

# Drew Landing Public Boardwalk

Town of Dunstable, MA - Conservation Commission

December 13, 2021



# Introduction

- Goals:
  - Show Examples of Boardwalk Construction
  - Provide Feedback / Share Your Vision
- Outline:
  - Company Overview and Project Team
  - Project Overview / Work Done to Date
  - Design Constraints and Wants
  - Boardwalk Examples
  - Notes on Pressure Treated Timber
  - Project Schedule
  - Questions, Comments, Feedback



# Company Overview



90 New England  
Professionals



CIVIL/SITE DESIGN | STRUCTURAL | ENVIRONMENTAL | AVIATION | ROADWAY/TRAFFIC

# Project Team



- Joe Ripley, PE – Project Manager
  - 10 years experience in structural engineering including historic covered bridges, pedestrian bridges, and recreation trails.
- Joanne Theriault, CWS – Environmental Scientist
  - 16 years experience in environmental permitting, wildlife ecology, and wetland science.
- Heidi Marshall, PE – Senior Municipal Engineer and Quality Control
  - 35 years experience in municipal and structural engineering including trails, youth camps, sidewalks, roadways, and municipal infrastructure.

# Project Overview / Work Done to Date



- Hoyle Tanner hired by Town in 2021 to act as Town Engineer.
- Assigned this task to determine a feasible boardwalk and assist with Mass Trails Grant Application.
- Met with Alan to layout path and boardwalk.
- Proceeding with Feasibility Study.

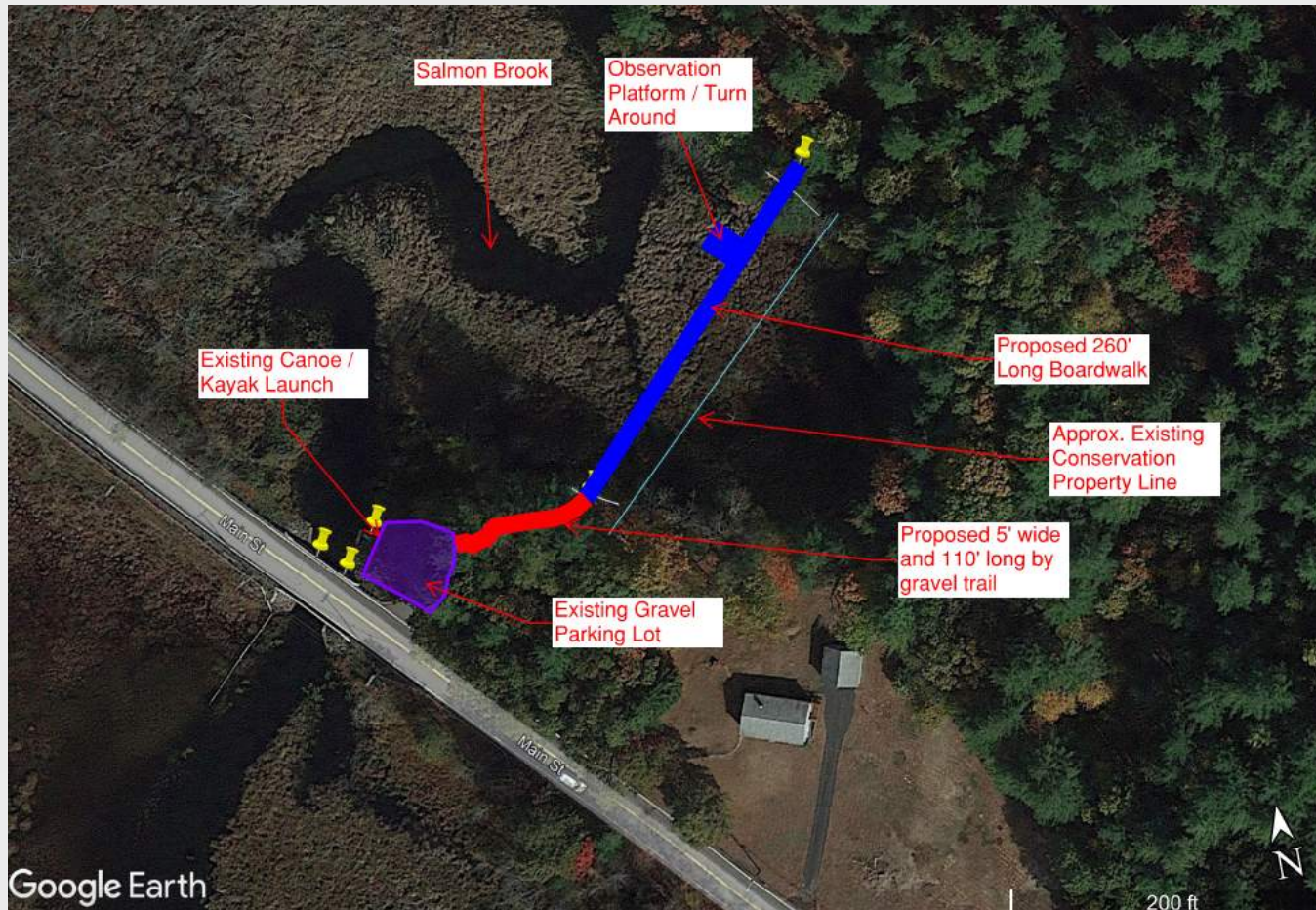


Boardwalk Starting Point from Drew Landing



Pine Trees to be Incorporated into Path Design

# Project Overview / Work Done to Date (Cont.)



- 110 LF Path
- 260 LF Boardwalk

# Design Constraints and Wants



- **Must be Accessible.** Designed to Meet US Forest Service FSTAG.
  - 5' Minimum Trail and Boardwalk Width.
  - ½" Max Gap Between Boards.
  - Proper Slopes and Grades.
- **Must** Carry 90 PSF Pedestrian Load.
- **Must** Have Rail if > 30" Drop.
- **Must** Have 20' Offset From Property Line.
- **Want** Durable and Easy to Maintain.
- **Want** Elevated Above Wetland.
- **Want** Limited Environmental Impact.



2013 Update

## Forest Service Trail Accessibility Guidelines (FSTAG) 2013

# Boardwalk Examples - Foundation



- Borings / Subsurface Exploration Not Part of Our Scope.
- Utilize Borings from Main Street Bridge.
  - Medium Dense Sand Underlying Organic Silt Layer at Channel Bed.
  - Deep Ledge.



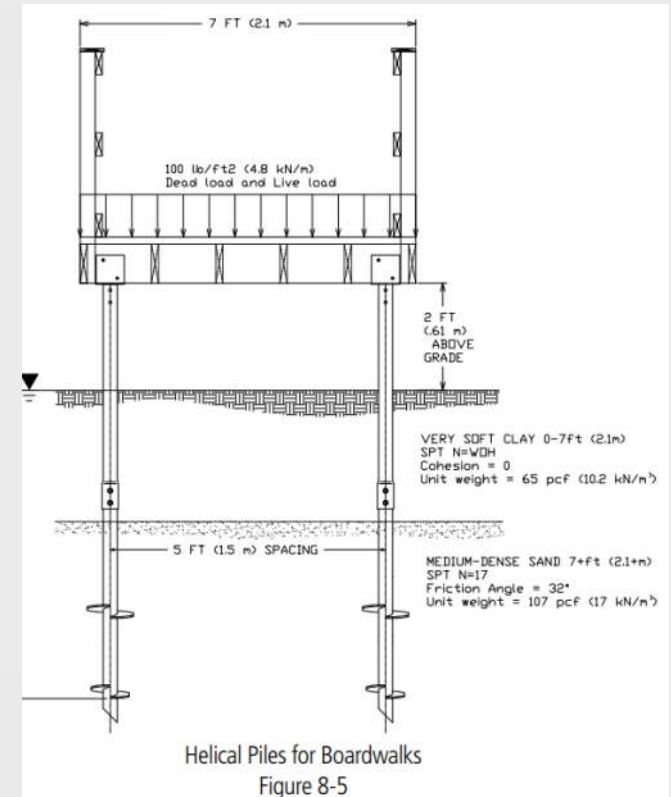
NEW ENGLAND BORING CONTRACTORS OF CT., INC.		BORING NO. BB-2						
129 KROEGER LANE, GLASTONBURY, CT 06033		Sheet 1 of 1						
(860) 633-8849 -- (860) 667-8046 FAX		Scale: 1" = 8'						
Boring Log								
City/Town: DUNSTABLE	Bridge Number: D-13-001	Project File Number: 606302	Contract Number: 58895					
Location: MAIN STREET OVER SALMON BROOK		Date & Time Started: 03/02/11 AT 1:00 P.M.	Total Hours:					
Groundwater Depth (Feet): 310' ON 03/04/11 AT 8:30 A.M.		Date & Time Completed: 03/07/11 AT 6:15 P.M.	11.75					
Coordinates (Feet) N: 3072155.38 E: 657969.78		Driller's Name: MIKE ST. JOHN	Helper's Name: ORRIN CONE					
Ground Elevation (Feet): 158.16		Inspector's Name: KUOK CHANG	Inspector's Company: MASSDOT District 3					
Sample Number	Depth Range (Feet)	Blow Counts Per 6 Inches				Recovery (inches)	Field Description	Strata Changes
		Coring Times Minutes Per Foot						
S1	1'-3'	35	30	16	11	18"	4" Asphalt 4" Gravel Base Most Dense Brown FINE to COARSE SAND Some Fine to Coarse Gravel, Some Inorganic Silt	0
S2	5'-7'	6	3	2	4	6"	Most Medium Stiff Brown ORGANIC SILT	5
S3	10'-12'	8	12	10	11	22"	Wet Medium Dense Gray FINE to COARSE SAND, Some Fine to Coarse Gravel, Trace Inorganic Silt	10
S4	15'-17'	4	6	8	8	12"	Wet Medium Dense Gray FINE SAND	15
S5	20'-22'	5	6	7	9	14"		
S6	25'-27'	6	8	10	12	16"		
S7	30'-32'	5	7	12	17	15"		
S8	35'-37'	6	7	6	8	14"	Wet Medium Dense Brown FINE to COARSE SAND, Some Fine to Coarse Gravel, Trace Inorganic Silt, Running Sand at 40'	35
S9	40'-42'	40	80	75	89	22"		
S10	42'-44'	7	9	10	13	7"		
S11	45'-47'	6	5	5	5	24"	Wet Medium Dense Gray FINE SAND, Some	45



# Boardwalk Examples - Foundation



- Helical Piles - Recommended
  - Installed with Small Equipment.
  - No Wetland Excavation.
  - Potential for “Top Down” Construction.
- Timber Piles - Not Recommended
  - Lower Reliability / Harder to Install at This Site.
  - Pressure Treated Elements in the Water.
- Concrete or Steel Footings -Not Recommended
  - Greater Environmental Impact.
  - More Excavation as Compared to Piles.
  - May Not Be Suitable for Proposed Loads.



# Boardwalk Examples - Framing

- Pressure Treated Timber
  - Natural Timber not Considered Due to Low Service Life (Rot).
  - Can Utilize Glue-Laminated Beams to Increase Spans and Reduce Piles.
- Galvanized Steel (Modular Construction)
  - Designed and Detailed by a Specialty Contractor.



Pressure Treated Timber (USDA “Innovative Foundations for Boardwalks and Viewing Platforms”)



Modular System – Southwest Park, Nashua, NH  
(Courtesy of Modular Trail Structures)  
Trusted Experts | Innovative Results

# Boardwalk Examples - Framing



Framing Option	Advantages	Disadvantages
Pressure Treated Timber	<ul style="list-style-type: none"><li>• Lower material cost.</li><li>• More “customizable”.</li></ul>	<ul style="list-style-type: none"><li>• Potential for increased pressure treating chemicals under bridge.</li><li>• More temporary impact for construction.</li><li>• Longer construction duration.</li></ul>
Galvanized Steel (Modular Construction)	<ul style="list-style-type: none"><li>• Longer service life.</li><li>• Top-down construction.</li><li>• Faster construction.</li><li>• Less environment impact.</li></ul>	<ul style="list-style-type: none"><li>• Higher material cost.</li><li>• Requires 8’ width.</li></ul>

# Boardwalk Examples - Framing



Modular "Top Down" Construction  
(Courtesy of Helical Drilling)



Modular Boardwalk Framing  
(Courtesy of Helical Drilling)

# Boardwalk Examples - Decking



- Composite Decking (HDPE or Trex Deck)
- Pressure Treated
  - Natural Timber not considered due to low service life (rot)



HDPE Deck  
(Courtesy of Helical Drilling)



Pressure Treated Deck  
Southwest Park, Nashua, NH  
(2015 Construction)

Trusted Experts | Innovative Results

# Boardwalk Examples - Decking

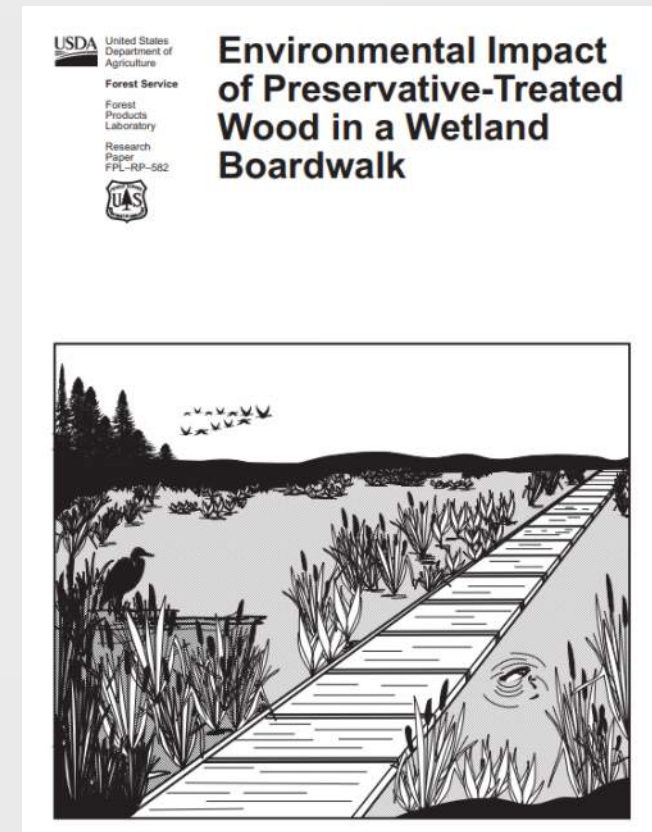


Framing Option	Advantages	Disadvantages
Pressure Treated Timber	<ul style="list-style-type: none"><li>• Lower Cost.</li><li>• Readily available for replacements.</li></ul>	<ul style="list-style-type: none"><li>• Potential for increased chemicals under bridge.</li></ul>
Composite	<ul style="list-style-type: none"><li>• Longer service life.</li></ul>	<ul style="list-style-type: none"><li>• Higher Cost (50% +/- more)</li><li>• Some concern with slipperiness and mold / mildew growth.</li></ul>

# Pressure Treated Timber



- Numerous industry and government studies on environmental impact of pressure treated timber.
  - Measurable increases in pressure treated chemicals below boardwalk.
  - “no taxa were excluded or significantly reduced in number by any preservative treatment”.
  - These included pressure treated piles. Our recommended piles are galvanized steel.
- All pressure treated timber is proposed to be treated with Micronized Copper Azole (MCA).
  - MCA is registered by the EPA for above-ground, ground contact, and freshwater contact.



# Project Schedule



- Feasibility Study Phase Now.
- Mass Trails Grant due February 1, 2022.
- Start Design July 1, 2022.
- Apply for Mass Trails Construction (or Other Grant) Winter 2022/2023.
- Construction Summer 2023.



# Thank You!

Questions / Feedback / Comments?



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