

EMTEK's Toolbox: Defining best practices for designing access roads that are performance rated and least environmentally damaging

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Access design: What and why should you care?



Savannah, Georgia

Chesapeake, VA



James Island, SC

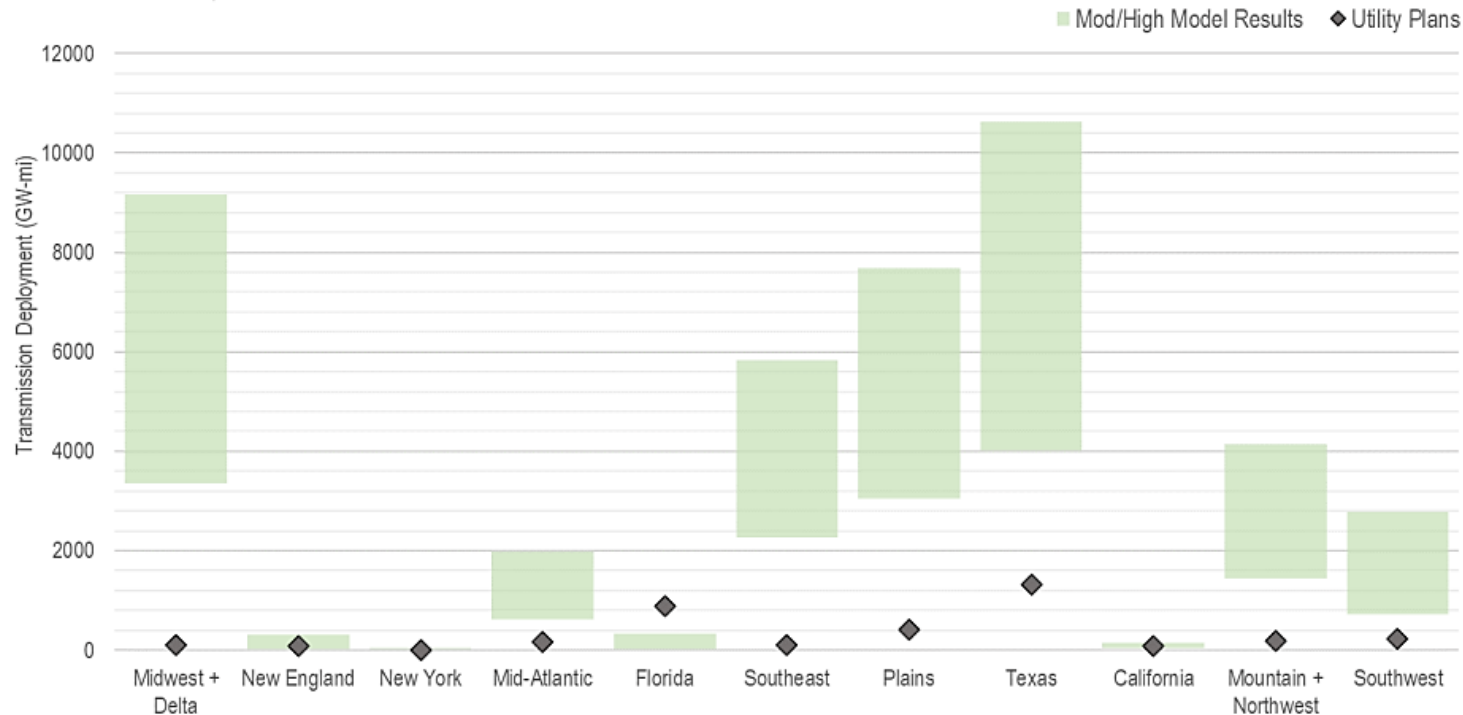
Increase in transmission line work to meet capacity needs

→ Building a Better Grid Initiative

Nation's grid transmission lines and power transformers

Comparison of transmission modeling results and utility plans in 2030

Middle 50% capacity expansion modeling results for Moderate/High scenario group
Under construction + planned 100kV and above lines from NERC ESD



(DOE, 2023)

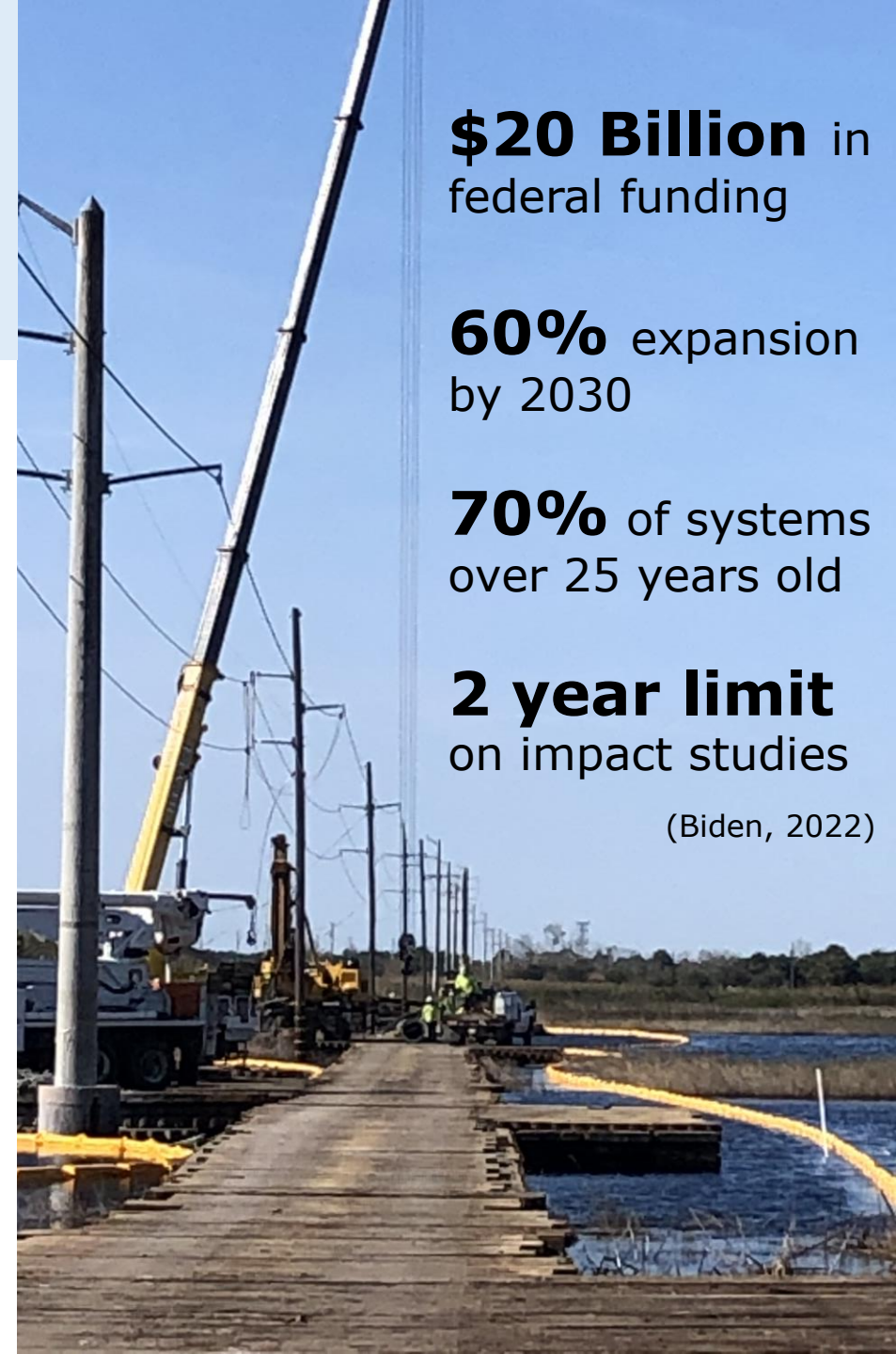
\$20 Billion in federal funding

60% expansion by 2030

70% of systems over 25 years old

2 year limit on impact studies

(Biden, 2022)



Worst Case Scenario: Matting in Wetlands

Performance

Mat gives way under heavy equipment load



Impact

Site 1 year after removal of mats shows significant rutting and ponding



Restoration:

\$ \$ \$

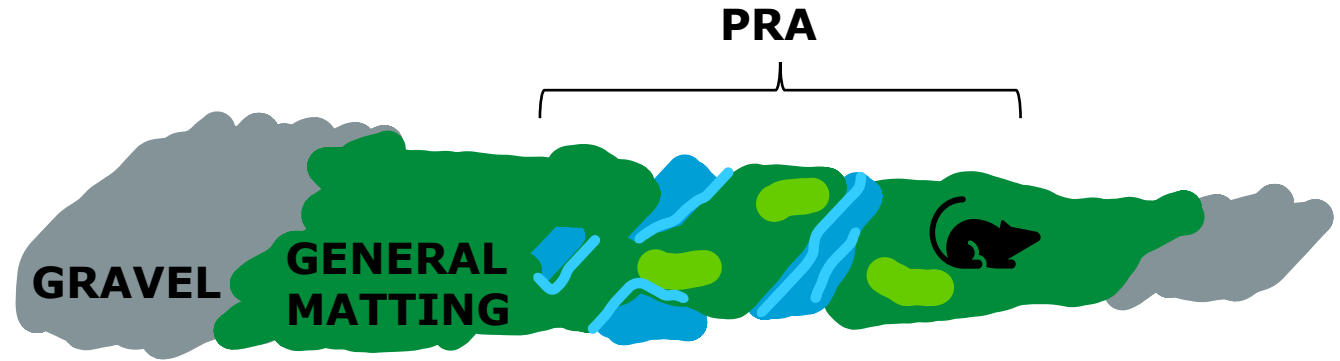


Net zero policy: CWA Section 404 Mitigation Bank Credits



Performance Rated Access

Access with **published material values** backed by known **engineering** to meet stated **expectations**:



Environmental

- Return to pre-construction conditions
- No sediment flow
- 70% regrowth in 5 yrs
- No soil mixing
- No pumping or ponding



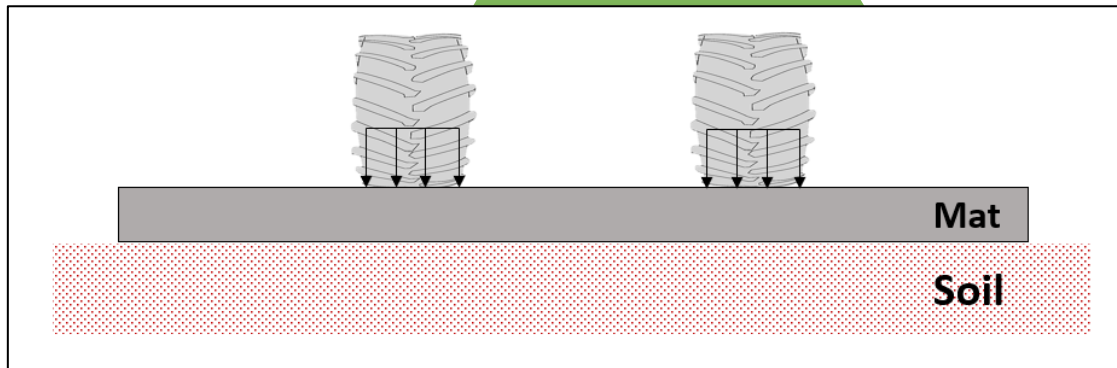
Access Design

- No more than ____ average pressure on surface
- No more than ____ deflection under loads

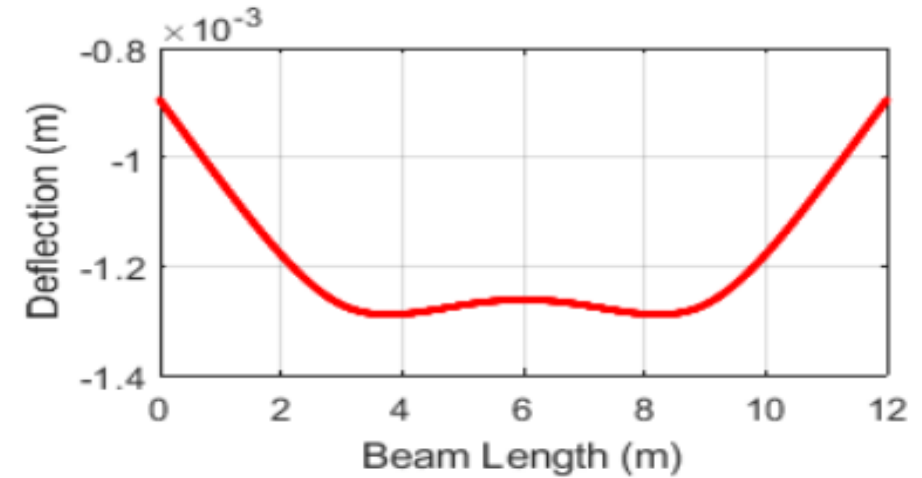
Performance Rated Access

Engineering community has known standards and methodologies for defining performance and impact.

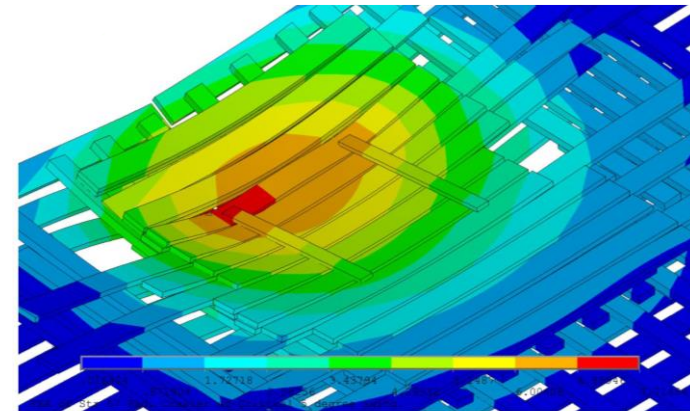
Design & Engineering



→ Beam on Elastic Foundation



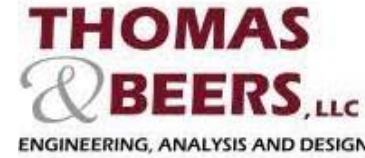
→ Finite Element Analysis of beams or full designs



Performance Rated Access

We have standards and methodologies for defining performance and impact.

Design & Engineering



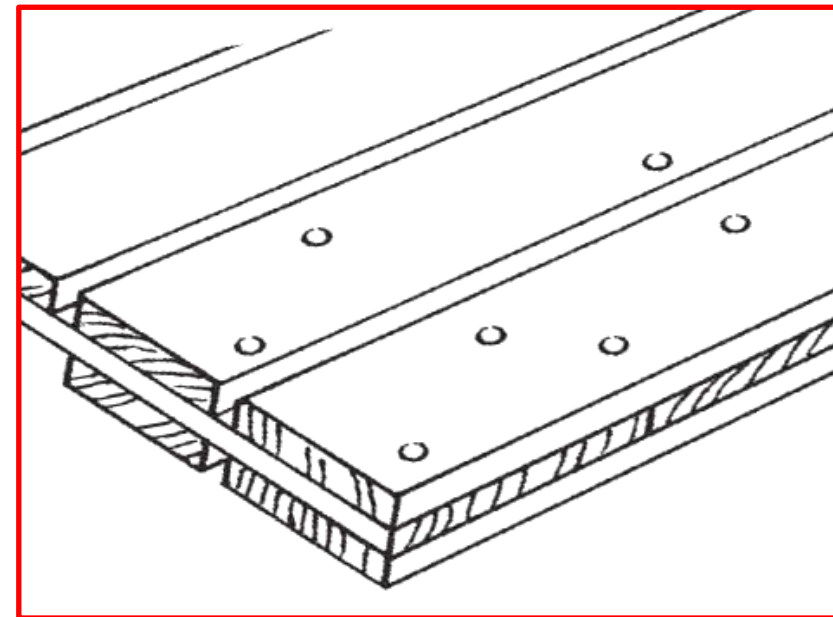
Material Properties





Mechanical testing of mats

ASTM D5456: Standard Specification for Evaluation of Structural Composite Lumber Products



Stack of 32 three-ply solid mat flexural specimens (mixed oak) prepped for testing.

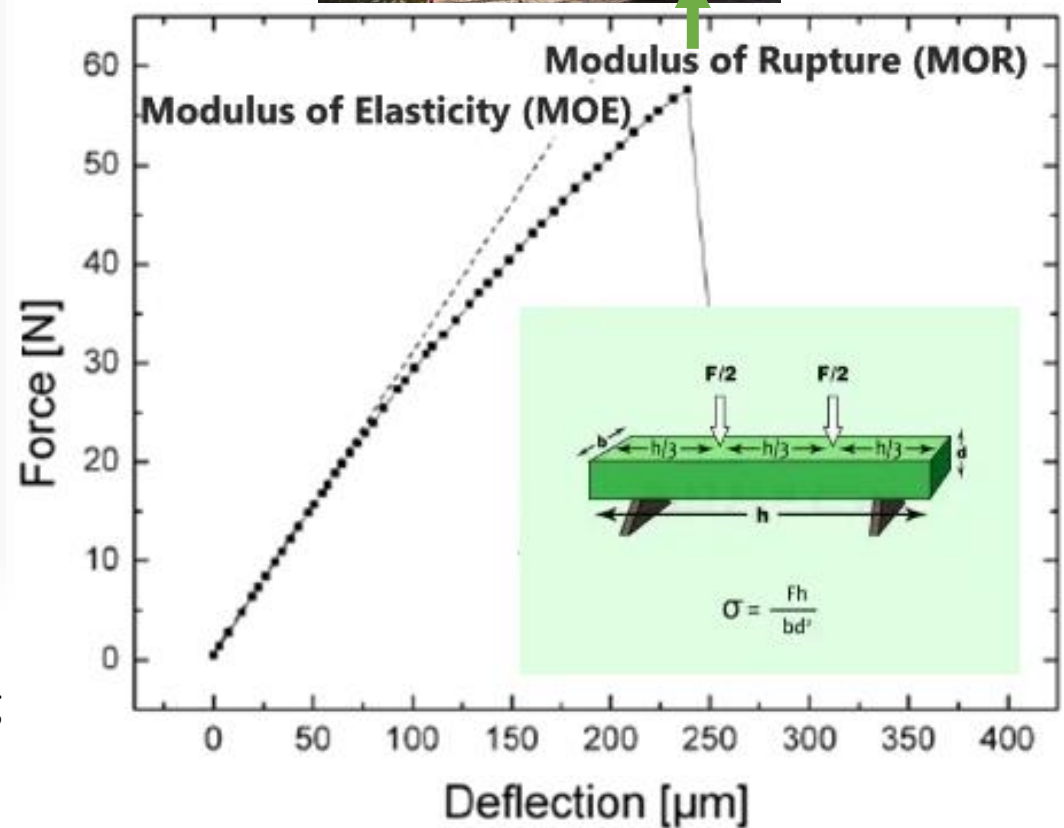
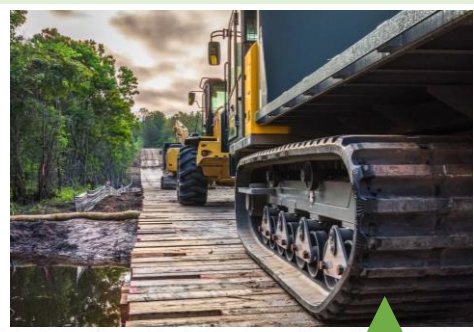
Three-ply solid mat bolted together in that the middle ply oriented in the perpendicular direction to the surface plies.
Dimension: 14 feet (length) × 8 feet (wide) × 5.25 inches (thickness)



Sample preparation and testing

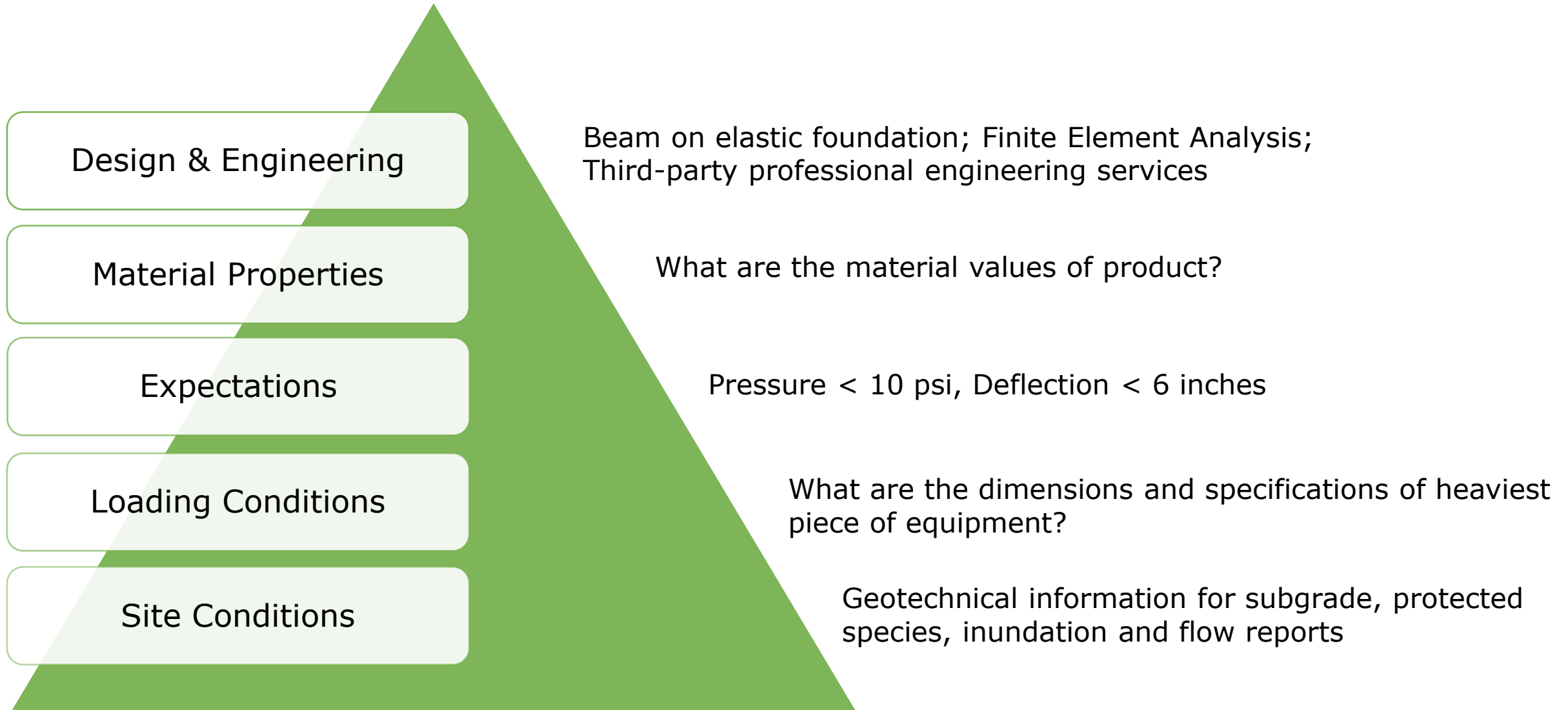


Three-ply solid flexural specimen in the universal testing machine while undergoing a third-point destructive bending test.



Performance Rated Access

We have standards and methodologies for defining performance and impact.



When you do use a performance rated design...



Commodity mats



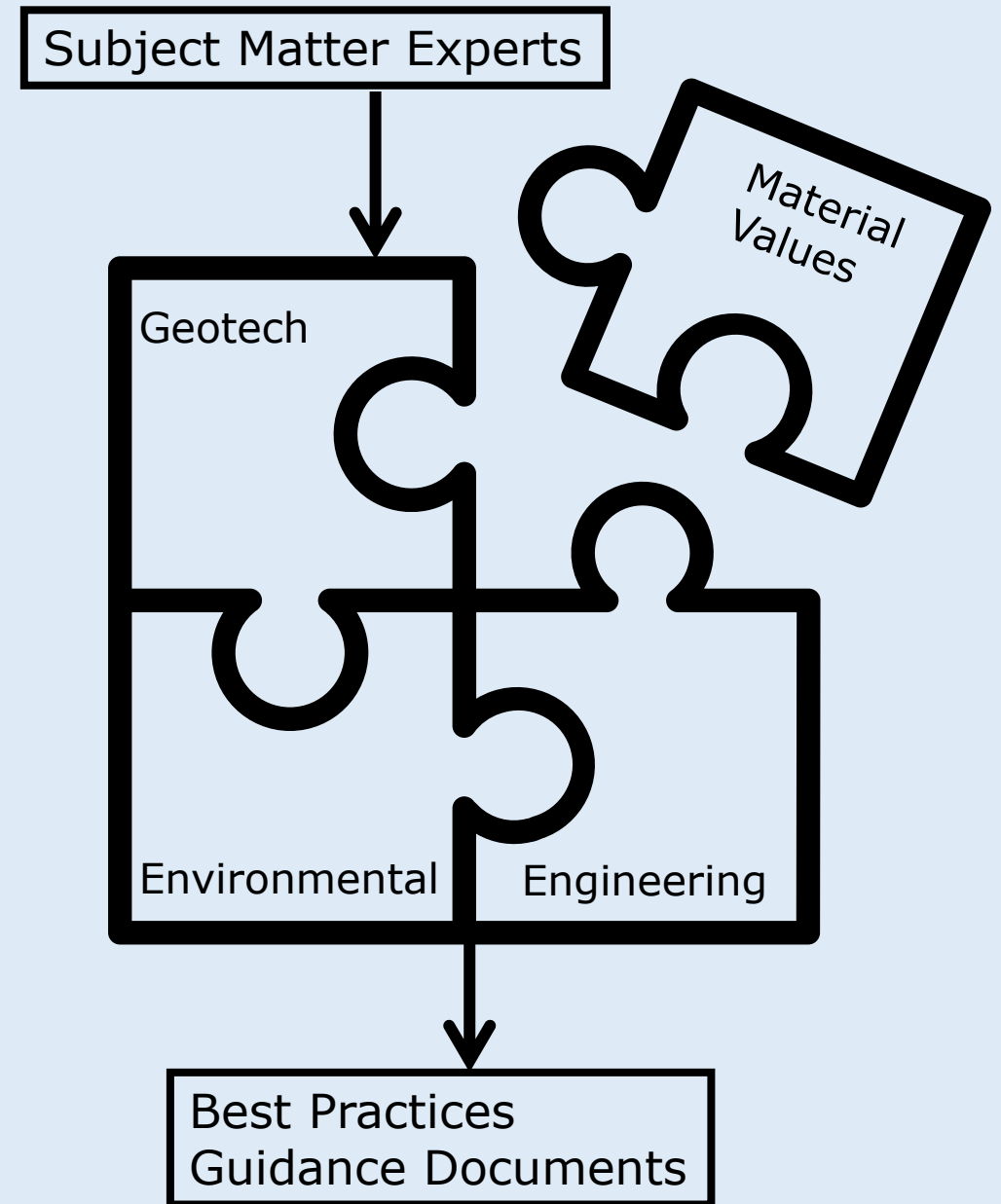
Example of performance rated access designed to site and expectations



Site 1 year after removal of access

Future Considerations

- Defining allowable pressure and deflection for vegetation regrowth in wetlands
- Language in permitting
- Getting involved with defining best practices



Thank You

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Sources

Biden-Harris Administration announces \$13 billion to modernize and expand America's power grid. Energy.gov. (2022, November 18). <https://www.energy.gov/articles/biden-harris-administration-announces-13-billion-modernize-and-expand-americas-power-grid#:~:text=Launched%20in%20January%202022%2C%20the,and%20distribution%20systems%20that%20are>

Department of Energy. (February 2023). *National Transmission Needs Study: Draft for Public Comment.*