification Drawings

INSTALLATION SPECIFICATIONS

1. DIG HOLE TO DIAMETER AND DEPTH INDICATED IN DETAIL BELOW.
2. $\frac{1}{3}$ 60 LB BAG OF CONCRETE TO BE USED TO INSTALL EACH MOUNT.
3. MOUNTING PLATE MUST BE CLEAN AND DRY TO ENSURE A STRONG BOND WITH DOUBLE SIDED TAPE.
4. MOUNT SIGN TO MOUNTING PLATE USING DOUBLE SIDED TAPE, POLYESTER, 1 INCH, CLEAR. MANUFACTURER # 9088 (GRAINGER ITEM # 24A675)



FABRICATION SPECIFICATIONS

1. POWDER COAT ENTIRE GROUND MOUNT TERRA BROWN (RAL 8028)
OR LEAVE WEATHERING STEEL. *CONFIRM WITH BPRD REPRESENTATIVE
2. MATERIAL LIST- (1) $8\frac{1}{2}" \times 5\frac{1}{2}" \times \frac{3}{16}"$ MOUNTING PLATE WITH 1" RADIUS CORNERS
(1) $1" \times 1" \times 120 \times 20"$ SQUARE TUBE, END CUT @ 45°
(1) #4 REBAR STUB

FILE: U:\Projects\PUA\Projects\2017\0170051.01 - BMD\Alpenglow Phase 2\CONUS CALDWELL\X00 - SITE DETAILS\Sheet 15.dwg PLOT DATE: 8/25/2015 10:23 PM PLOT FILE BY: DAVID KLEBS



Appendix B

Approved Plant and Tree List

1. All trees and plants should be selected from the following list or extension catalog. The use and location of plantings must be reviewed and approved by owner. Exceptions or substitutions must be approved by owner prior to acceptance.

A. Wetland Plants

- 1) Thin leaf alder, *Alnus incana*
- 2) White alder, *Alnus rhombifolia*
- 3) Redosier dogwood, *Cornus sericea*
- 4) Twinberry, *Lonicera involucrata*
- 5) Red flowering currant, *Ribes sanguineum*
- 6) Woods rose, *Rosa woodsia*
- 7) Blue elderberry, *Sambucus cerulea*
- 8) Alpine spirea, *Spiraea densiflora*
- 9) Douglas spirea, *Spiraea douglasii*
- 10) Pacific ninebark, *Physocarpus capitatus*
- 11) Black cottonwood, *Populus balsamifera* ssp. *trichocarpa*
- 12) Stinky currant, *Ribes hudsonianum*
- 13) Prickly currant, *Ribes lacustre*
- 14) Golden currant, *Ribes aureum*

- B. All other plantings: <https://catalog.extension.oregonstate.edu/sites/catalog/files/project/pdf/em9136.pdf>

Appendix C

Native Restoration Plant Palette and Renovation Schedule

1. **Native Restoration Plant Palette:** Per 100 SF, planted in a random spacing and drifts. See following page for example images.

QTY	Botanical Name	Common Name	Size	Notes
<i>Shrubs</i>				
1	Ribes cereum	Wax Currant	1 gal	
1	Chrysothamnus nauseosus	Gray Rabbitbrush	1 gal	
1	Purshia tridentata	Antelope Bitterbrush	1 gal	
1	Artemisia tridentata ss. wyomingensis	Wyoming Big Sagebrush	1 gal	
<i>Grasses</i>				
10	Festuca idahoensis	Idaho Fescue	plug	
5	Achnatherum hymenoides	Indian Ricegrass	plug	
5	Poa secunda	Sandberg Bluegrass	plug	
<i>Perennials</i>				
2	Eriogonum umbellatum	Sulfur Buckwheat	plug	
2	Penstemon humilis	Lowly Penstemon	plug	
2	Penstemon speciosus	Showy Penstemon	plug	
2	Penstemon strictus	Rocky Mountain Penstemon	plug	
2	Penstemon pinifolius	Pineleaf Penstemon	plug	
2	Eriophyllum lanatum	Oregon Sunshine	plug	
2	Achillea millefolium	Common Yarrow	plug	
2	Aquilegia formosa	Western Columbine	plug	

2. Restoration Schedule

Restoration Type	Material	Development Standard Reference
Native Restoration	Plants/Soils	Native Plant Palette, See above Chapter 3, Section 7, Plantings
Ornamental Beds	Plants/Soils	Chapter 3, Section 7, Plantings
Lawn/Sports Field	Turf/Sod	Chapter 3, Section 7, Sod
Pathways/Paving	Concrete Asphalt Pavers TSA	Chapter 3, Section 3, Concrete Paving Chapter 3, Section 3, Asphalt Paving Chapter 3, Section 3, Concrete Unit Paving Chapter 3, Section 3, Soft Surface-Trail Surface Aggregate



Appendix D

Standards Update Record

Previous Development Standard updates have occurred in:

January 2022

June 2021

January 2020

January 2019

January 2018

January 2017

January 2016

January 2015