

## **Nahant Thicket Wildlife Sanctuary Visitor Services and Invasive Plant Management**

### **Project Location and Resource Areas**

Nahant Thicket Wildlife Sanctuary is an approximately 4.0-acre property located at 50 Wharf Street, Nahant, Massachusetts. The property location is shown on Plan 1. The sanctuary provides important habitat for birds, especially during spring migration, and it is part of the Nahant Bay Important Bird Area. It also provides green space and a recreational amenity for neighbors. Currently there is an unimproved parking area for two vehicles located on Furbush Road and the property is transected by a walking trail.

The entire property is located within Land Subject to Coastal Storm Flowage (see Plan 2 for FEMA Zone AE mapped areas in the vicinity of the sanctuary). The site contains two man-made drainage/mosquito control ditches, which collect stormwater runoff from the adjacent street system and properties, and convey flows to Boston Harbor via a tidegate located to the south of Willow Street (owned and maintained by the Town of Nahant). These ditches constitute inland Bank and Land Under a Water Body. Due to increased stormwater runoff as a result of development within the watershed, and increased storm intensity, Nahant Thicket and the surrounding properties are frequently inundated during storm events. Vegetated wetlands, which include marsh, shrub, and forested wetland, occur throughout the property, bordering these waterways. These areas meet the definition of Bordering Vegetated Wetland. The limits of BVW were not delineated for this project, but are assumed to coincide with the toe of slope along the edges of Furbush, Willow and Walton Roads, which coincides with the 5 foot elevation line. Plan 3 shows the layout of the property, locations of drainage ditches, and the assumed boundaries of BVW on the property.

### **Project Description**

The proposed project involves visitor service improvements and modest habitat management activities at the Massachusetts Audubon Society's (Mass Audubon) Nahant Thicket Wildlife Sanctuary. The proposed work is intended to improve visitor access and experience and reduce the prevalence of invasive species on the site.

When acquired by Mass Audubon in 1949, the property was primarily a wooded swamp. However, since that time, increased rainfall, development of the surrounding watershed, and the establishment of non-native invasive plant species have resulted in changes in vegetation and degraded the habitat values. Vegetation has encroached on an existing 2-car parking area and an existing boardwalk is in poor condition.

To address and evaluate these issues and identify remedial measures, Mass Audubon conducted a detailed study of the property. The study included close coordination with the Town of Nahant, and two public meetings were held to identify concerns and receive comments from residents of Nahant living near the property. The results of the study and consultations are the basis for the proposed improvements.

## Attachment 1: Project Description

The proposed project has the following goals:

1. Improve access for visitors by improving the existing parking area and installing a visitor information sign.
2. Improve the existing trail system to provide better access during wet weather and reduce impacts of foot traffic by replacing the existing dirt path with a raised boardwalk.
3. Carry out limited management of invasive plant species over time to prevent establishment and spread of new species and to improve habitat values to benefit birds and other wildlife.
4. Carry out periodic maintenance of the main mosquito ditch and trash grate to improve water flow.

These project elements are described in detail below.

### **Visitor Access**

The existing two-car parking area located directly adjacent to 18 Furbush Road (location shown on Plan 3; photographs in Figure 1) will be improved. The existing site consists of a 21' x 19' dirt surface that can be muddy at times and becomes overgrown with vegetation late in the summer. We propose to remove 2-3 inches of the existing top surface material and replace it with a stone aggregate material which will compact to a firm, permeable surface that drains well and resists the growth of vegetation. This work will not result in the net placement of fill within Land Subject to Coastal Storm Flowage. The parking lot is not BVW.

A small sign (approximately 18 x 24 inches) providing information about Nahant Thicket Wildlife Sanctuary will be installed in the parking lot to provide visitor information. We will coordinate with the direct abutter to plant shrubs to screen the parking area from that property.

### **Trail Improvements**

Currently Nahant Thicket Wildlife Sanctuary has an approximately 650-foot long walking trail that runs on a north/south axis between Furbush Road and Wharf Street. Plan 3 shows the location of the existing trail and parking area. The trail includes approximately 200 feet of 28-inch wide boardwalk raised less than a foot above the ground that traverses the wettest areas and a wooden bridge that crosses a 20 to 25 foot wide mosquito control ditch that flows from the northwest to the southeast across the property. The remainder of the trail is a dirt path that varies from 3 to 4 feet wide that is frequently muddy. Images of the existing trail, boardwalk, and bridge are presented in Figure 1.

The proposed trail improvements include rebuilding the boardwalk to run the entire length of and along the footprint of the existing trail (Plan 3). The proposed trail will consist entirely of a 4-foot wide boardwalk, with two areas that bump out to 6 feet for passing, each approximately 10 feet in length. The boardwalk will stand roughly one foot above the ground. The replacement of the existing trail with boardwalk will eliminate the soil impacts of foot traffic while improving access to the property even during periods of high water. The proposed boardwalk design will utilize helical piers for support to minimize soil disturbance (Figure 2). We recently used this con-

## Attachment 1: Project Description

struction method in partnership with the U. S. Fish & Wildlife Service at the Great Meadows National Wildlife Refuge in Sudbury, Massachusetts. Images of this boardwalk are presented in Figure 3. The proposed new boardwalk at Nahant Thicket will be built by staff or a contractor experienced in the design and construction of boardwalks using helical pier supports.

The use of helical piers for boardwalk support will minimize soil disturbance; however boardwalk construction may result in temporary disturbance of vegetation within approximately 1 foot of the trail on either side. Since the rebuilt boardwalk will run along the route of the existing path, this work will not result in any new disturbance of vegetation or soil.

We will also replace the existing bridge over the main mosquito ditch. The new bridge will have the same footprint of the existing bridge and will not result in the alteration of Bank or Land Under a Waterway. We will submit the design of the new bridge to the Conservation Commission for approval before construction begins.

### **Invasive Plant Management**

Much of the Nahant Thicket Wildlife Sanctuary is currently invaded to a greater or lesser degree by non-native invasive plant species such as common reed (*Phragmites australis* ssp. *australis*), Japanese knotweed (*Fallopia japonica*), oriental bittersweet (*Celastrus orbiculatus*), and multi-flora rose (*Rosa multiflora*).

Initial invasive plant management will focus on areas disturbed for boardwalk construction and small populations of common reed and Japanese knotweed. The invasive plant species to be targeted are all species identified as invasive in Massachusetts by the Massachusetts Invasive Plant Advisory Group and are banned for importation, growing, or sale in Massachusetts by the Massachusetts Department of Agricultural Resources.

Invasive plant control will include a combination of manual, mechanical, and chemical methods. Manual control, such as cutting with hand tools, will be performed by Mass Audubon staff and volunteers. Mechanical control, such as the use of motorized saws and mowing machines, will be performed by Mass Audubon staff or qualified contractors. Chemical control will be performed or supervised by Mass Audubon staff or qualified contractors experienced in ecological restoration and licensed for herbicide use in wetlands by the Massachusetts Department of Agricultural Resources. The herbicides that will be used for invasive plant control at Nahant Thicket are formulations approved for use in wetlands by the Massachusetts Department of Agricultural Resources. Invasive plant management will not involve uprooting plants or otherwise disturbing soil within the property. Where treatment will involve the application of herbicide, this will be accomplished either by means of a closely directed foliar spray using a backpack sprayer, or by cutting each living stem and applying herbicide directly to the cut stem. Shrubs will be cut and swiped; common reed and Japanese knotweed will be treated either through foliar spray or cutting and swiping. In most cases, treatment will be performed in September or October to maximize effectiveness. Invasive plant management will be carried out over time and would not result in large barren areas, rather we will remove or treat individual plants or small stands sequentially over time.

### **Ditch Maintenance**

A main hydrological feature of the property is a large drainage ditch, approximately 20 to 25 feet wide by 290 feet long that drains much of Nahant Thicket and ultimately discharges flow to the storm sewer beneath Furbush Road. While this ditch is periodically maintained by the Northeast Massachusetts Mosquito & Wetland Management District, we will more frequently remove debris including woody material and trash from the ditch that is disrupting flow and clean the trash grate. The location of the ditch and trash grate are shown in Plan 3.

### **Wetland Resource Area Impacts of the Project**

Most wetland resource area impacts of the proposed project will be temporary in nature. We anticipate the following impacts on wetland resource areas from the various project elements:

Parking area renovation: The proposed parking area will cover the same footprint as the existing parking lot. As described above, the work will not change Land Subject to Coastal Storm Flowage, and will not alter BVW.

Boardwalk Construction: The proposed boardwalk construction falls under the Limited Project provision at 310 CMR 10.53(3)(j):

(j) The construction and maintenance of catwalks, footbridges, wharves, docks, piers, boathouses, boat shelters, duck blinds, skeet and trap shooting decks and observation decks; provided, however, that such structures are constructed on pilings or posts so as to permit the reasonably unobstructed flowage of water and adequate light to maintain vegetation.

The proposed boardwalk, constructed on helical pilings and at least 12 inches above the ground, will permit the flow of water and allow adequate light to maintain vegetation, and therefore can be permitted as a limited project.

The proposed boardwalk construction will take place over the footprint of current low boardwalk and un-vegetated, compacted trail. The existing 650-foot long trail and boardwalk has a footprint of approximately 2,041 square feet, and because much of the existing boardwalk is less than 1 foot in height, most of the area under the current boardwalk is not vegetated. The total area beneath the new boardwalk will be 2,640 square feet of BVW. This is an increase of 599 sf of BVW disturbance. However, as the new boardwalk will be at least 12 inches above the soil surface, we expect the area under the boardwalk within one foot of the edge of the boardwalk will receive sufficient light to revegetate. We estimate that this will result in the revegetation of approximately 1,300 square feet of BVW under the boardwalk. Therefore, we expect the construction of the new boardwalk over the footprint of the existing trail will result in an increase in vegetated area within BVW. During construction, up to 2 feet on either side of the boardwalk may be temporarily cleared of vegetation by cutting above-ground stems. Therefore, up to 3,900 square feet of BVW will be temporarily impacted by the project. These areas will revegetate following completion of construction.

Invasive Plant Control: Since the invasive plant control will be conducted over several years, and no soil disturbance will take place, no wetland resources values are expected to be impacted and the long term result will be an improvement in wildlife habitat value.



## Attachment 1: Project Description

Ditch Maintenance: This part of the project will remove debris from Bank and Land Under a Waterway, but not result in impacts to the resource.

### **Regulatory Compliance**

The proposed project complies with all applicable performance standards under the Wetland Protection Act Regulations.

Land Subject to Coastal Storm Flowage: The regulations for coastal wetlands (310 CMR 10.21 et seq.) do not establish any performance standards or significance for this resource area. Generally, LSCSF is presumed to be significant to flood control and storm damage prevention. The proposed reconstruction of the parking lot, boardwalk and ditch maintenance will not adversely affect these interests and will improve the ability of the resource to drain following storm events.

Bank/Land Under a Waterway: No work is proposed within these resources other than removing debris and trash from the bank and trash grate. This work will not alter the resource, and will improve the ability of water to flow from the site following storm events. The existing bridge is supported on pilings within this resource. Mass Audubon anticipates that these pilings would be re-used or removed when the new bridge is installed, with no new impact to the resource. The proposed work complies with performance standards at 310 CMR 10.54(4) and 10.56(4).

The proposed bridge replacement complies with the Massachusetts Stream Crossing Standards, as required by 310 CMR 10.53(8). The existing bridge crosses a short (less than 300 ft long) man-made drainage ditch that conveys street runoff to Boston Harbor. The bridge replacement, at a slightly higher elevation than the existing bridge, will continue to allow the unrestricted movement of aquatic organisms and wildlife within the stream channel to the extent that such organisms use the channel.

Bordering Vegetated Wetland: The proposed project meets the criteria for a Limited Project at 310 CMR 10.53(3)(j). The only work within BVW is to replace and extend the existing boardwalk with a new structure that will be installed on helical pilings, at least 12 inches above the ground surface, and will permit the unobstructed flowage of water and provide sufficient light to maintain vegetation under the outer foot on either side of the boardwalk. Raising the boardwalk will restore 1,300 sf of BVW. Mass Audubon has evaluated alternatives to the proposed boardwalk replacement, which included a significantly longer boardwalk on new location, and determined that there are no reasonable alternatives that meet the project purpose. Managing invasive species within BVW will be done consistent with the performance standards at 310 CMR 10.55(4) and will not destroy or impair any portion of the BVW. Invasive species management will improve the ability of the BVW to provide the significant interests of wildlife habitat.

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## Attachment 1: Project Description

### **List of associated attachments and figures referenced in the project description: and to be appended to the NOI:**

Plan 1: Location of Nahant Thicket Wildlife Sanctuary.

Plan 2: FEMA Zone AE (1% annual flood risk) in vicinity of Nahant Thicket Wildlife Sanctuary.

Plan 3: Existing and proposed conditions, Nahant Thicket Wildlife Sanctuary.

Figure 1: Existing Conditions at Nahant Thicket Wildlife Sanctuary.

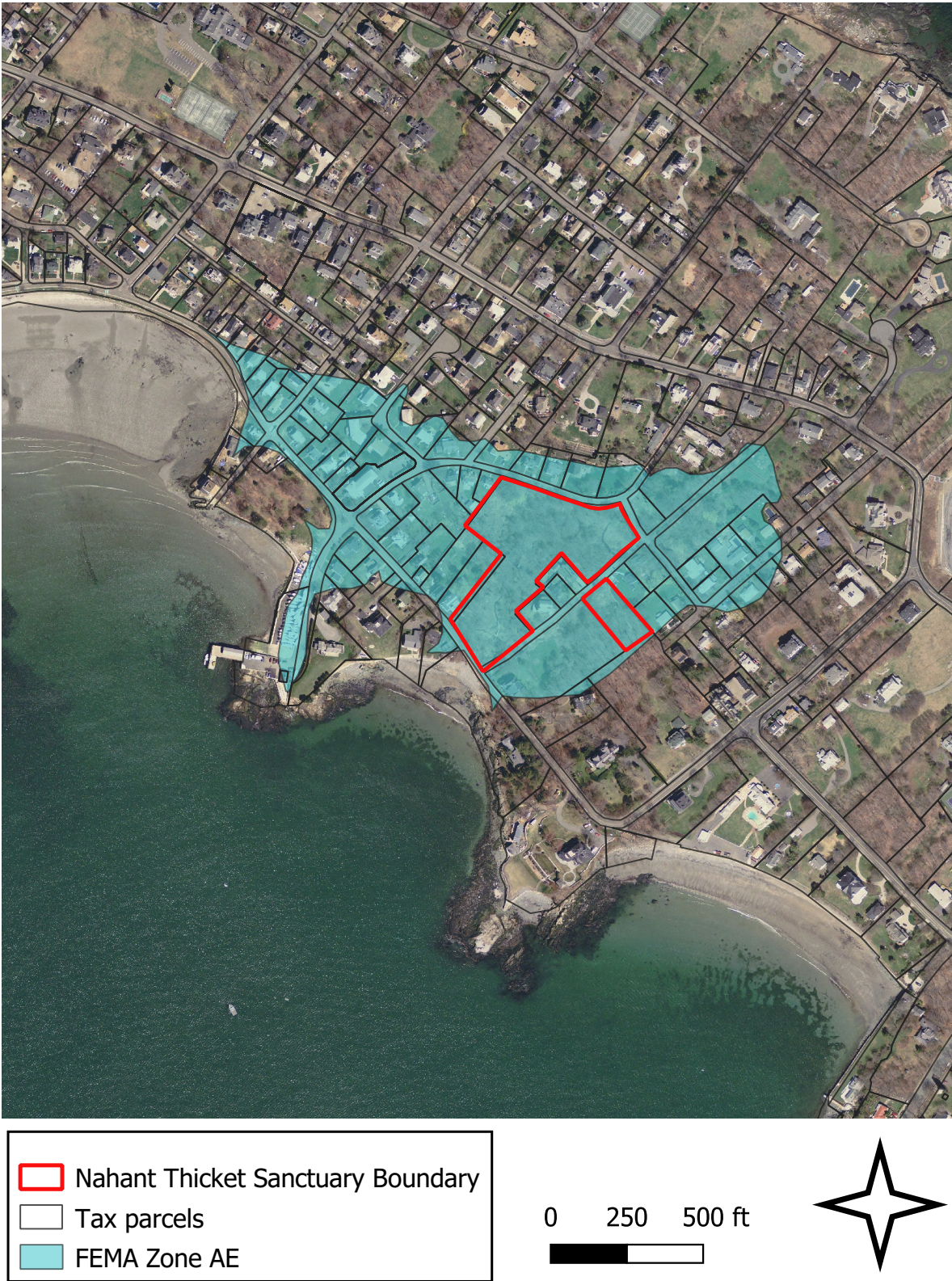
Figure 2: Boardwalk Framing Plan and General Notes, Room & Guarracino LLC, Structural Engineers, Somerville, MA.

Figure 3: Raised Boardwalk at Great Meadows National Wildlife Refuge, Sudbury, Massachusetts.





Plan 2. FEMA Zone AE (1% annual flood risk) in the vicinity of Nahant Thicket Wildlife Sanctuary.





Plan 3. Existing and proposed conditions, Nahant Thicket Wildlife Sanctuary





Figure 1. Existing Conditions at Nahant Thicket Wildlife Sanctuary.



Existing trail.



Figure 1. Existing Conditions at Nahant Thicket Wildlife Sanctuary.



Existing boardwalk.



Figure 1. Existing Conditions at Nahant Thicket Wildlife Sanctuary.



Exiting bridge.



Parking on the north side of Furbush Road.



Figure 1. Existing Conditions at Nahant Thicket Wildlife Sanctuary.



Existing signage. Nahant Thicket Wildlife Sanctuary.



Figure 2

## GENERAL

1. Structural work shall conform to the requirements of "The Massachusetts State Building Code"-9th Edition; "The International Building Code"-IBC 2015; and ASCE 7-10.
2. Verify and coordinate dimensions related to this project.
3. Typical details and notes shown on structural drawings shall be applicable to all parts of the structural work except where specifically required otherwise by contract documents.
4. Details not specifically shown shall be similar to those shown for the most nearly similar condition as determined by the engineer.
5. The contractor shall submit complete shop drawings for all parts of the work. No performance of the work shall commence without review of the shop drawings by the engineer.

## FOUNDATIONS

1. Foundations for this project consist of steel pipes with augers.
2. No responsibility is assumed by the structural engineer for the validity of the subsurface conditions described on the drawings.
3. Foundation units shall be centered under supported structural members, unless noted otherwise on the drawings.
4. Exterior construction shall be carried down below finished exterior grade to a minimum depth of 4'-0", unless noted otherwise.

## STRUCTURAL TIMBER CONSTRUCTION

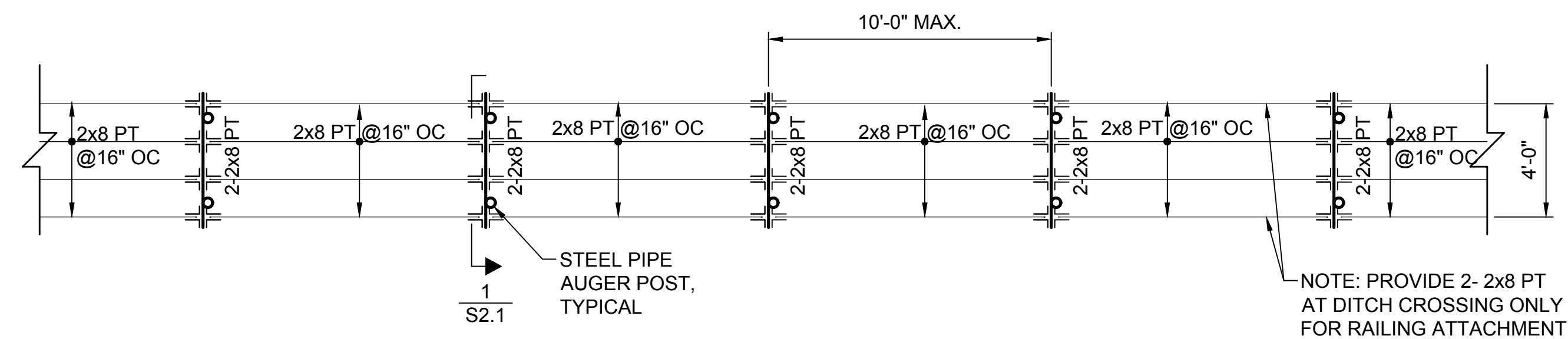
1. Timber construction shall conform to Part II "Design" as published in the "Timber Construction Manual" (AITC 6<sup>th</sup> Edition) and to "National Design Specification for Wood Construction" (NF.PA, 2010 Edition).
2. New timber for structural use shall have a moisture content as specified in the "National Design Specification for Wood Construction (NF.PA, 2010 Edition).
3. Timber construction shall conform to Article 23, "Wood" of the Mass. Code, latest edition
4. Material properties for timber shall conform to the following:
  - (A) For pressure-treated members with nominal 2" thickness, Southern Pine #1 or better (19% max MC) (ACQ Pressure Treated).  
Allowable bending stress  $F_b = 1300$  PSI  
Allowable shear stress  $F_v = 90$  PSI  
Compression parallel to grain = 1550 PSI  
Compression perpendicular to grain = 565 PSI  
Modulus of elasticity = 1,500,000 PSI

5. "PT" indicates pressure-treated lumber (to be used when in contact with concrete, masonry or weather).
6. Joist support by nailing is forbidden unless used with an approved hanger. Unless noted otherwise on plans, all flush framed joists and beams shall be framed with Simpson hangers as follows (or approved equals):

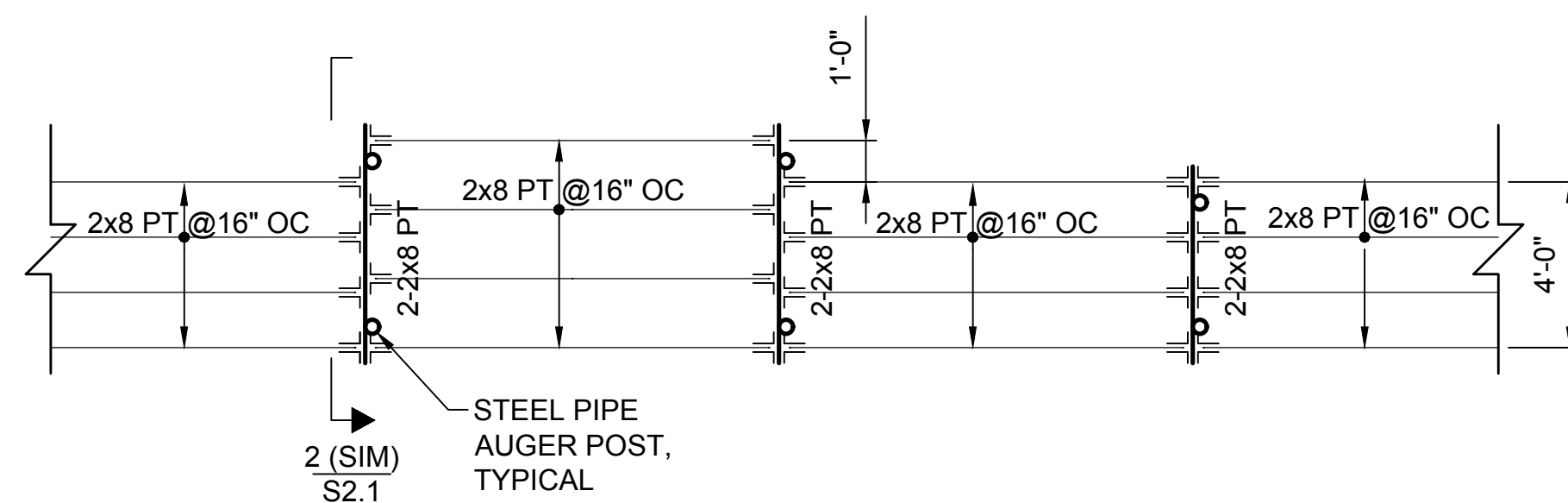
(A) 2x6; 2x8	Type 'U26'
(B) 2-2x6; 2-2x8	Type 'U26-2'
(C) 3-2x6; 3-2x8	Type 'U26-3'
7. Anchor bolts and bolts for structural timber shall be ASTM A 307 (Galvanized). Standard cut washers shall be provided between wood and bolt head, and between wood and bolt nut unless steel plates or plate washers are used.
8. No joist shall be noted or drilled with holes without the specific approval of the architect.
9. No joist shall be repaired or reinforced in any way without the specific approval of the architect.
10. Beams built up of timbers shall be firmly nailed or bolted together.
11. Temporary erection bracing shall be provided to hold structural timber securely in position as described on the drawings. It shall not be removed until permanent bracing has been installed.
12. Timber shall be generally knot-free, with only small tight knots permitted and generally straight-grained.
13. Structural timber shall be identified by the grade mark or of certificate of inspection issued by a grading or inspection bureau or agency recognized as being competent.
14. Structural timber shall be visually stress-graded lumber in accordance with the provisions of ASTM designation D245-74, "Methods for Establishing Structural Grades and Related Allowable Properties for Visually Graded Lumber".
15. Timber shall be so handled and covered as to prevent marring and moisture absorption from snow or rain.
16. Steel plates and angles shall be new steel conforming to ASTM A36, and be hot dipped galvanized.

## STRUCTURAL DESIGN LOADS

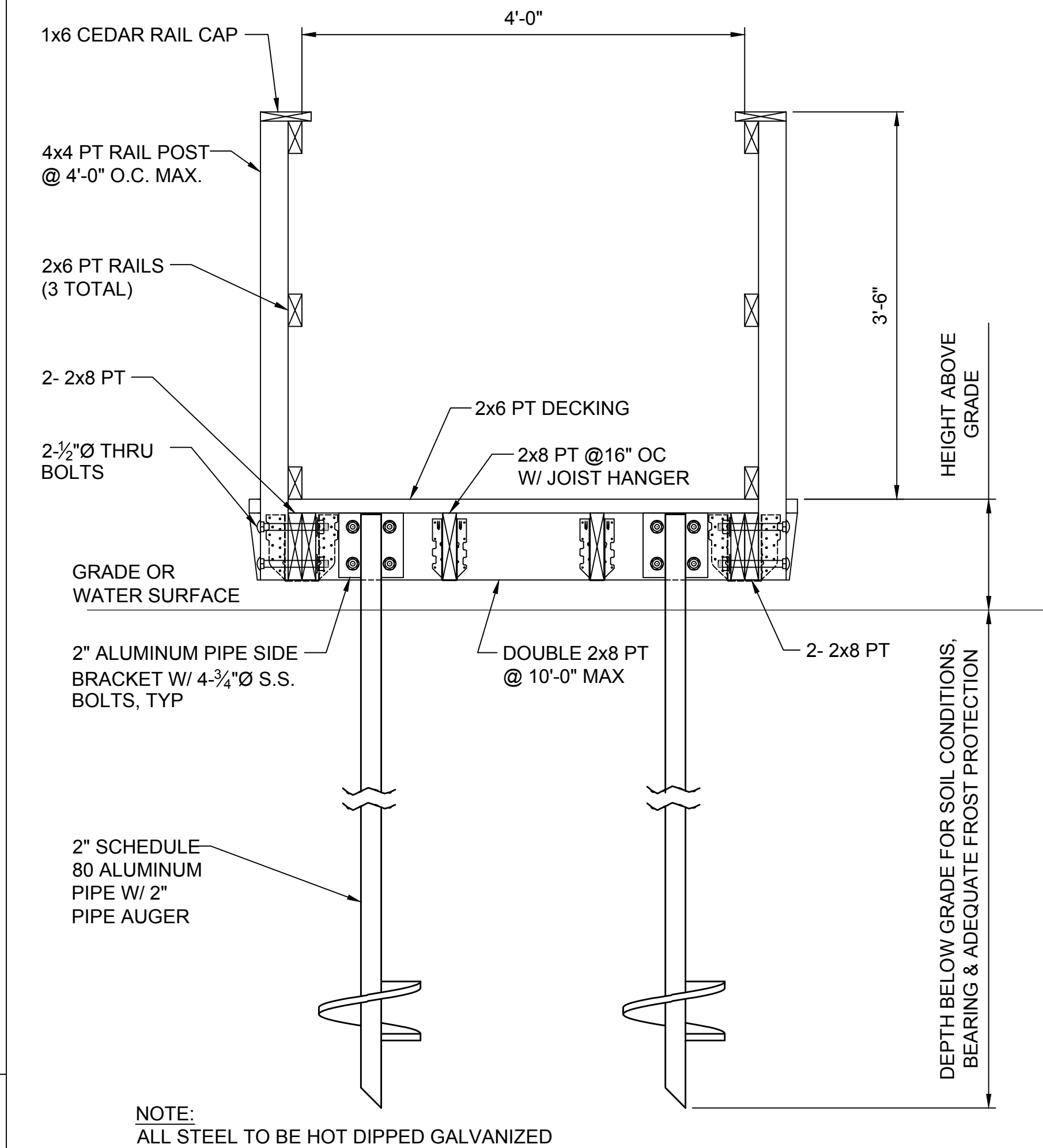
1. Dead loads
  - (A) Weight of building components
2. Live loads
  - (A) Walkways – 60 PSF



**BOARDWALK FRAMING PLAN**  
SCALE:  $\frac{1}{4}" = 1'-0"$



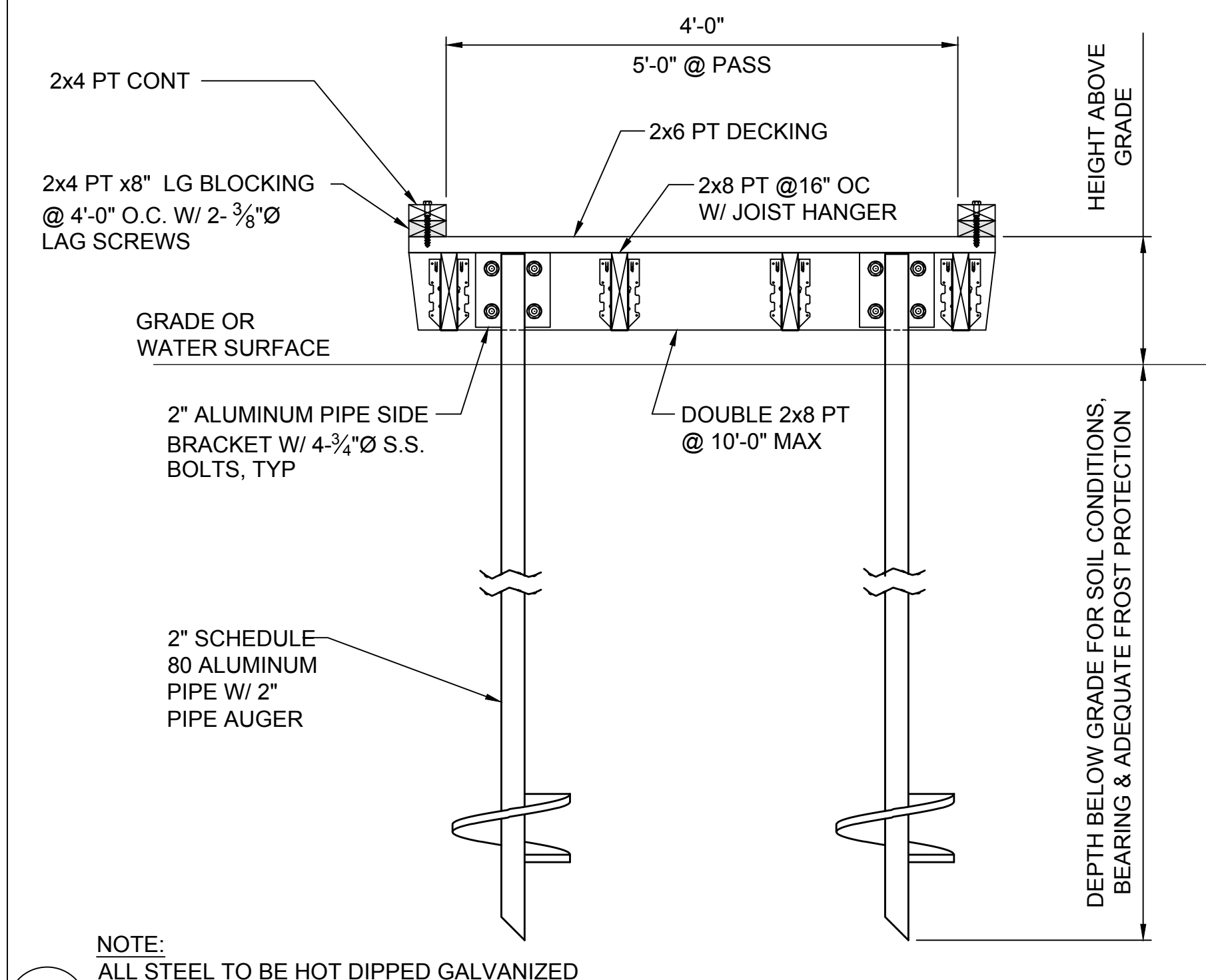
BOARDWALK PASS FRAMING PLAN EVERY 100'±  
SCALE: 1/4" = 1'-0"



2

## AT DITCH CROSSING

SCALE: 1" = 1'-0"



1

SCALE: 1" = 1'-0"

**Roome & Guarracino LLC**  
STRUCTURAL ENGINEERS  
48 Grove Street Somerville, MA 02144  
T: 617-628-1700 F: 781-883-1081



revisions:		

project: NAHANT BOARDWALK  
NAHANT, MA

drawing title: BOARDWALK FRAMING PLAN,  
& GENERAL NOTES

drawn: BR	scale: AS NOTED	date: 06/05/18
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## S1.1

dwg no:



Figure 3. Raised Boardwalk at Great Meadows National Wildlife Refuge, Sudbury, Massachusetts.





Figure 3. Raised Boardwalk at Great Meadows National Wildlife Refuge, Sudbury, Massachusetts.

