



Town of Zebulon

SECTION 8 GREENWAY DESIGN STANDARDS

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SECTION 8.1: INTRODUCTION

Overview

This document was created to establish minimum design standards for greenways throughout the Town of Zebulon to protect the health, safety, and welfare of the public and the Town's greenway system. These standards are meant to guide greenway development throughout the Town, ensuring they are safe, accessible, properly interconnected, and have a minimum impact on the natural environment and resources.

The Town of Zebulon Public Works Director will be responsible for interpreting and implementing the greenway design standards criteria. Alternative design methods may be considered by the Public Works Director on a case-by-case basis.



8.1.1 Definitions

Greenway

The Town of Zebulon Greenway System defines greenways as linear, natural areas that may be suitable for access. Some greenways in Zebulon may not be suitable for greenway trail development and benefit the community by remaining as undeveloped open space, providing buffers, environmental preserves, or wildlife corridors.

Greenways connect separate tracts of open space and help protect natural features and processes while maintaining the ecological integrity of the surrounding landscape. When associated with creeks and rivers, greenways serve to protect water quality, with buffers in place to help ensure development does not impact flow, habitats, or associated ecosystems of waterways.

Although greenways are mostly associated with natural areas, they also can serve highly urbanized areas. In these cases, a greenway is usually a linear park system with developed recreational and alternative transportation facilities or park nodes along the length of the system.

Greenway Trails

Greenway trails are constructed public access facilities within greenways or public utility easements. Combined, the individual greenway trails make up a greenway trail network, connecting neighborhoods, schools, parks, and commercial areas. Greenway trails also are referred to as multiuse paths (MUPs), shared-use trails, or side paths when along roadways.

Constructing greenway trails should provide access and connectivity without damaging the valued qualities of the natural environment. Surfacing, drainage, and topography should all be considered during design to help ensure maximum accessibility for users with minimum disturbance to the surrounding environment.



8.1.2 Principles of Greenway Design

Safety

Safety is essential to trails and greenways. This includes minimizing risk, crime, and discrimination. Separated and protected bike facilities and greenway trails provide safe alternatives to unprotected or insufficient on-street facilities that put users at physical risk from automobile traffic. Furthermore, designing these facilities with adequate lighting, maintenance, signage, and access points with clear emergency locations and contact information throughout will help create conditions that deter criminal activity, while providing trail users with a sense of safety and preparation in the event of an emergency. In turn, the feeling a safety encourages more trail use, thereby increasing natural surveillance, further deterring criminal activity with more eyes on the trail.

Accessibility

Trails and trail crossings should permit the mobility of residents of all ages and abilities. The trail network should employ principles of universal design, as well as the Americans with Disabilities Act (ADA) and Architectural Barriers Act (ABA) requirements, ensuring users can find direct routes to destinations regardless of mobility, sensory, or cognitive disability impairments. All roads are legal for the use of pedestrians and bicyclists, meaning that bicycle and pedestrian facilities connecting to the greenway trail system should be designed, marked, and maintained accordingly.

Connectivity

Greenway systems should provide connections to community assets—such as parks, schools, commercial centers, and wildlife preserves—encouraging increased use of greenway routes. The sprawling nature of land development patterns often leaves residents and visitors with no choice but to drive, even for short trips. As part of a local transportation system, a complete greenway trail network offers effective transportation alternatives by connecting homes, workplaces, schools, parks, downtown areas, and cultural attractions.

Environmental Impact

There are a variety of environmental benefits accepted in providing greenways that help protect the essential functions performed by the natural ecosystems. Greenways protect and link fragmented habitats and provide opportunities for protecting plant and animal species otherwise threatened by development. When compared to roads, highways, and parking lots, paved greenway trails are insignificant impervious surfaces that provide access to natural features in the community. The presence of greenway trails has not been shown to materially change the function of storage capacity of a floodplain, according to HEC-1 and HEC-2 studies produced by the U.S. Army Corps of Engineers.

Value

Significant population growth is expected over the next decade for the Town of Zebulon and its extra-territorial jurisdiction. The Zebulon Greenway system will help protect the Town's creek, streams, and floodplains, among other natural assets. A well-integrated system can:

- Increase property values
- Conserve open space
- Provide transportation savings
- Create a network between neighborhoods, parks, and commerce
- Mitigate flooding and soil erosion
- Preserve buffering from development
- Provide public art space
- Enhance the visual aesthetics of the Town

SECTION 8.2: DESIGN GUIDELINE RESOURCES

The guidelines recommended in this document are intended to assist the Town of Zebulon staff and those designing the Town's greenway system in the selection and design of greenway trails. The standards seek to combine the best practices of various public agencies and municipalities nationwide. When designing greenways, users are encouraged to consult with design professionals licensed in the state of North Carolina, such as planners, landscape architects, and engineers, experienced in designing and implementing greenways.

8.2.1 National Guideline Resources

Several resources have been made available to design professionals concerning road, sidewalk, and greenway trail design at a national level. These guidelines can serve as a framework for designers and additional resources to this document.

The Federal Highway Administration's **Manual on Uniform Traffic Control Devices** (MUTCD) defines the standards used by road engineers nationwide to install and maintain traffic control devices on public streets, highways, greenway trails, and private roads open to public traffic. This manual is the primary source for guidance on lane striping requirements, signal warrants, and recommended signage and pavement markings. The manual includes an experimental table of contemporary bicycle facilities that lists various bicycle-related signs, markings, signals, and other treatments and identifies their official status.

The American Association of State Highway and Transportation Official's (AASHTO) **Guide for the Development of Bicycle Facilities**¹ provides information for the dimensions, use, and layout of specific bicycle facilities. The guide includes information on sidewalk widths, bicycle lane dimensions, striping requirements, and recommended signage.

The National Association of City Transportation Official's (NACTO) **Urban Bikeway Design Guide**² provides cities with state-of-the-practice solutions to create complete streets that are safe and enjoyable for bicyclists. The guide was developed by bicycle-friendly cities worldwide to invent innovative solutions to urban street problems.

All greenway trails and facilities shall comply with the ABA and the ADA. The United States Access Board's proposed **Public Rights-of-Way Accessibility Guidelines**³, the **2010 ADA Standards for Accessible Design**⁴ and the Architectural and Transportation Barriers Compliance Board's **Shared Use Path Accessibility Guidelines**⁵ contain standards and guidance for constructing accessible facilities, including sidewalk curb ramps, slope requirements, and pedestrian railings.

¹ https://nacto.org/wp-content/uploads/2015/04/AASHTO_Bicycle-Facilities-Guide_2012-toc.pdf

² <https://nacto.org/publication/urban-bikeway-design-guide/>

³ <https://www.access-board.gov/guidelines-and-standards/streets-sidewalks/public-rights-of-way/proposed-rights-of-way-guidelines>

⁴ <https://www.ada.gov/regs2010/2010ADASTandards/2010ADASTandards.htm>

⁵ <https://www.access-board.gov/guidelines-and-standards/streets-sidewalks/shared-use-paths/supplemental-notice>

8.2.2 State Guideline Resources

Additional resources available at the state level help ensure greenway trails conform to the safety, accessibility, and aesthetic standards expected of the public.

The North Carolina Department of Transportation (NCDOT) **Complete Streets Planning and Design Guidelines**⁶ outlines ways communities can incorporate various modes of transportation when developing new projects. The guidelines explain how new policies will be implemented to promote collaboration between NCDOT and cities, towns, and communities during the planning and design phases to best serve communities with transportation options.

NCDOT also provides the **Statewide Pedestrian and Bicycle Plan**⁷, a framework for improving bicycle and pedestrian transportation as a means to enhance communities. The plan is centered around 5 principles—safety, health, economy, mobility, and environment.

The **North Carolina Bicycle Facilities Planning and Design Guidelines** were developed by NCDOT's Division of Bicycle and Pedestrian Transportation and contribute to designing and constructing safe bicycle facilities.

The **2012 North Carolina Building Code** (NCBC)⁸ is intended to protect public health, safety, and welfare during design and construction, without increasing construction costs or restricting material usage. The building code most recently adopted by the Town of Zebulon should be consulted when designing any structure, including railings, fencing, bridges, and restrooms.

8.2.3 Local Guideline Resources

Local resources at the county, city, or town level, provide design professionals with information specific to the ordinances, provisions, and geography of the area in which they are designing.

The **Wake County Greenway System Plan**⁹ outlines the County's vision to create a connected and comprehensive system of greenway trails. The plan includes goals for the County's greenway system and design recommendations and implementation strategies.

The **Town of Zebulon Unified Development Ordinance**¹⁰ (UDO) provides the Town's vision of a sense of place while protecting the natural environment. The ordinance discusses zoning, development standards, and enforcement policies. This ordinance should be consulted whenever new greenway trail development is considered.

The **Town of Zebulon Street and Storm Drainage Standards and Specification Manual**¹¹ was established to assist developers and engineers with designing and constructing stormwater infrastructure, streets, roadways, and sidewalks. The manual provides methods, procedures, and standard specifications to establish minimal guidelines for new developments.

⁶ https://www.completestreetsnc.org/wp-content/themes/CompleteStreets_Custom/pdfs/NCDOT-Complete-Streets-Planning-Design-Guidelines.pdf

⁷ <https://www.ncdot.gov/bikeped/walkbikenc/default.aspx>

⁸ https://up.codes/viewer/north_carolina/ibc-2009

⁹ http://www.wakegov.com/parks/about/Documents/masterplan/Greenway%202017/1_Introduction.pdf

¹⁰ https://www.townofzebulon.org/sites/default/files/uploads/planning/adopted_udo.pdf

¹¹ https://www.townofzebulon.org/sites/default/files/uploads/public-works/street_and_storm_drainage_standards_specifications_manual.pdf

SECTION 8.3: DESIGN STANDARDS

This document states minimum design standards for implementing the Town of Zebulon's greenway network. The standards are founded on best practices and accepted guidelines for greenway facilities throughout the U.S. and should apply to both public and private off-road additions to the Town's greenway network. Applying these standards will help ensure that all aspects of the greenway vision are met through consistent design.

Because greenway facility design is a broad topic that covers many issues, the drawings and standards outlined in this document should not be interpreted as a substitute for more thorough, site-specific, professional design and engineering work. Each segment of the greenway network should be evaluated, designed, and constructed in consultation with qualified and licensed professional engineers and landscape architects.



8.3.1 Greenway Trails

Greenway trails provide two-way travel through several environments and serve a variety of users, including walkers, runners, and bicyclists. The following greenway trail guidelines are based on the most recent versions of widely accepted regulatory guidelines that are amended and supplemented throughout this section.

- All greenway trails shall meet ADA standards as outlined in the *2010 ADA Standards for Accessible Design Chapter 4* and the ABA standards as outlined in the ABA Accessibility Standards Chapter 4. For running slope requirements see Figure 8.3.1.B.
- All proposed greenway trails require a greenway-specific geotechnical report from a North Carolina registered geotechnical engineer.
- All greenway trails shall have a minimum width of 10-foot paved surface, with a 2-foot-wide compacted aggregate shoulder on both sides of the trail.
- Greenway trails shall be paved with a minimum 2-inch asphalt surface course, Type SF 9.5A per NCDOT standards. Greenway areas subject to frequent flooding shall be constructed using a concrete greenway surface.
- Greenway trails shall have a minimum 6-inch aggregate subbase course, as specified in Section 520 in the NCDOT Standard Specifications for Roads and Structures. Additional subbase may be required based on a greenway-specific geotechnical investigation and recommendation. Geotextile fabric may be used for unsuitable soils.
- Greenway trails shall have a maximum 2% cross slope.
- Greenway trails shall have thermoplastic, reflective centerline striping within 50 feet of blind curves, bridge approaches, and intersections with roadways.
- Proposed greenway trail design and construction must adhere to all state and local stream buffer requirements.
- Proposed greenway trail design and construction shall minimize land disturbance and preserve existing vegetation to the greatest extent possible.
- Greenway boardwalks shall be designed to mitigate concentrated flows of stormwater using best practices outlined in NCDEQ's Stormwater BMP Manual Part E-5.
- Vertical clearance shall be a minimum of 10 feet for emergency vehicle access.
- Horizontal curves shall have a minimum 60-foot radii, per NCDOT standards. When ample room exists, curves greater than 60-foot radii shall be implemented.
- Site drainage shall be collected on the upside of the greenway trail and piped under the trail with a 12-inch minimum reinforced concrete pipe.
- Diversion ditches shall be used to collect water on the upside of the trail. Ditches shall be a minimum of 2-feet away from the greenway trail's compacted shoulder.
- All drainage culverts shall be reinforced concrete piping class 3, following Town of Zebulon standards. Culverts shall have a minimum of 12-inches of compacted fill between the pipe and trail surface.
- A Class B rip rap dissipater with filter fabric below shall be installed at any pipe outflow.

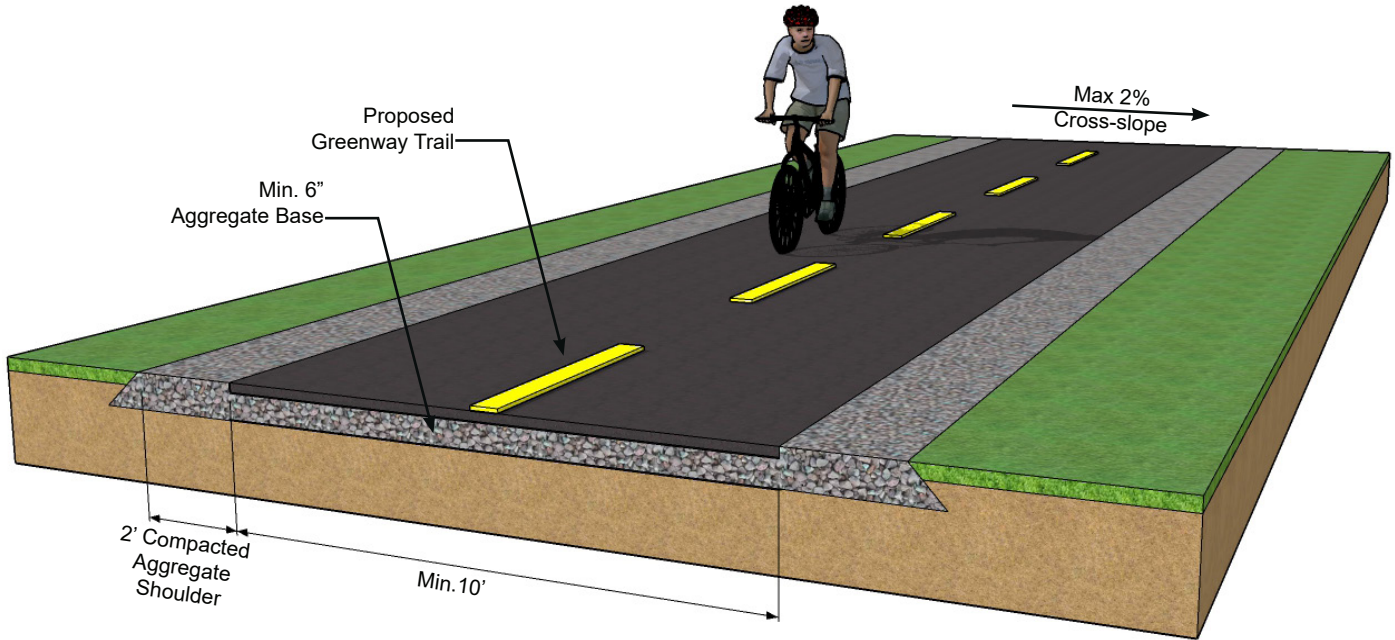


Figure 8.3.1.A

Source: ABA Standards Section 1017.7.1

MAX RUN OF GREENWAY TRAIL SLOPE	MAX DISTANCE BETWEEN LEVEL LANDINGS
0 to 5%	Any distance
>5 to 8.33%	200 feet of run
>8.33 to 10%	30 feet of run*
>10 to 12%	10 feet of run*

*No more than 30% of the total length of a trail shall have a running slope steeper than 8.33%

Figure 8.3.1.B

8.3.2 Greenway Trailheads

Greenway trailheads serve as access points for the Town of Zebulon's greenway trail system. They should be established near residential developments and may include parking lots, restrooms, greenway signage for wayfinding and trail information, and other recreational amenities. All trailheads, major and minor, shall include rules and regulation signage. Trailheads should be located where they will be most convenient to the largest concentrations of trail users. All greenway trails that intersect with a public or private roads shall provide access for bicycles and greenway maintenance vehicles.

8.3.2.1 Major Greenway Trailheads

- Major greenway trailheads shall include a 10-foot wide concrete driveway apron, complying with Town's Streets and Storm Drainage Standards and Specifications 2.2.2, with a maximum slope of 5%.
- Driveway aprons must be accessible by greenway maintenance vehicles (See figure 8.3.2.1.A).
- Driveway aprons shall connect to a 10-foot width asphalt spurtrail (a trail connecting the trailhead to the main greenway trail network), designed to the same standard as a greenway trail per Section 8.3.1.
- Major greenway trailheads shall be secured with a retractable bollard (see Section 8.4, detail G4), located 25-feet from the start of the driveway apron, and centered on the greenway trail. Where trailheads provide vehicular access off-trail, protective elements such as boulders shall be provided within 5 feet of the trail surface. The standards set forth shall not prevent maintaining a minimum 4-foot clearance for greenway visitors, per NCBC 1104.1.
- Major greenway trailhead entrances shall include retroreflective signage displaying STOP facing the greenway trail per MUTCD Section 9B.03, and displaying NO MOTOR VEHICLES facing adjacent parking or roadways per MUTCD Section 9B.08. (See figure 8.3.2.1.B)
- Major greenway trailheads designed and constructed alongside new neighborhood developments shall include one (1) parking space per 50 dwelling units. Parking lots shall include ADA accessible parking spaces in numbers complying with ADA Accessibility Guidelines Table 4.1.2 (5) and marked according to ADA Accessibility Guidelines Section 4.6.

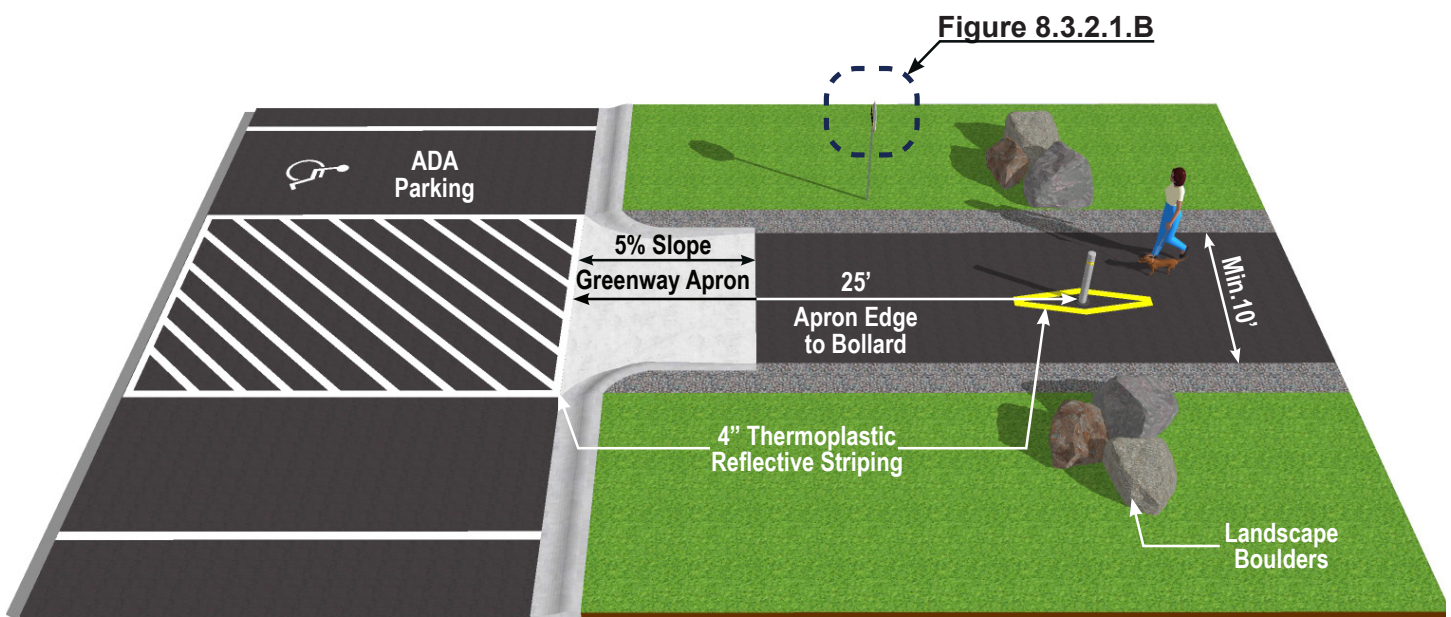


Figure 8.3.2.1.A

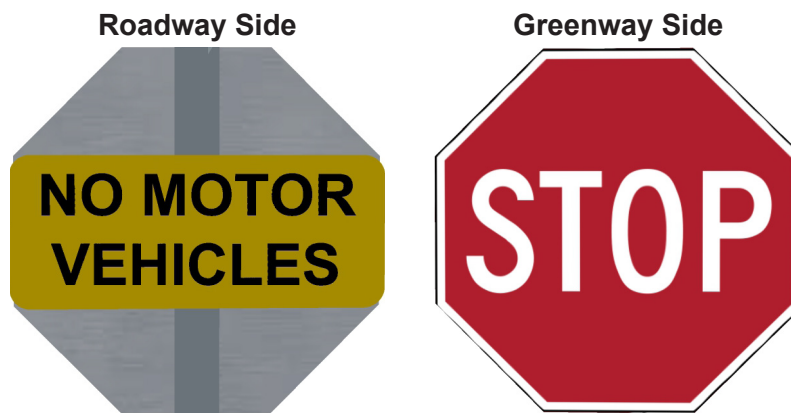


Figure 8.3.2.1.B

8.3.2.2 Minor Greenway Trailheads

- Minor greenway trailheads shall provide emergency and greenway maintenance vehicle access.
- New developments adjacent to the greenway trail system are required to include a minimum of one (1) minor greenway trailhead.
- Minor greenway trailheads may include parking, but it is not required.
- Minor greenway trailheads shall include a 10-foot-wide spurtrail, paved with cast-in-place concrete, constructed per NCDOT Standard Detail 848.01.
- Spurtrails at minor greenway trailheads shall include a connection to a residential sidewalk at a 90° angle (see figure 8.3.2.2.A).
- Major greenway trailheads shall be secured with a retractable bollard (see Section 8.4, detail G4), located 25-feet from the start of the driveway apron, and centered on the greenway trail. Where trailheads provide vehicular access off-trail, protective elements such as boulders shall be provided within 5 feet of the trail surface.
- Sidewalks connecting to minor greenway trailheads shall be at least 5-feet-wide per Town of Zebulon UDO, paved with cast-in-place concrete, constructed per NCDOT Standard Detail 848.01.
- Sidewalks shall be compliant with the 2010 ADA Standards for Accessible Design Chapter 28 CFR 35.151.
- Minor greenway trailheads shall use 24-inch rolled curbs between sidewalk and roadway.

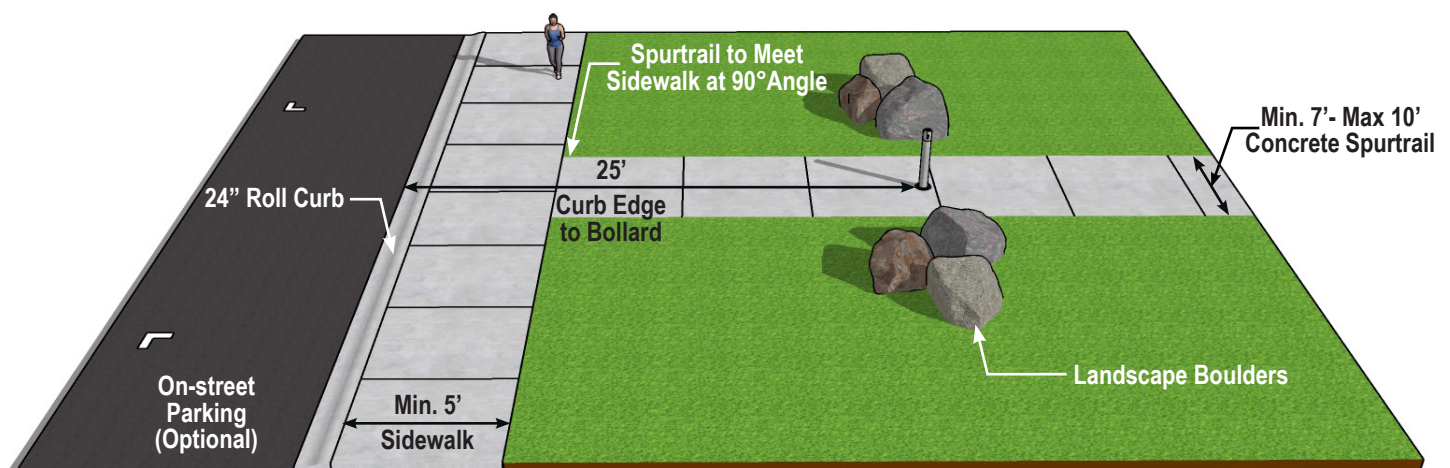


Figure 8.3.2.2.A
Town of Zebulon

8.3.3 Greenway Boardwalks

Greenway Boardwalks are structures that span over sensitive natural or inundated areas while limiting the potential for environmental impact. The following greenway boardwalk guidelines are based on the most recent versions of widely accepted regulatory guidelines that are amended and supplemented throughout this section.

- Greenway boardwalks shall have a minimum of 12-feet of clearance width.
- Greenway boardwalks shall have a minimum of 24-inches of clearance from finished floor height to top of the adjacent finish grade. The bottom-most support beam at any section of the boardwalk shall be above the 100-year storm elevation.
- Greenway boardwalks shall have a 54-inch-high guardrail composed of timber and chain link fencing. Attached to the guardrail shall be a 1-inch-by-6-inch lpe rub rail. The bottom of the rub rail shall be at 34-inches above-finished floor (AFF). Chain link fencing shall have a 2-inch mesh size comprised of 8-gauge core wire with dark green polyolefin elastomer permafused coating.
- Guardrail is required to support 200 pounds of force as required by the North Carolina Building Code.
- Greenway boardwalks shall be constructed with timber, concrete, or steel depending on site conditions. Glued laminated timber shall not be used.
- Larger dimensional lumber, such as 2-inch-by-6-inch boards, shall be .60 chromated copper arsenate.
- Greenway boardwalk foundations will consist of a marine grade timber posts or auger piers screw anchors. If timber posts are used, they must driven to a minimum of 10-feet into the adjacent ground.
- All hardware, bolts, nuts, and washers shall be factory galvanized. All screws shall be pre-drilled, coated, or stainless steel.
- A professional structural engineer is required for all board member sizing and post footing designs.
- Timber and concrete greenway boardwalks shall be designed following the most current AASHTO Standard Specifications for Highway Bridges. Design Live Load shall be for an AASHTO H10 vehicle.
- Greenway boardwalks shall be designed to mitigate concentrated flows of stormwater using best practices outlined in NCDEQ Stormwater BMP Manual Part E-5.
- A geotechnical report shall be submitted to the structural engineer of record and to the Town indicating that the soil properties can support the proposed foundation loads before boardwalk construction.
- Designing and constructing greenway boardwalks shall minimize land disturbance and preserve existing vegetation to the greatest extent possible.
- Greenway boardwalk structures shall not be located within the Town of Zebulon sanitary sewer easements.
- When boardwalks are located in wetland or over a blue line stream, local, state, and federal permits will be required. Coordination with the Town and relevant review agencies will be needed.

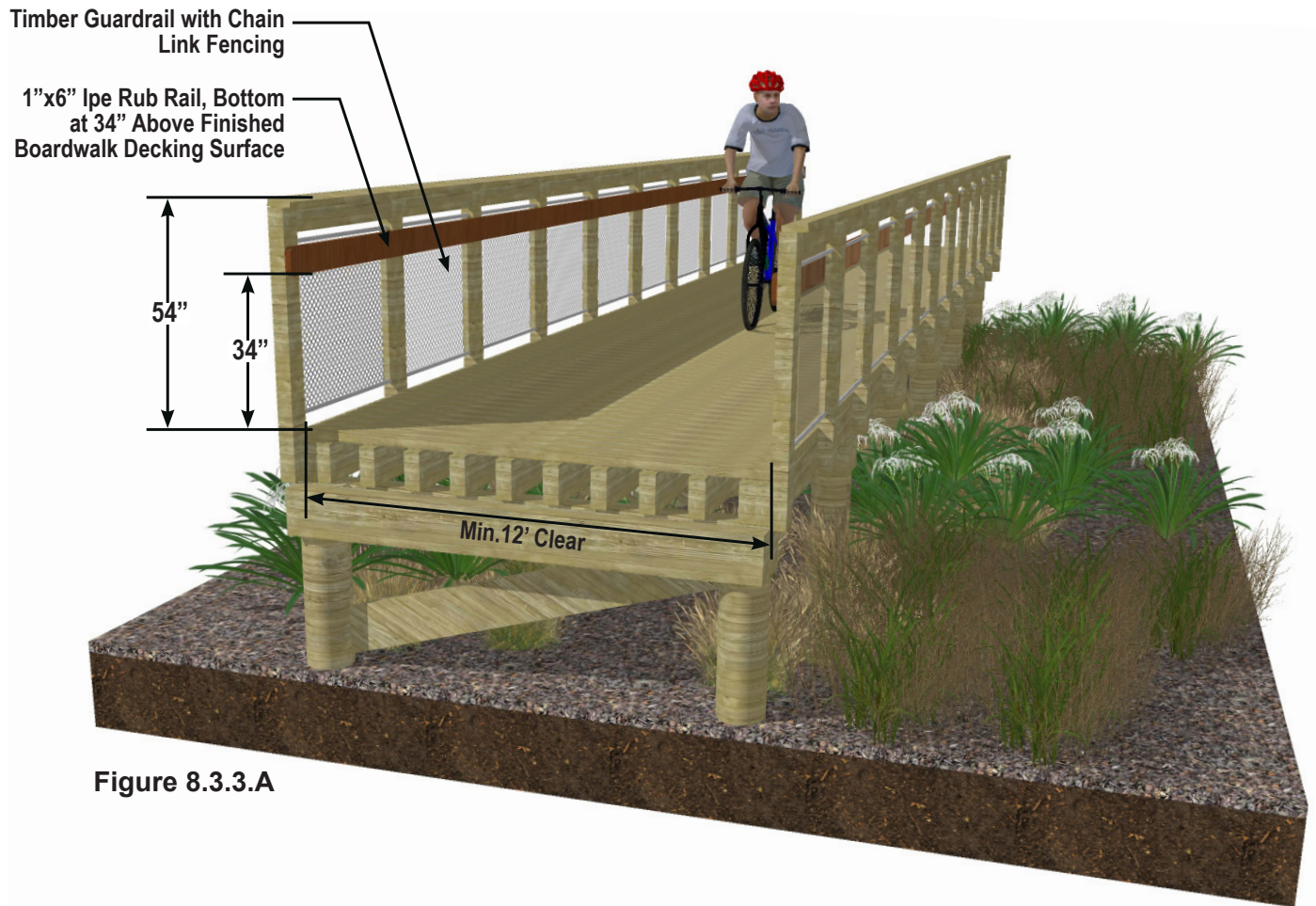


Figure 8.3.3.A

8.3.4 Greenway Bridges

Greenway bridges may be required for access over natural features, such as streams and rivers, as required to meet State of North Carolina and federal guidelines.

- All greenway bridges shall be designed, reviewed, and sealed by a licensed professional in the state of North Carolina.
- Greenway bridges crossing roads owned and maintained by NCDOT require approval from the Department, including all necessary permits and agreements.
- Local building permits, development permits, and all other regulatory entitlements are required before greenway bridge construction.
- All greenway bridges shall meet current AASHTO, ADA, and ABA standards, including ramp slopes and handrail specifications.
- Greenway bridges shall be prefabricated, arch style, and composed entirely of weathered steel, except for decking and rub rails.
- Decking shall be cast-in-place concrete with a Design Live Load for an AASHTO H10 vehicle.
- Rub rails shall be 2-inch-by-8-inch lpe, and shall be installed so that the bottom of the rub rail is at 34-inches AFF (See figure 8.3.4.B).
- Greenway bridges shall have a minimum clearance width of 12-feet.
- Greenway bridges shall include a minimum 15-foot-long cast-in-place concrete approach on both sides of the bridge (See Figure 8.3.4.C). Bridge approaches shall match the width of the bridge.
- Adjacent to the concrete approach shall be composite safety fencing, tapered down to 6-inches above finish grade on both sides (See Figure 8.3.4.C).
- Greenway bridges shall have a minimum overhead clearance of 10-feet.
- When greenway bridges are located in wetlands or over a blue line stream, local, state, and federal permits will be required. Coordination with the Town and relevant review agencies will be needed for guidance on elevation.

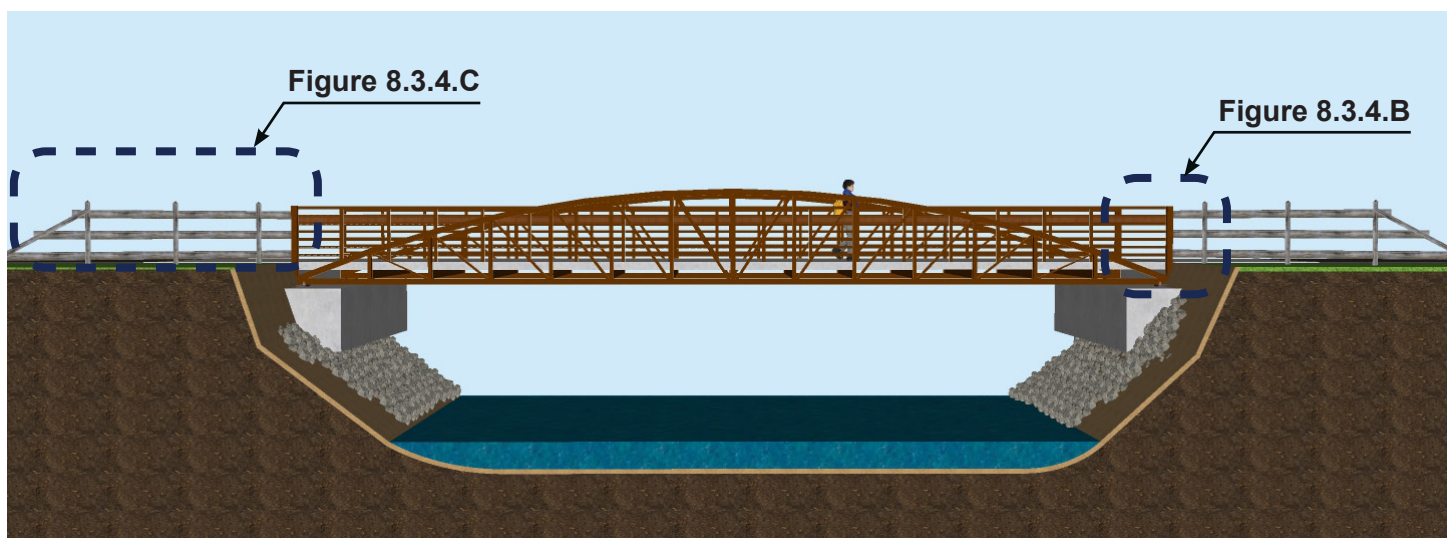


Figure 8.3.4.A

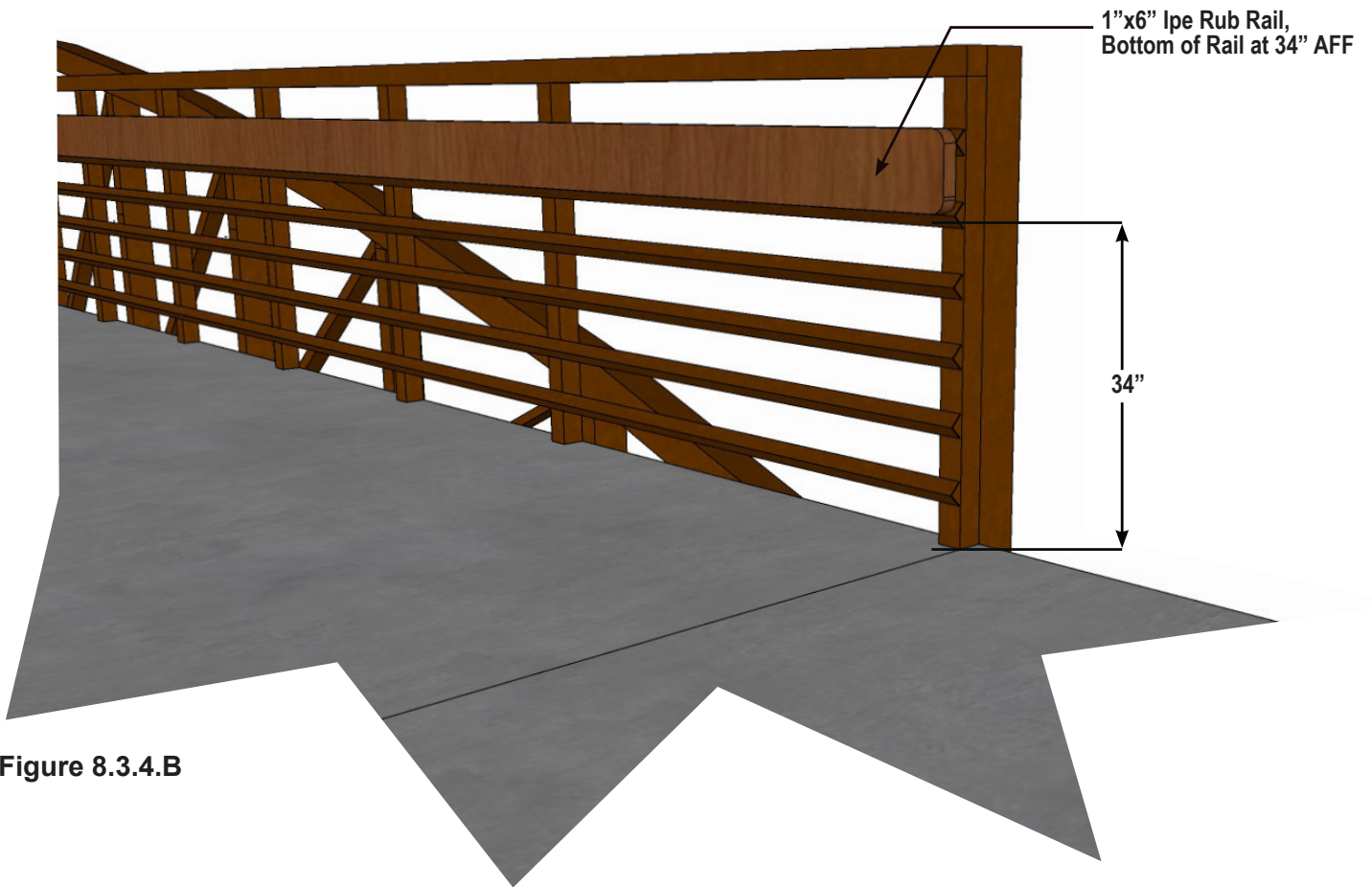


Figure 8.3.4.B

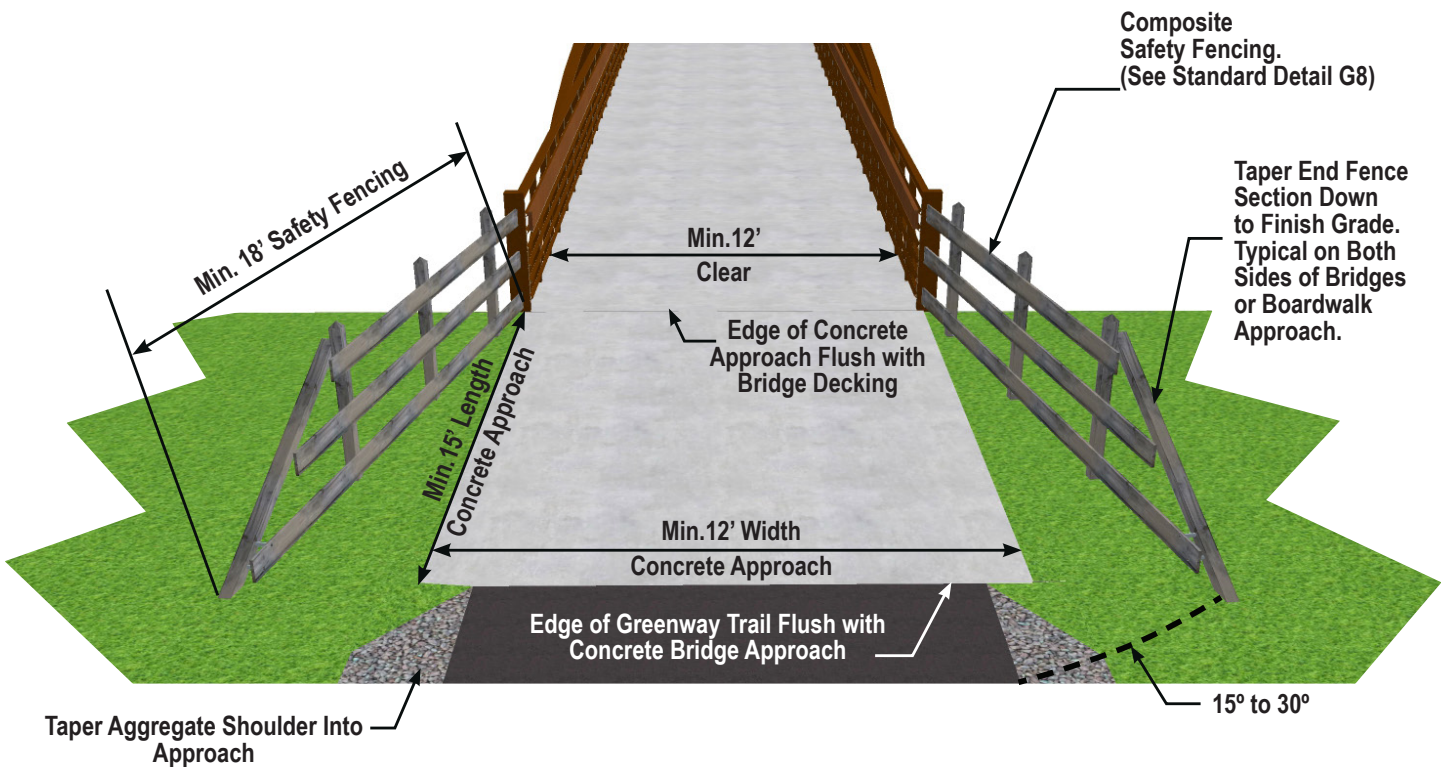


Figure 8.3.4.C

8.3.5 Greenway Underpasses and Tunnels

Greenway underpasses or tunnels may be required to avoid undesirable at-grade intersections of trails and high-volume vehicular roadways. However, they should be used sparingly in suburban or rural areas and use existing overhead roadway bridges when possible.

- All greenway underpasses and tunnels shall be designed, reviewed, and sealed by a licensed professional in the state of North Carolina. All underpasses and tunnels crossing roads owned and maintained by NCDOT shall receive Department approval before any work begins within the right-of-way.
- Greenway underpasses and tunnels shall have a minimum width of 12-feet and a minimum vertical clearance of 10-feet.
- Greenway underpasses and tunnels shall be 12-foot-by-12-foot reinforced poured-in-place concrete structures as specified by NCDOT.
- Headwalls with wingwalls are required at all entrances of greenway underpasses and tunnels.
- Underpasses and tunnels shall have a minimum daytime illumination of 10-foot candles and a minimum nighttime illumination of 4-foot candles. Power meters for tunnel lighting shall be located above the 100-year flood elevation and a minimum of 8-feet above trail surface.
- Proper drainage must be established to avoid stormwater pooling. A minimum 2% longitudinal slope is required for positive drainage. Cross slope shall be at a maximum of 2%.
- Trench drainage may be necessary at underpass and tunnel entrances to intercept water from pooling within the tunnel.

8.3.6 Retaining Walls

Retaining walls are often necessary within greenways to provide level and stable slopes on which greenway trails can be built. Modular walls are low-cost options and provide additional flexibility where access for concrete trucks may be limited such as when a trail is constructed in wooded or natural areas. The design of retaining walls taller than 30-inches shall be sealed by a licensed professional in the state of North Carolina.

- Building permits for retaining walls must be obtained following local permitting authorities.
- All retaining walls shall be at the lines, grades, and depths as shown on the approved plans.
- The base block size shall be a commercial block with minimum dimensions of 8-inches-high, by 18-inches-wide, by 18-inches-deep. Compact mini blocks or garden-size blocks are not acceptable. The block color shall be light tan or gray.
- All block retaining walls shall have a masonry cap on top of the wall.
- The selected retaining wall systems shall be joined, pinned, and secured per the manufacturer's recommendations.
- Retaining walls that are 30-inches or taller and located adjacent to a trail shall have a 42-inch tall metal safety rail on top of the wall. Safety rails shall be designed and installed with a wall.
- For retaining walls that require screening with plantings, no plantings shall be located such that they will encroach into the trail or trail shoulders at plant maturity.

8.3.7 Greenway Signage and Amenities

Greenway signage indicates and alerts various path locations and conditions for greenway users such as mile markers, greenway connections, steep grades, hazardous trail conditions, or narrow trails. Regulatory and warning signage notify greenway users of location-specific regulations and unexpected trail conditions that may require a reduction in speed or other action. Examples of common greenway regulatory signage can be found in Figure 8.3.7.A. Wayfinding signage assists path users in estimating their progress and provides a means for identifying the location of emergency incidents by indicating distances, trail names, and directions. Examples of common greenway wayfinding signage can be found in Figure 8.3.7.B. Refer to Table 9B-1 in the MUTCD document for allowable path signage and signage dimensions.

Greenway amenities, for this document, include furnishings such as bike racks, benches, and trash receptacles; pet waste stations; bike repair stations; and water fountains. These amenities are spaced at even intervals throughout the greenway system to provide users with an opportunity to rest, rehydrate, and dispose of any waste. The spacing of these amenities may vary by trail design, but all amenity spacing shall be approved by the Town of Zebulon Planning Director before installation.

- Greenway regulatory and wayfinding signage, except for mile marker signs, shall be mounted on 3-inch-by-3-inch square aluminum, powder-coated, posts. Signage shall also be mounted on a 2-foot-by-3-foot concrete foundation slab. Refer to Section 8.4, detail G9 in this document.
- Greenway signs shall be placed a minimum of 50-feet in advance of the trail change or hazard they are indicating.
- Greenway signage shall be retroreflective and conform to the color, legend, and shape requirements described in MUTCD Table 9B-1.
- If a greenway trail crosses a roadway, regulatory signage shall be added to the roadway to alert motorists of the crossing. For allowable regulatory signage at roadway crossings, refer to MUTCD Intersection Warning Sign Template, Signs W2-1, -2, -3, -4, and -5.
- No portion of a greenway sign or its support shall be placed less than 2-feet laterally from the near edge of the greenway trail.
- Mounting height for post-mounted signs on greenway trails shall be a least 3-feet high, measured vertically from the bottom of the sign to the elevation of the near edge of the path surface, and shall not exceed 8-feet high.
- Mile marker signs shall be placed at ¼-mile intervals along all greenway trails. At a minimum, mile marker signs shall include the trail mile but also may include the trail name. Mile marker signs shall be at least 3-feet tall. Refer to Section 8.4, detail G10 in this document.
- Signage and amenities shall be set back an additional minimum of 3-feet from trails.
- All benches, trash cans, and bike racks shall be secured to concrete foundation slabs with redhead type fasteners.



Figure 8.3.7.A



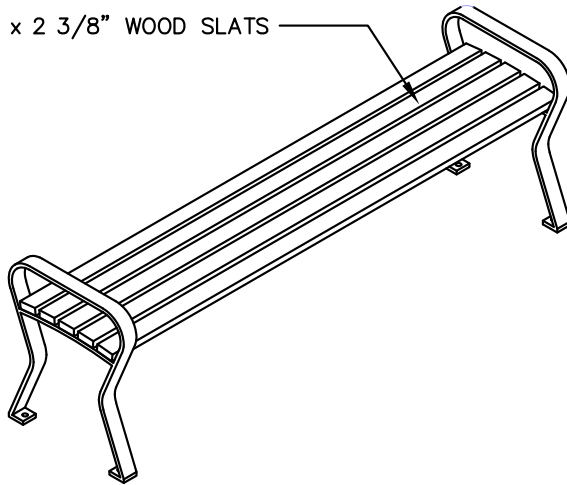
Figure 8.3.7.B

SECTION 8.4: STANDARD DETAILS

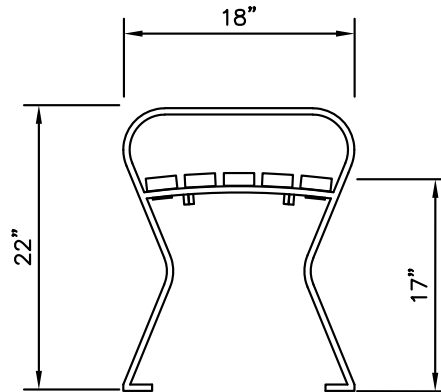
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G6 Standard Greenway Bike Repair Station	27
G7 Standard Greenway Pet Waste Station	28
G8 Standard Greenway Tapered Safety Fence	29
G9 Standard Greenway Signage and Wayfinding	30
G10 Standard Greenway Mile Marker	31

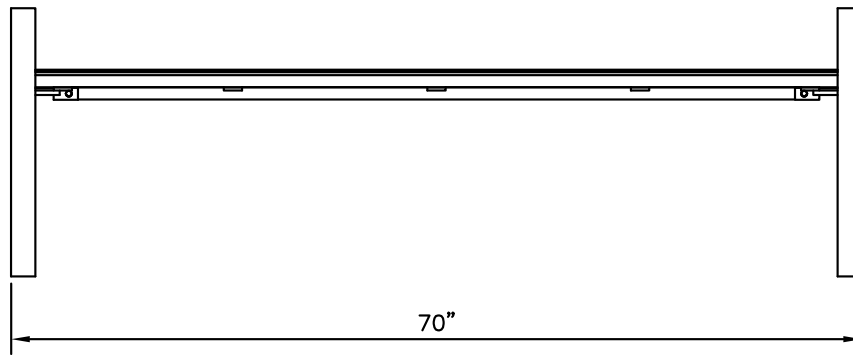
1" x 2 3/8" WOOD SLATS



PERSPECTIVE VIEW



SIDE VIEW



FRONT VIEW

NOTES:

1. SURFACE MOUNT PER MANUFACTURER'S RECOMMENDATIONS
2. PRODUCT SHOWN IS VICTOR STANLEY RBW-12 BENCH
3. ACCEPTABLE ALTERNATIVE PRODUCTS INCLUDE:
 - THOMAS STEELE WALDEN II FLAT BENCH
 - DUMOR BENCH 163

FINISH SCHEDULE:

POST: TGIC POLYESTER POWDER COAT (BLACK) PER MANUFACTURER'S STANDARDS FINISH SCHEDULE.
SEATING SURFACE: IPE



TOWN OF ZEBULON

STANDARD GREENWAY BENCH

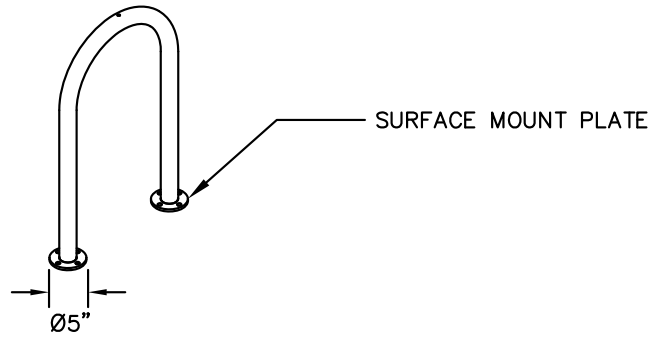
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SCALE:
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DATE:

DETAIL #
G1

SHEET #
1 OF 1

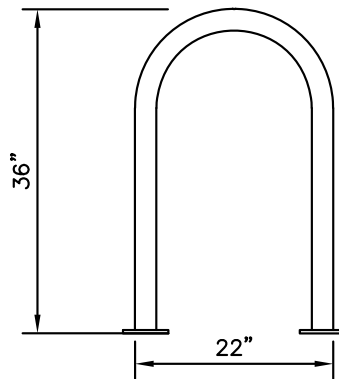


PERSPECTIVE VIEW

FORMED FROM Ø2-3/8" SCHEDULE 40 STEEL PIPE



SIDE VIEW



FRONT VIEW

NOTES:

1. SURFACE MOUNTED PER MANUFACTURER'S RECOMMENDATIONS
2. PRODUCT SHOWN IS VICTOR STANLEY BIKE RACK BRWS-101.
3. ACCEPTABLE ALTERNATIVE PRODUCTS INCLUDE:
 - DUMOR BIKE RACK 83
 - DERO HOOP RACK

FINISH SCHEDULE:

TGIC POLYESTER POWDER COAT (BLACK) PER MANUFACTURER'S STANDARDS FINISH SCHEDULE.



TOWN OF ZEBULON

STANDARD GREENWAY BIKE RACK

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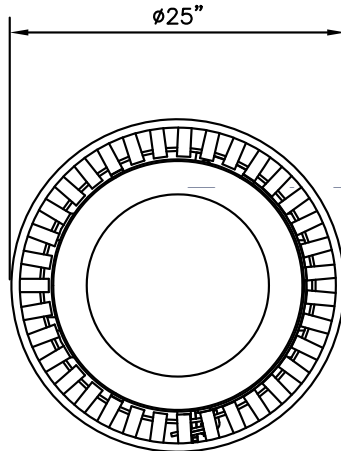
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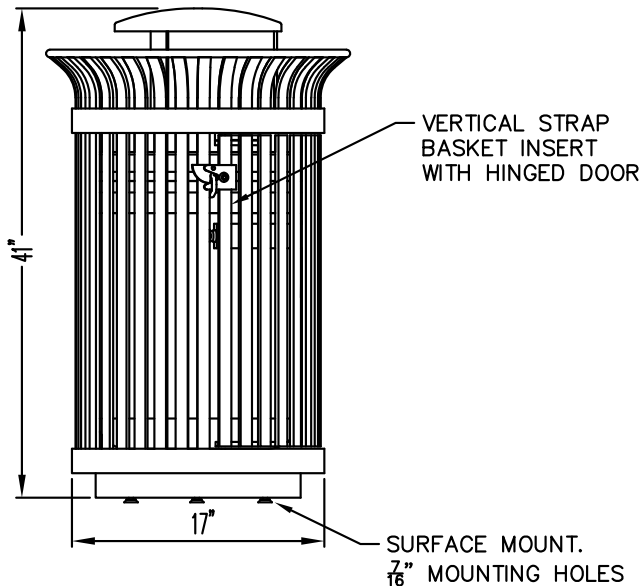
DETAIL #
G2

SHEET #

1 OF 1



TOP VIEW



FRONT VIEW

NOTES:

1. ALL TRASH RECEPTACLES SHALL HAVE HINGED DOORS ON THE SIDE FOR TRASH REMOVAL.
2. PRODUCT SHOWN IS VICTOR STANLEY TRASH RECEPTACLE SD-35.
3. ACCEPTABLE ALTERNATIVE PRODUCTS INCLUDE:
 - LANDSCAPEFORMS SCARBOROUGH TRASH RECEPTACLE
 - DUMOR TRASH RECEPTACLE 157

FINISH SCHEDULE:

TGIC POLYESTER POWDER COAT (BLACK) PER MANUFACTURER'S STANDARDS FINISH SCHEDULE.



TOWN OF ZEBULON

STANDARD GREENWAY TRASH RECEPTACLE

USE WITH STANDARD SPECIFICATIONS ONLY

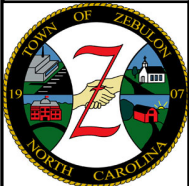
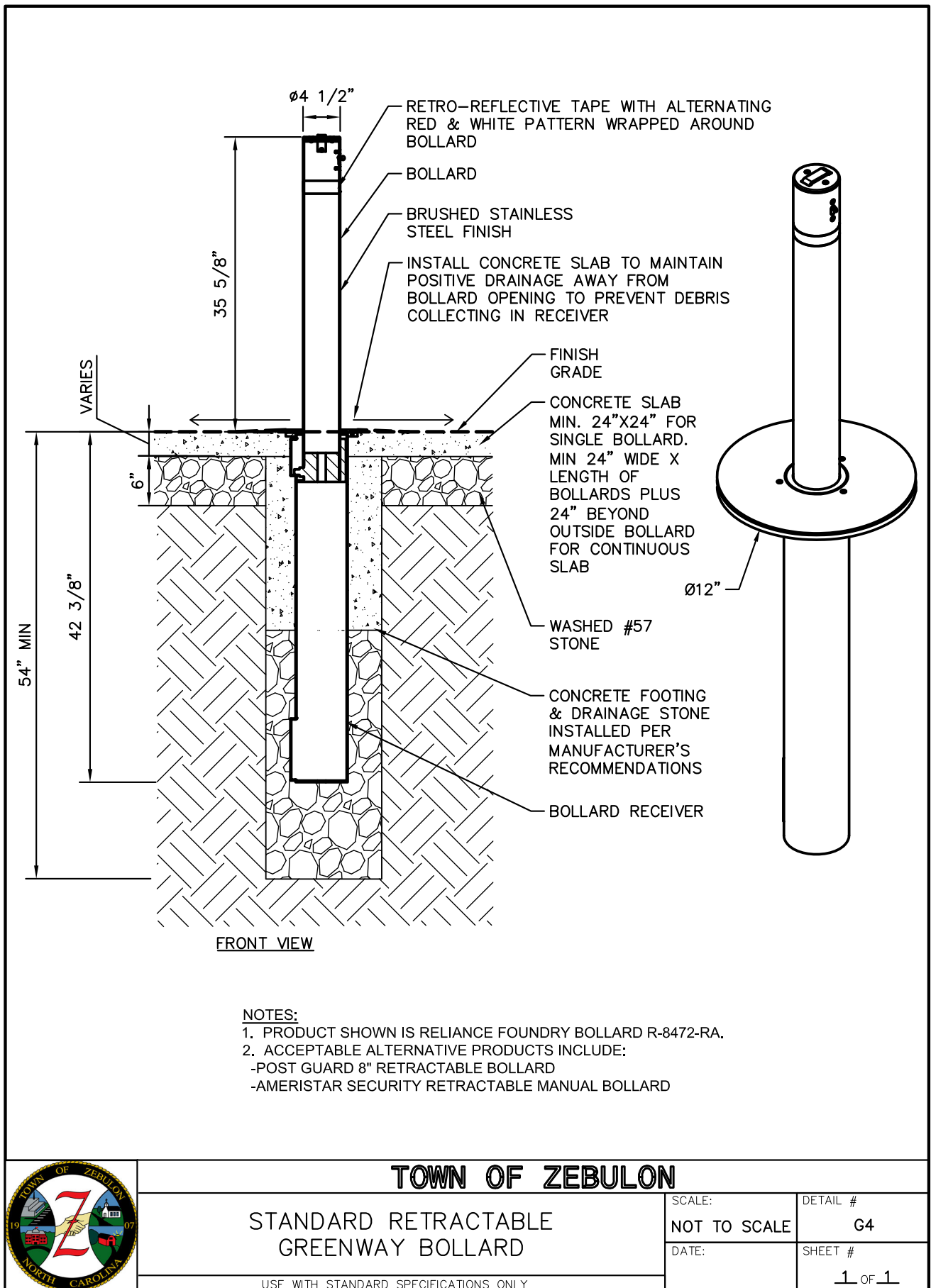
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DETAIL #
G3

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SHEET #

1 OF 1



TOWN OF ZEBULON

STANDARD RETRACTABLE GREENWAY BOLLARD

USE WITH STANDARD SPECIFICATIONS ONLY

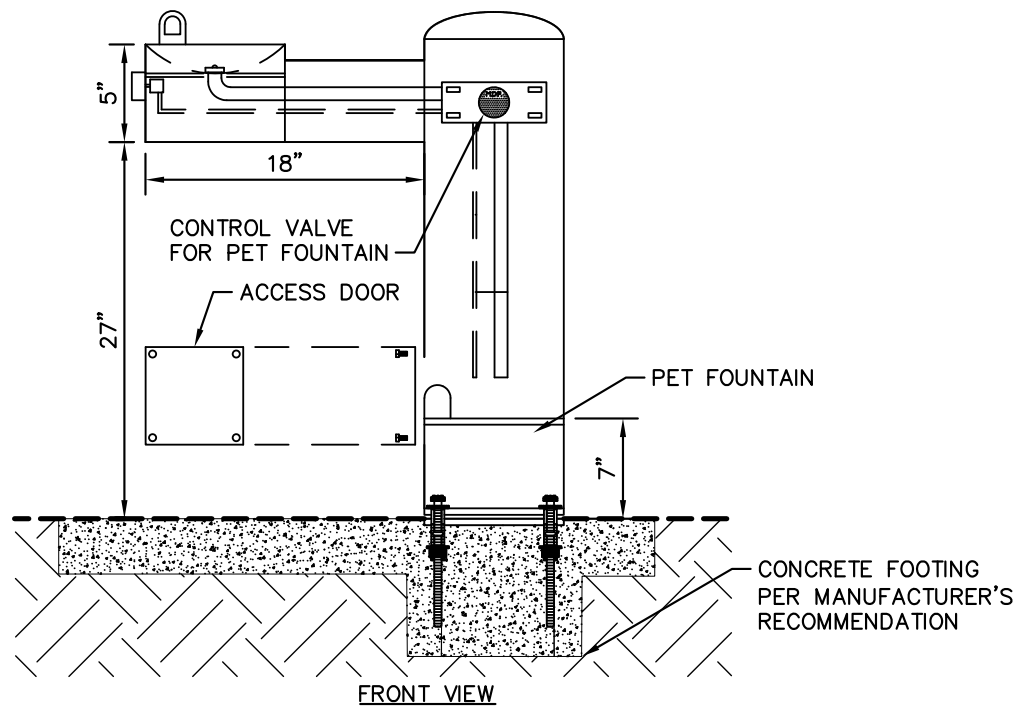
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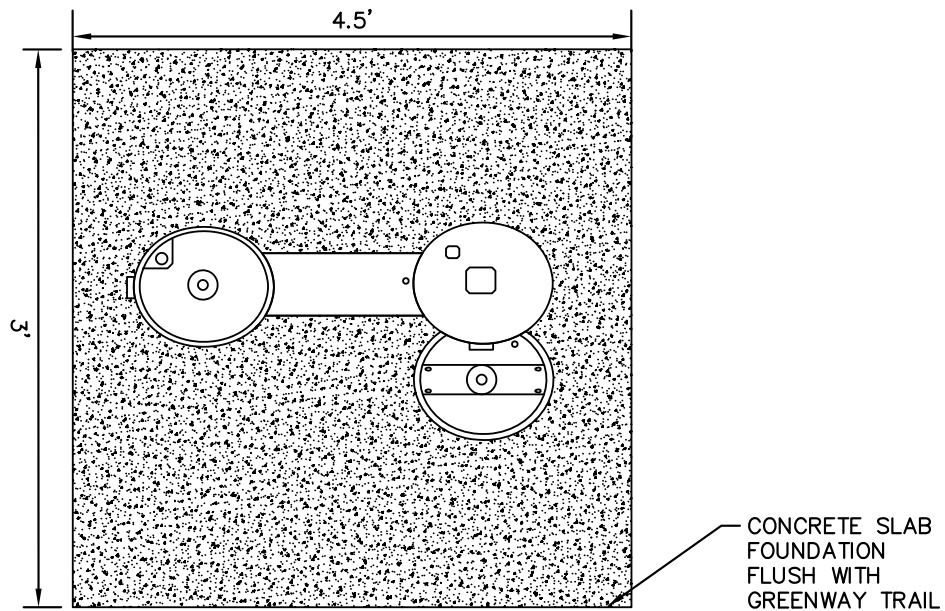
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G4

SHEET #

1 OF 1



FRONT VIEW



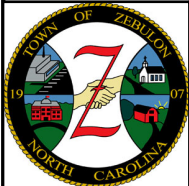
TOP VIEW

NOTES:

1. PRODUCT SHOWN IS MOST DEPENDABLE FOUNTAINS MODEL 410SM WITH PET FOUNTAIN.
2. ACCEPTABLE ALTERNATIVE PRODUCTS INCLUDE:
 - ELKAY BI-LEVEL PEDESTAL WATER FOUNTAIN WITH PET STATION LK4420DB
 - MURDOCK WATER FOUNTAIN GRM45
3. PLUMBING CONNECTIONS TO BE DETERMINED ON A CASE BY CASE BASIS.

FINISH SCHEDULE:

TGIC POLYESTER POWDER COAT (BLACK) PER MANUFACTURER'S STANDARDS FINISH SCHEDULE.



TOWN OF ZEBULON

STANDARD GREENWAY WATER FOUNTAIN

USE WITH STANDARD SPECIFICATIONS ONLY

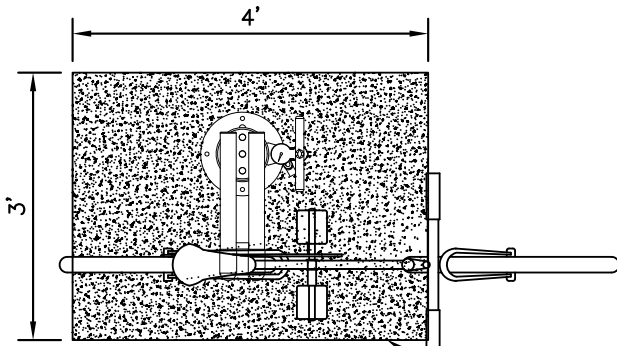
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G5

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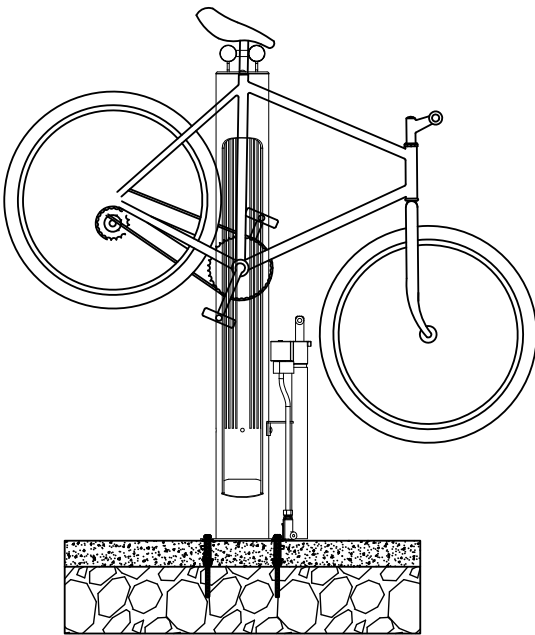
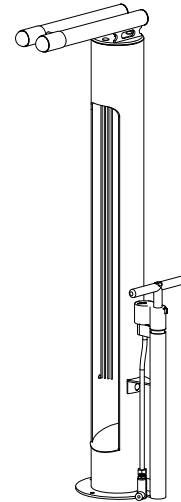
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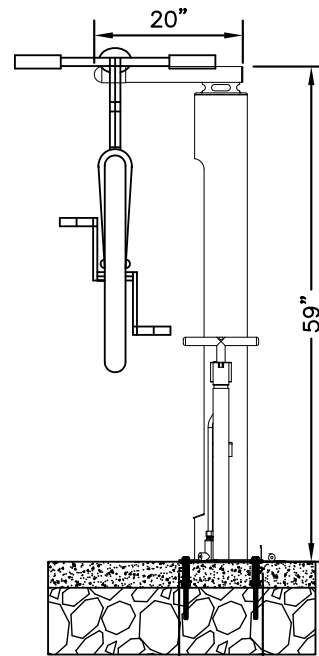


TOP VIEW

CONCRETE SLAB FOUNDATION FLUSH WITH GREENWAY TRAIL



FRONT VIEW



SIDE VIEW

NOTES:

1. PRODUCT SHOWN IS SARIS DELUXE PUBLIC WORK STAND
2. ACCEPTABLE ALTERNATIVE PRODUCTS INCLUDE:
 - DERO FIXIT BIKE STATION WITH AIR KIT
 - TREETOP ULTIMATE BIKE REPAIR STATION & STAINLESS STEEL BIKE PUMP

FINISH SCHEDULE:

TGIC POLYESTER POWDER COAT (BLACK) PER MANUFACTURER'S STANDARDS FINISH SCHEDULE.



TOWN OF ZEBULON

STANDARD GREENWAY BIKE REPAIR STATION

USE WITH STANDARD SPECIFICATIONS ONLY

SCALE:

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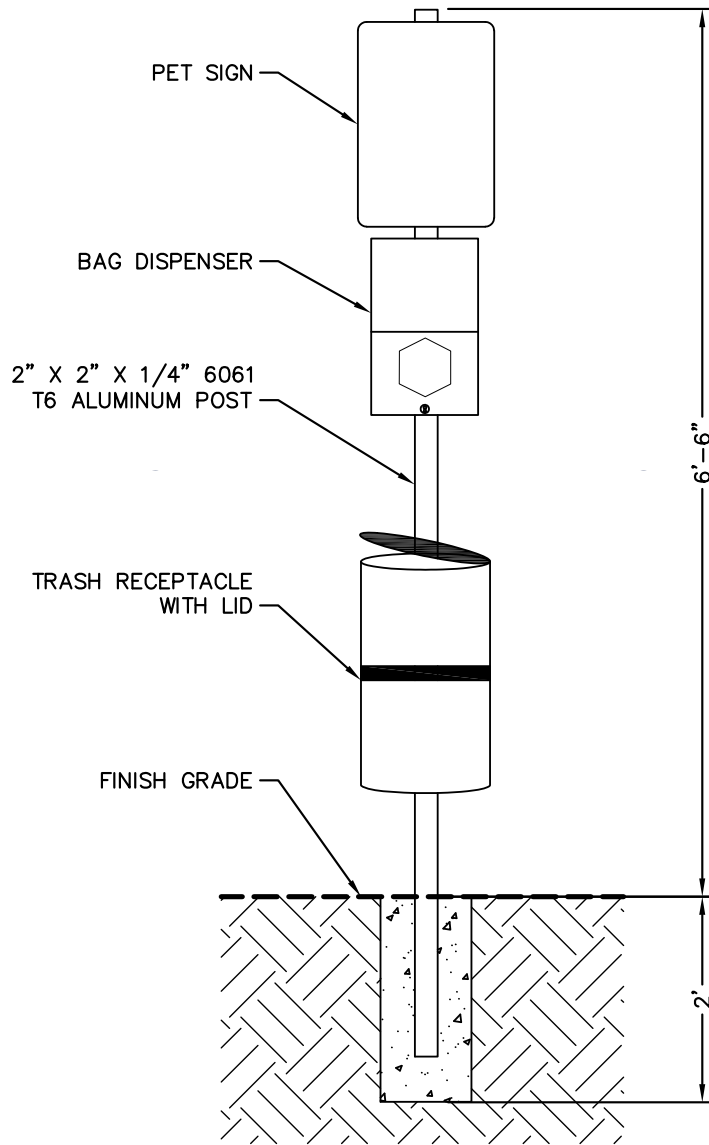
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G6

SHEET #

1 OF 1



FRONT VIEW

NOTES:

1. PRODUCT SHOWN IS DOGIPOT ALUMINUM HEADER PAK PET STATION.
2. ACCEPTABLE ALTERNATIVE PRODUCTS INCLUDE:
 - DOG WASTE DEPOT WASTE STATION DEPOT-006-B
 - MUTTMITT DOG WASTE STATION 1005

FINISH SCHEDULE:

POST: "STURDY BROWN", SW 6067
 PANEL FRONT: 3M ENGINEER GRADE RETRO REFLECTIVE VINYL WITH BORDER, TEXT, SYMBOLS SILK SCREENED (WHITE)
 FONT: ARIAL, MIN. 1' HT.
 PANEL BACK: "SHAMROCK", SW 6454



TOWN OF ZEBULON

STANDARD GREENWAY
 PET WASTE STATION

USE WITH STANDARD SPECIFICATIONS ONLY

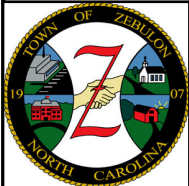
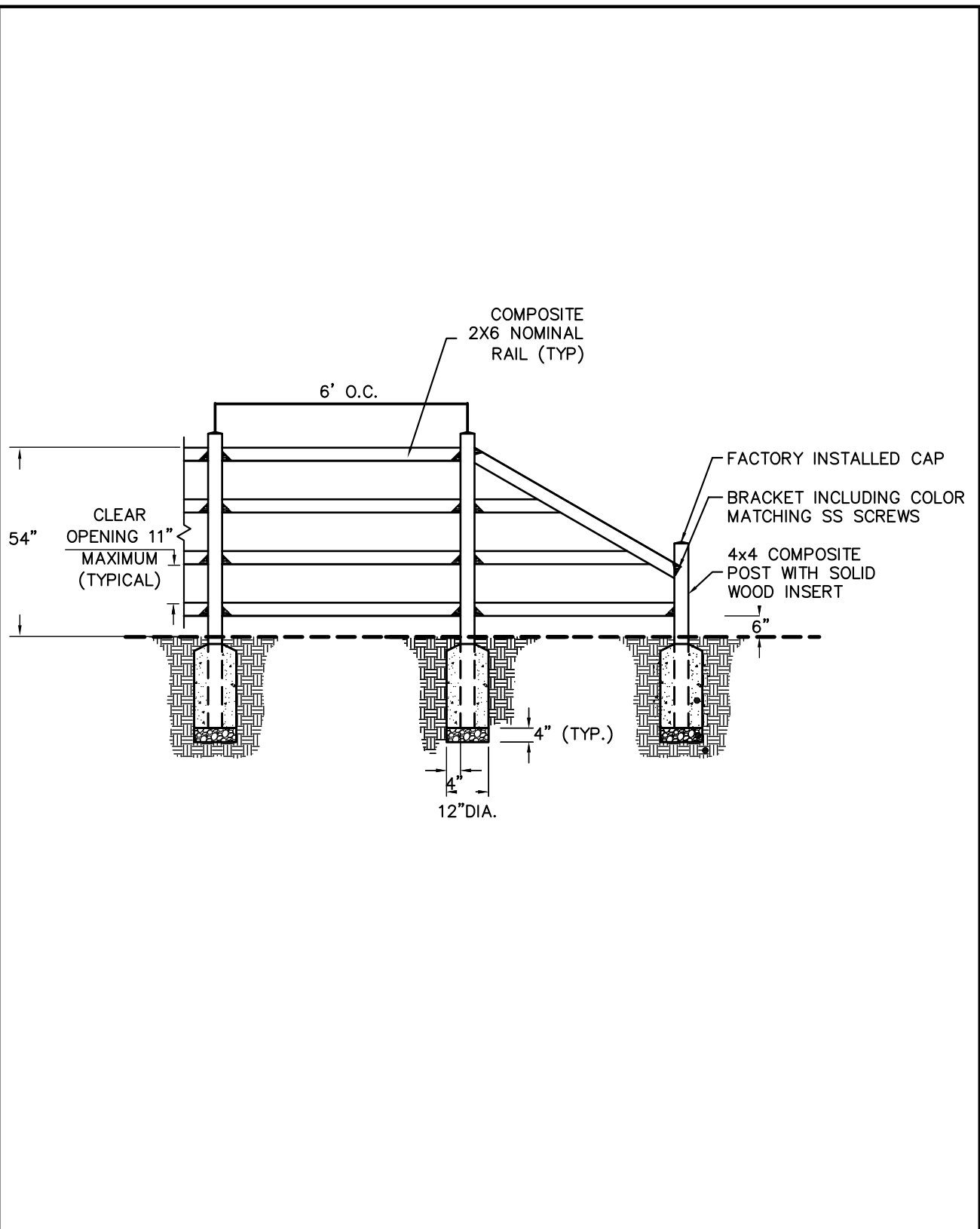
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DETAIL #
 G7

SHEET #

1 OF 1



TOWN OF ZEBULON

STANDARD GREENWAY
TAPERED SAFETY FENCE

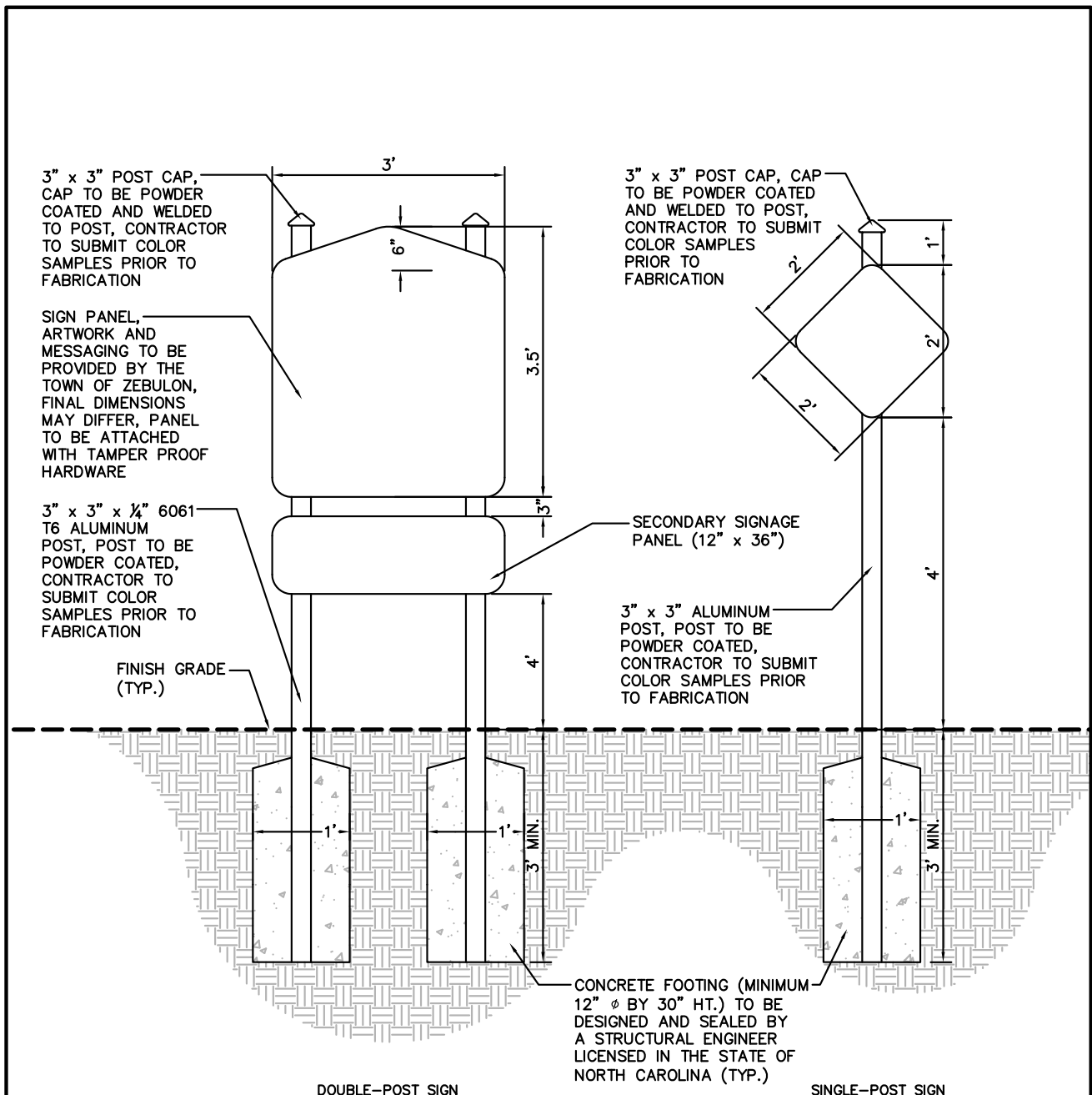
USE WITH STANDARD SPECIFICATIONS ONLY

SCALE:
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DATE:

DETAIL #
G8

SHEET #
1 OF 1



FINISH SCHEDULE:
 POST: "STURDY BROWN", SW 6067
 PANEL FRONT: 3M ENGINEER GRADE RETRO REFLECTIVE VINYL WITH BORDER, TEXT, SYMBOLS SILK SCREENED (WHITE)
 FONT: ARIAL, MIN. 1' HT.
 PANEL BACK: "SHAMROCK", SW 6454

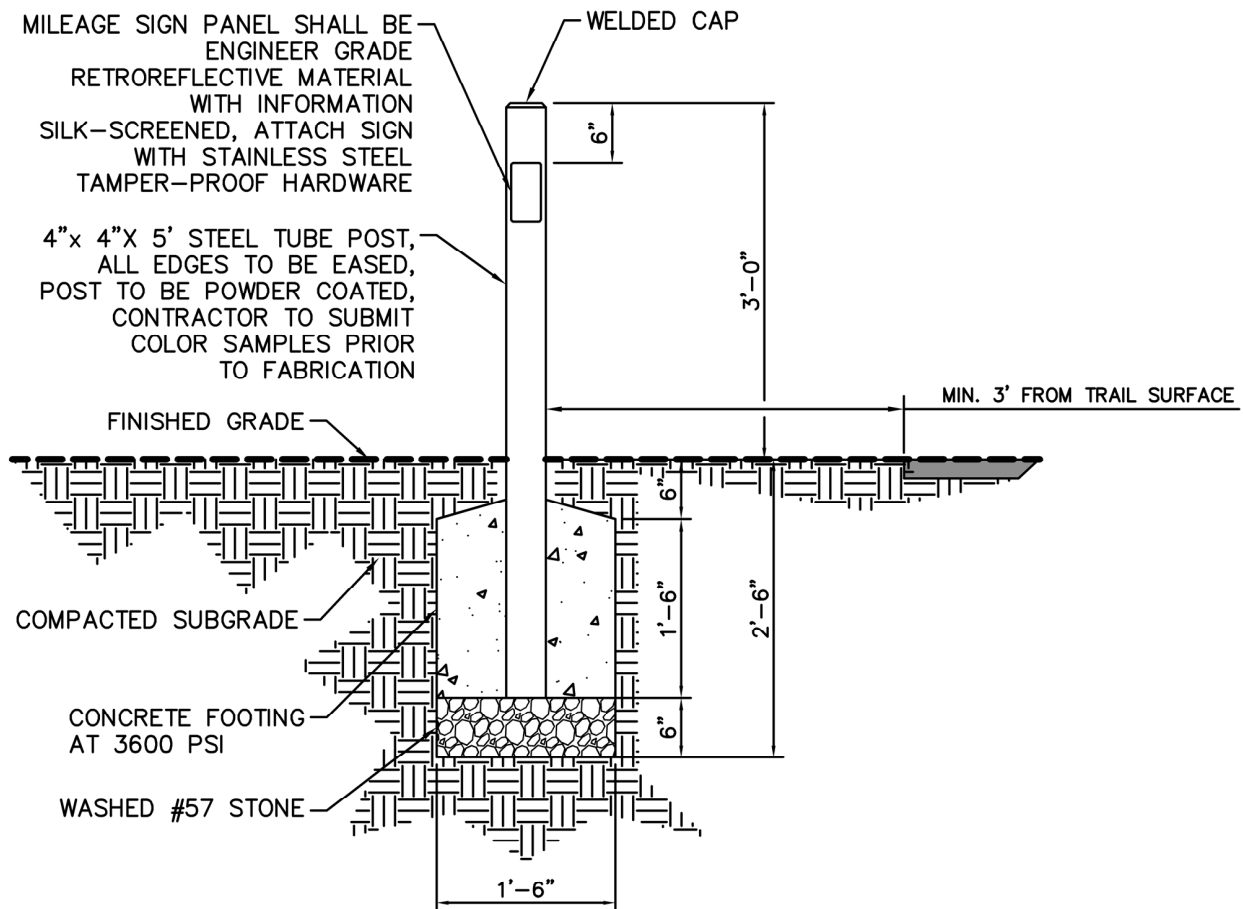


TOWN OF ZEBULON

STANDARD GREENWAY
SIGNAGE AND WAYFINDING

USE WITH STANDARD SPECIFICATIONS ONLY

SCALE:	DETAIL #
NOT TO SCALE	G9
DATE:	SHEET #
	1 OF 1



NOTES:

1. TOWN SHALL COORDINATE WITH OVERALL GREENWAY/TRAILS MASTER PLAN FOR LOCATION AND MAPPING OF MILE MARKERS. MILE MARKERS SHALL BE PLACED AT ¼ MILE INCREMENTS ALONG THE TRAIL.
2. TOWN SHALL COORDINATE WITH POST MANUFACTURER TO DETERMINE SIGN PANEL DESIGN AND DIMENSIONS.



TOWN OF ZEBULON

**STANDARD GREENWAY
MILE MARKER POST**

USE WITH STANDARD SPECIFICATIONS ONLY

SCALE:

NOT TO SCALE

DATE:

DETAIL #

G10

SHEET #

1 OF 1