Impact Avoidance and Minimization Techniques

Environmental Summit
DEEP Headquarters
November 20, 2018

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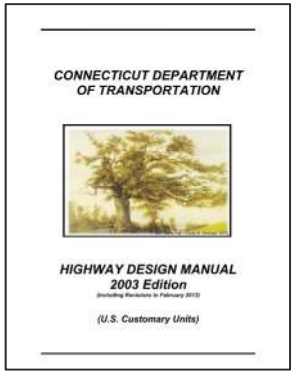
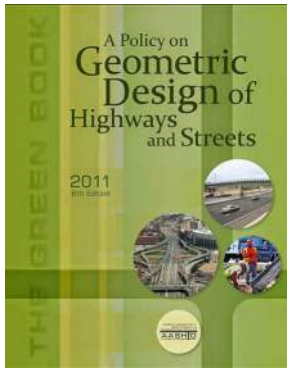
Department of Transportation

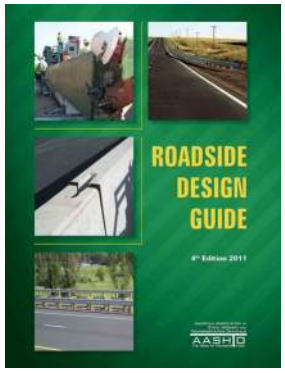
Design Manuals and Guidelines

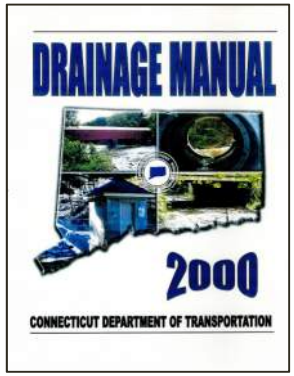
- Highway Design
- Drainage
- Bridge Design
- Bridge Safety
- Geotechnical
- Landscape
- Traffic
- Facilities & Transit
- Rights of Way

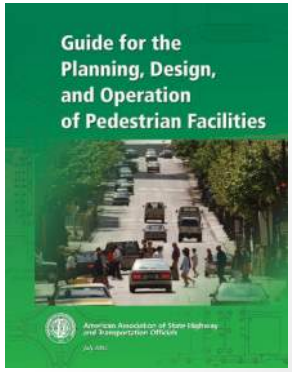
- Environmental Planning
- Utilities
- Maintenance





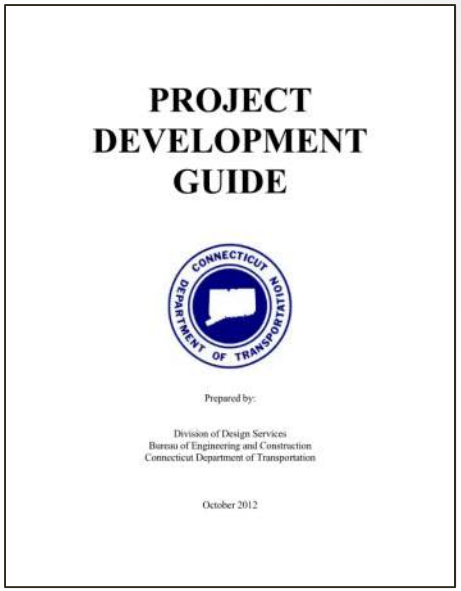






Project Development

- Systematic Decision Making
  1. Define the Problem
     - Traffic conditions and performance
     - Infrastructure conditions
     - Plans/Requirements
  2. Identify and Evaluate Alternatives
     - Evaluation:
       - Effectiveness
       - Impacts
       - Cost
     - Ideal alternatives are rare
     - Tradeoffs
     - Make a “well informed, well considered” decision



Project Development (cont'd.)

- Systematic Decision Making
  3. Select an Alternative
     - Present selected alternative to management
     - Design Approval → Funding
  4. Refine Selected Alternative
     - Refinement of design
     - Coordination with utility companies, railroad, property owners
     - Permit preparation
     - Contract development

Avoidance and Minimization Techniques

- Realign or relocate the corridor
  - Cross wetlands/watercourses at narrowest section
- Follow contours of existing land
- Narrow the corridor
- Change design type
- Span as much of a wetland as possible
- Use existing bridge abutments
- Use pervious materials
- Best Management Practices

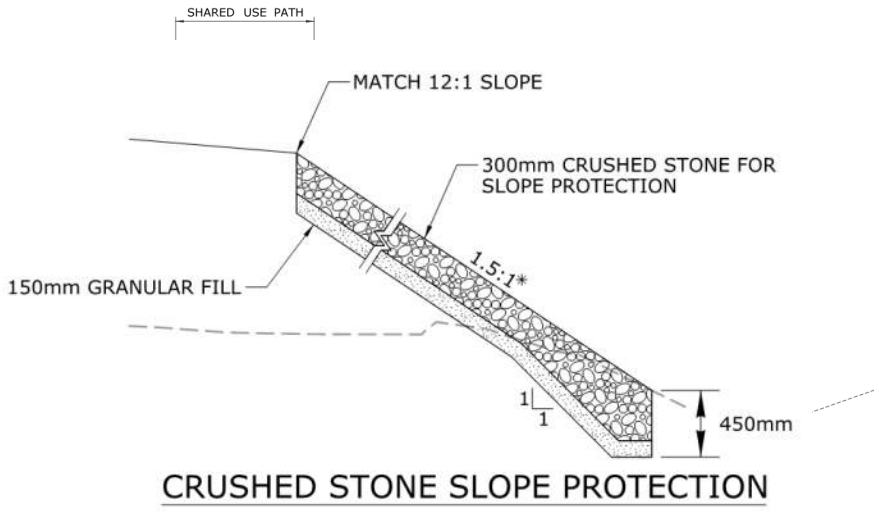
Avoidance and Minimization Techniques

Avoidance and Minimization Techniques

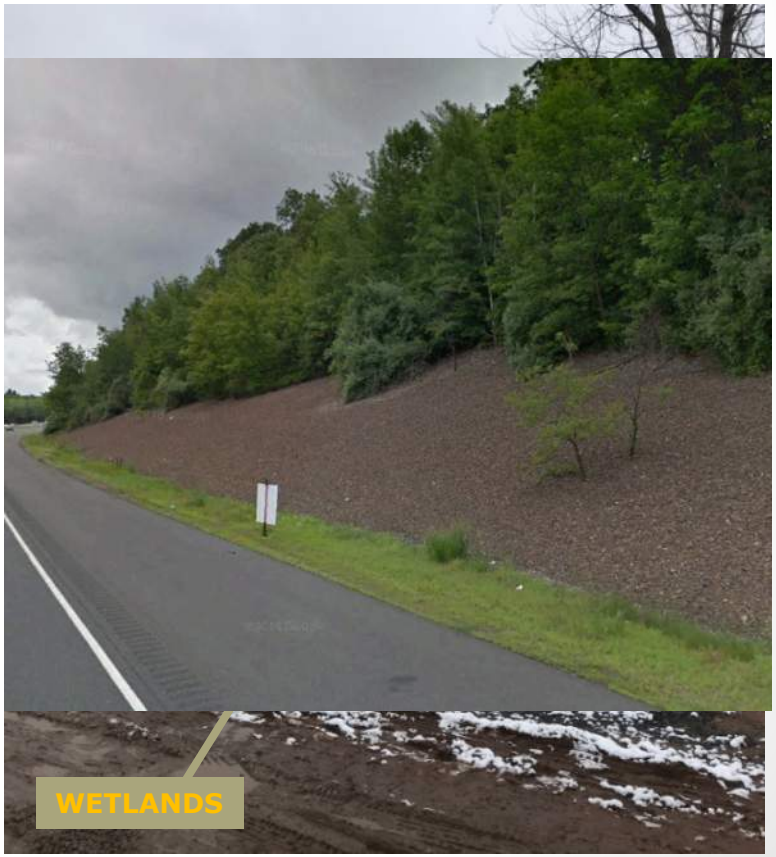
- Roadway Side Slopes
  - 6H:1V slopes preferred for safety, maintenance, and constructability
    - Traversable and recoverable
    - Soils are stable
    - Easily maintained
  - 3H:1V – 4H:1V slopes are acceptable
    - Traversable but not recoverable
    - Typically installed when fill heights are greater than 10’
  - 2H:1V slopes are acceptable when needed
    - Not traversable
    - Guiderail is often required to protect errant vehicles
    - Guiderail introduces a roadside hazard
    - Erosion control matting required on slope

Avoidance and Minimization Techniques

- Side slopes steeper than 2H:1V require special treatment
  - Crushed stone surface protection up to 1.5H:1V slope
  - Retaining wall
  - Reinforced soil slope



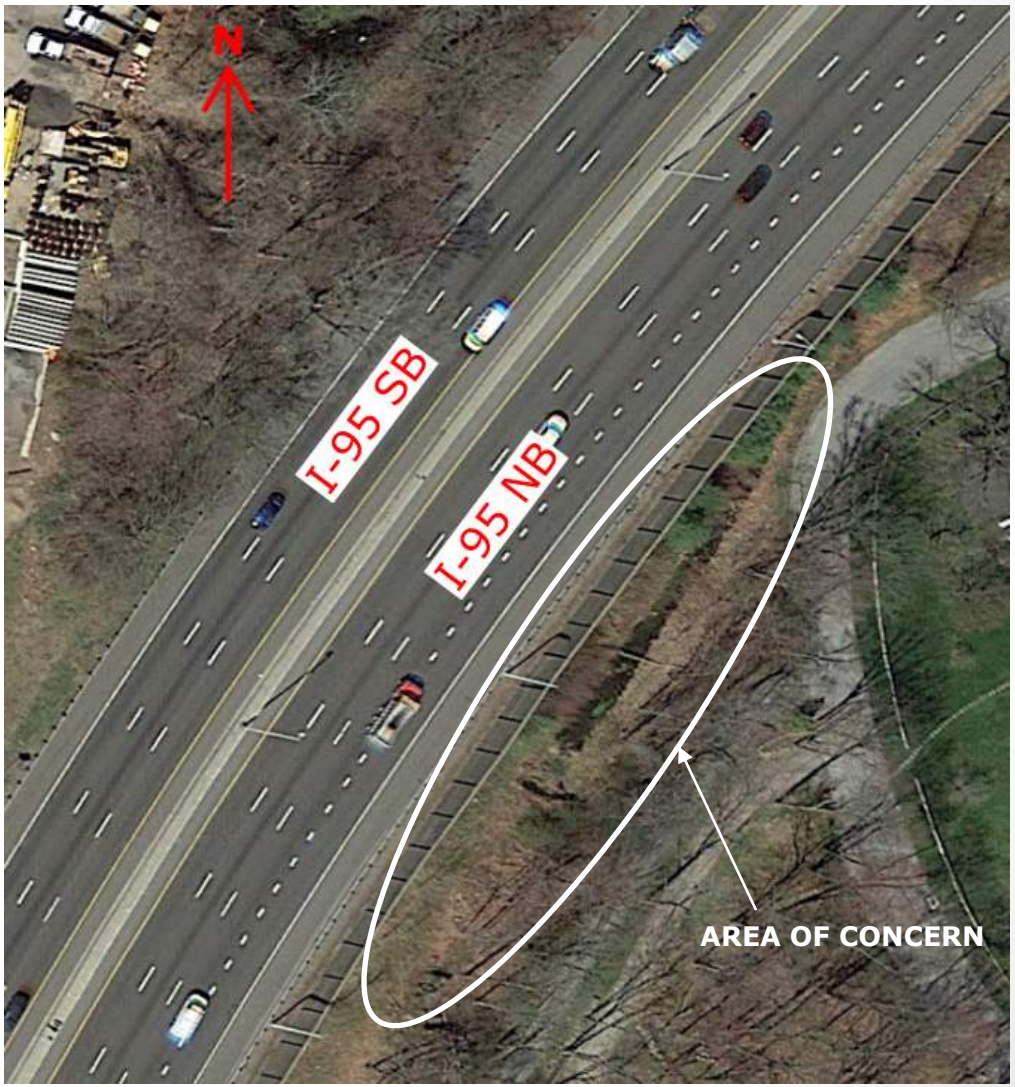
Cross-Section



Avoidance Techniques

- Project 35-188 – Darien, CT – Speed Change Lanes Interstate 95 at Interchanges 11 to 12 and 13

- Technique Implemented: Noise Barrier Wall with Earth Retaining Panels



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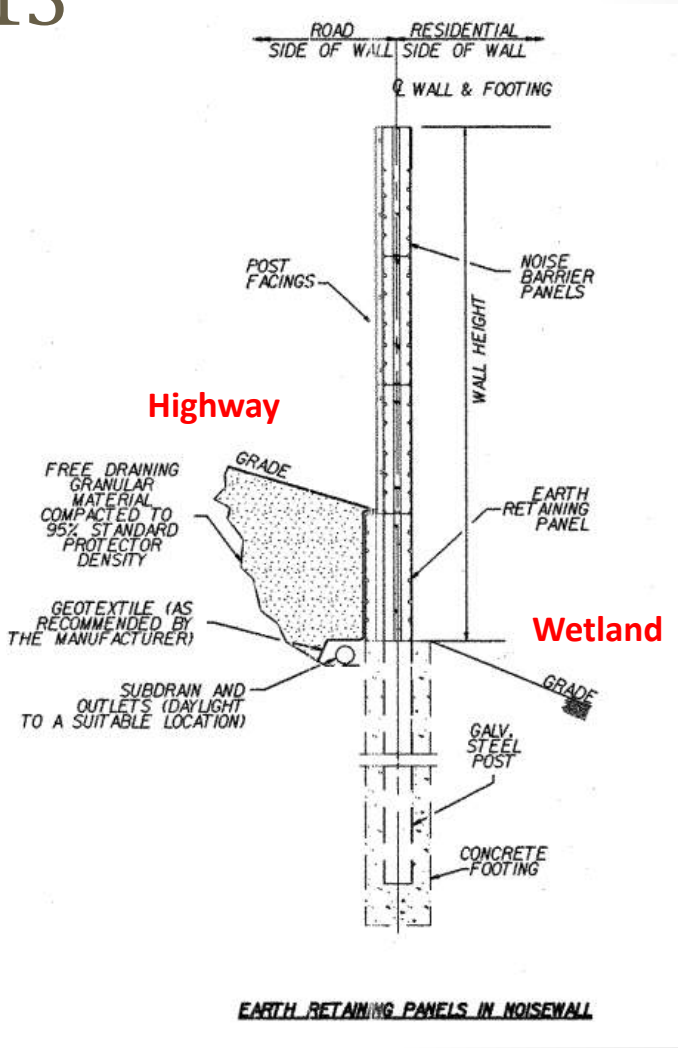
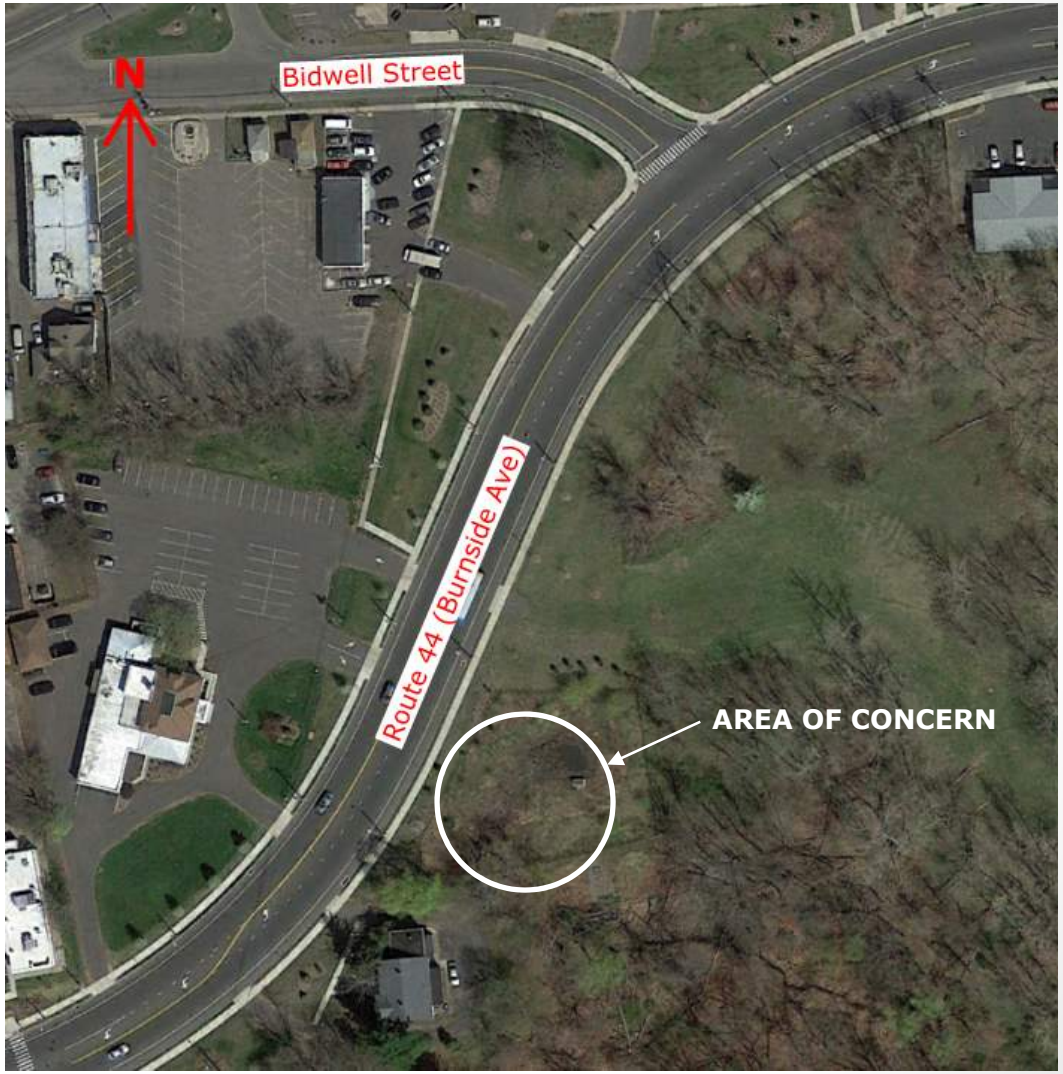
Speed Change Lanes Interstate 95 at Interchanges 11 to 12 and 13



Avoidance Techniques

- Project 42-292 – East Hartford, CT – Realignment of Route 44

- Technique Implemented: Gabion Basket Outlet Structure



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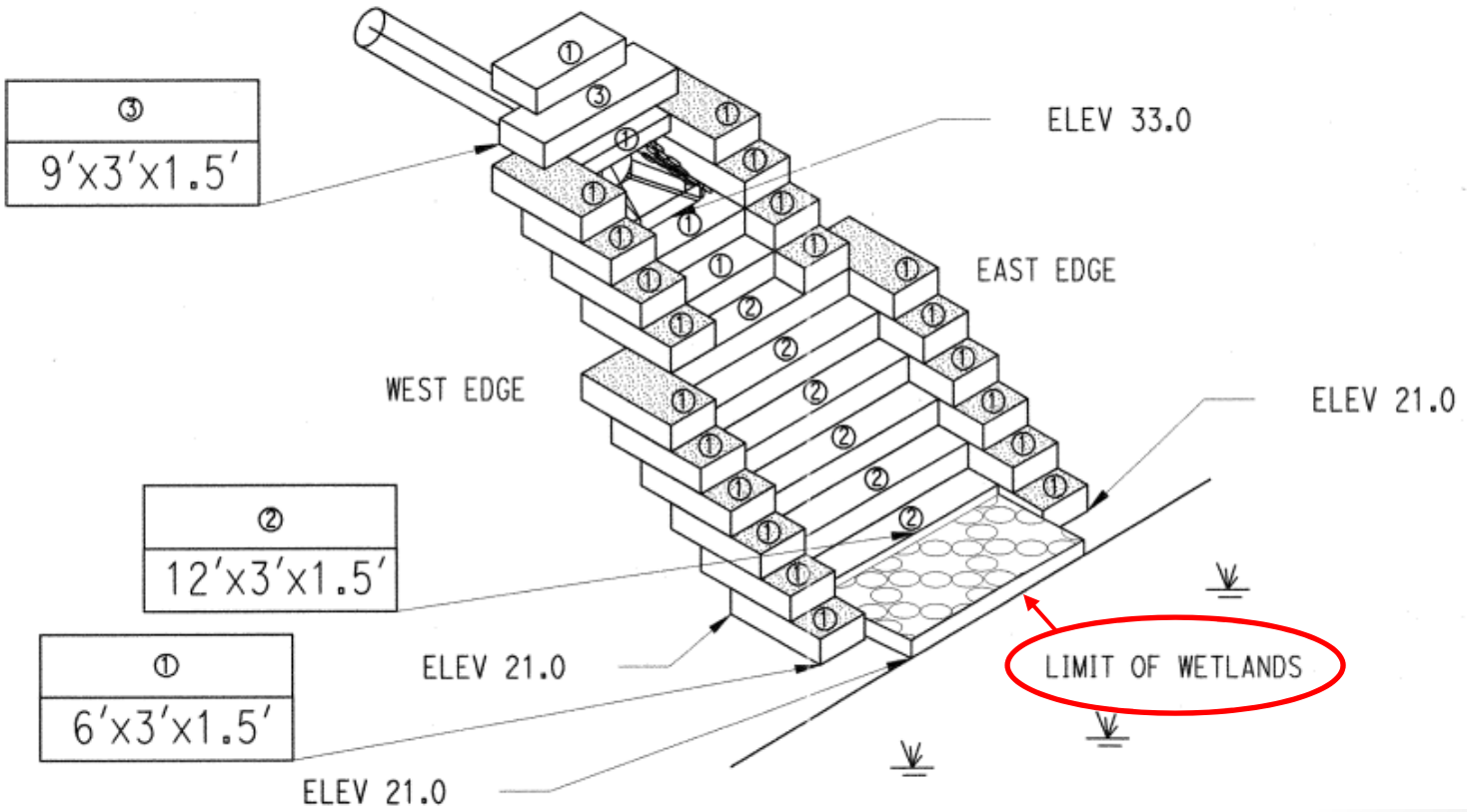

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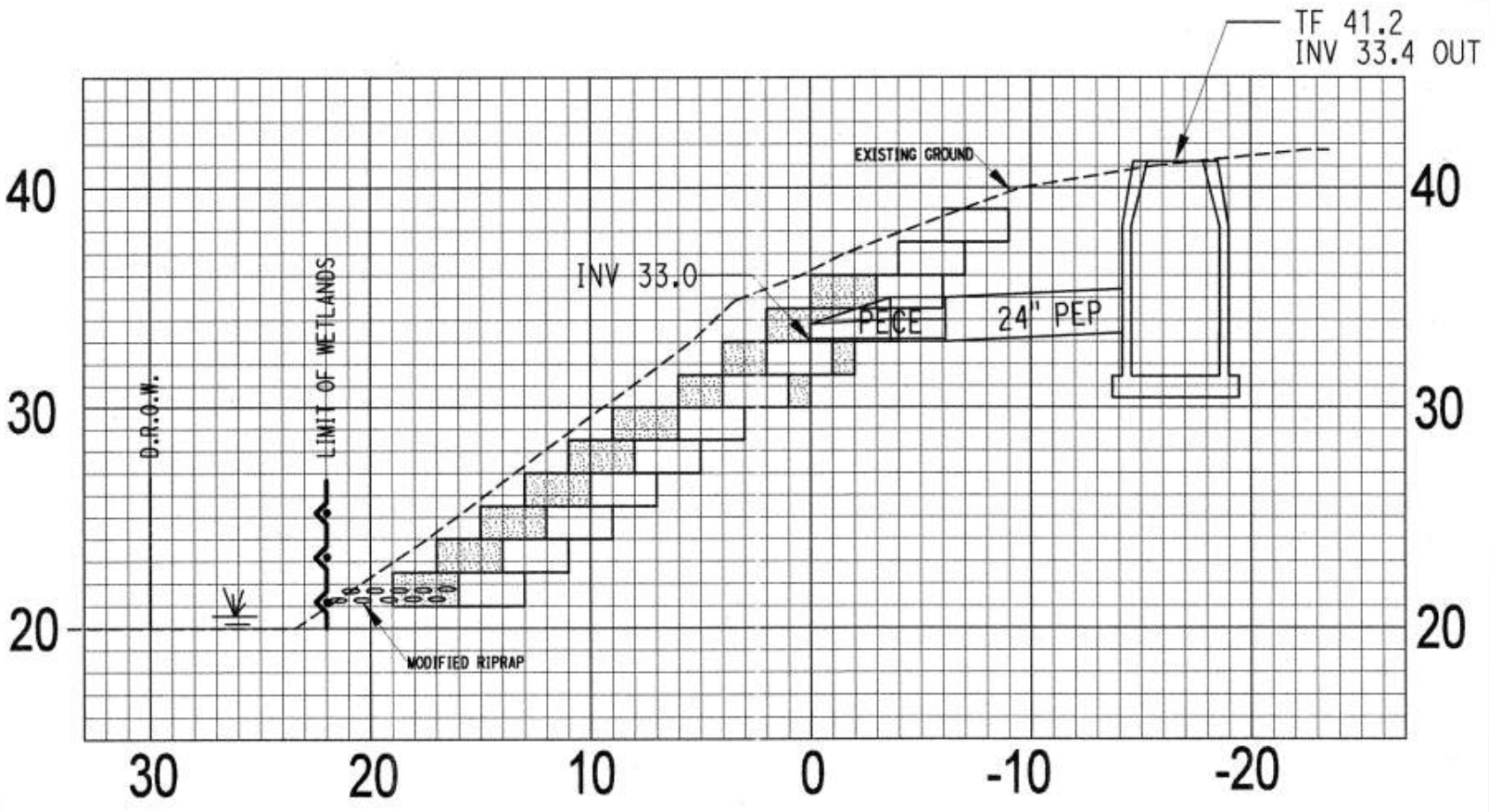
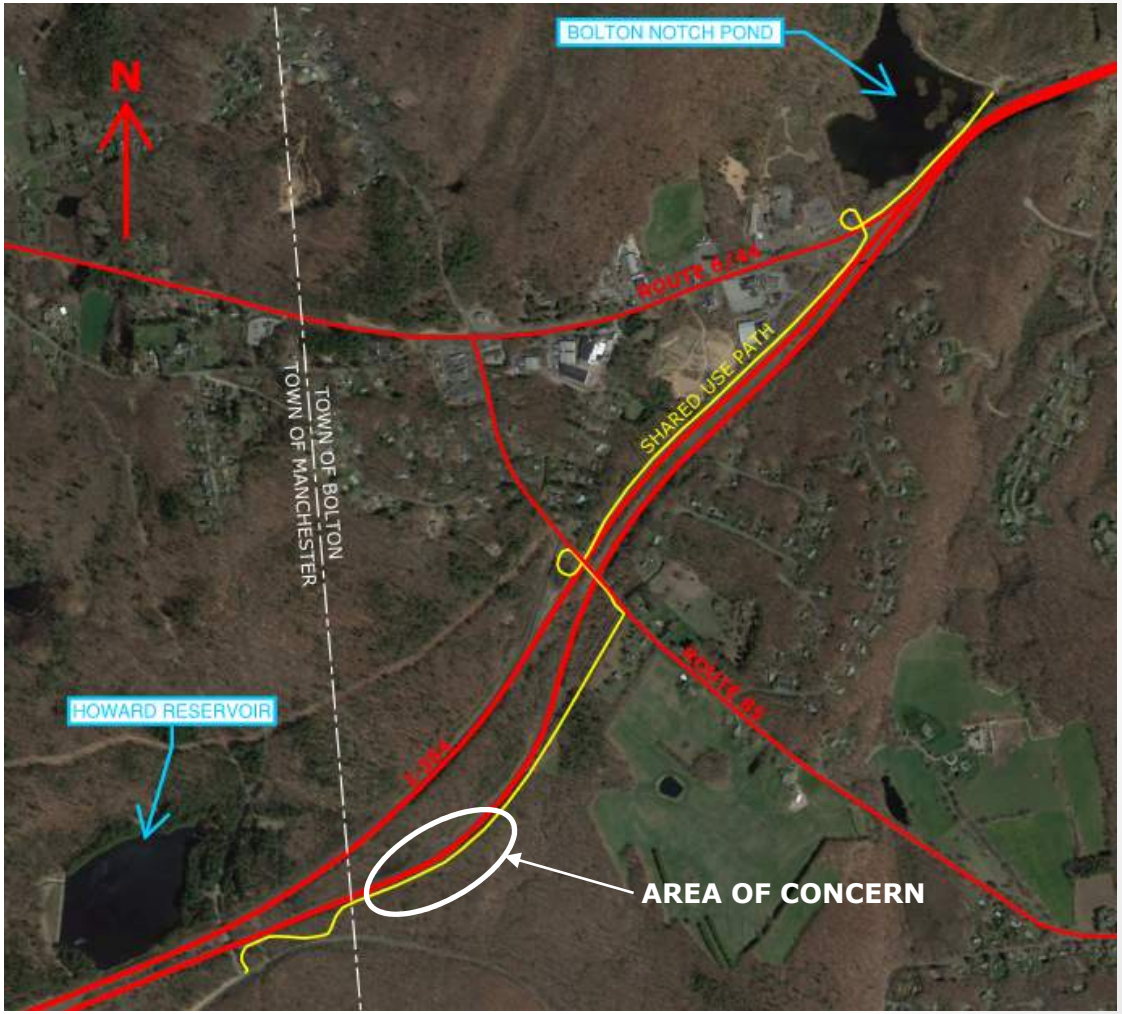


Avoidance Techniques

- Project 12-96 – Bolton, CT

  Construction of Charter Oak Greenway Shared Use Path

- Technique Implemented: Reinforced Soil Slope



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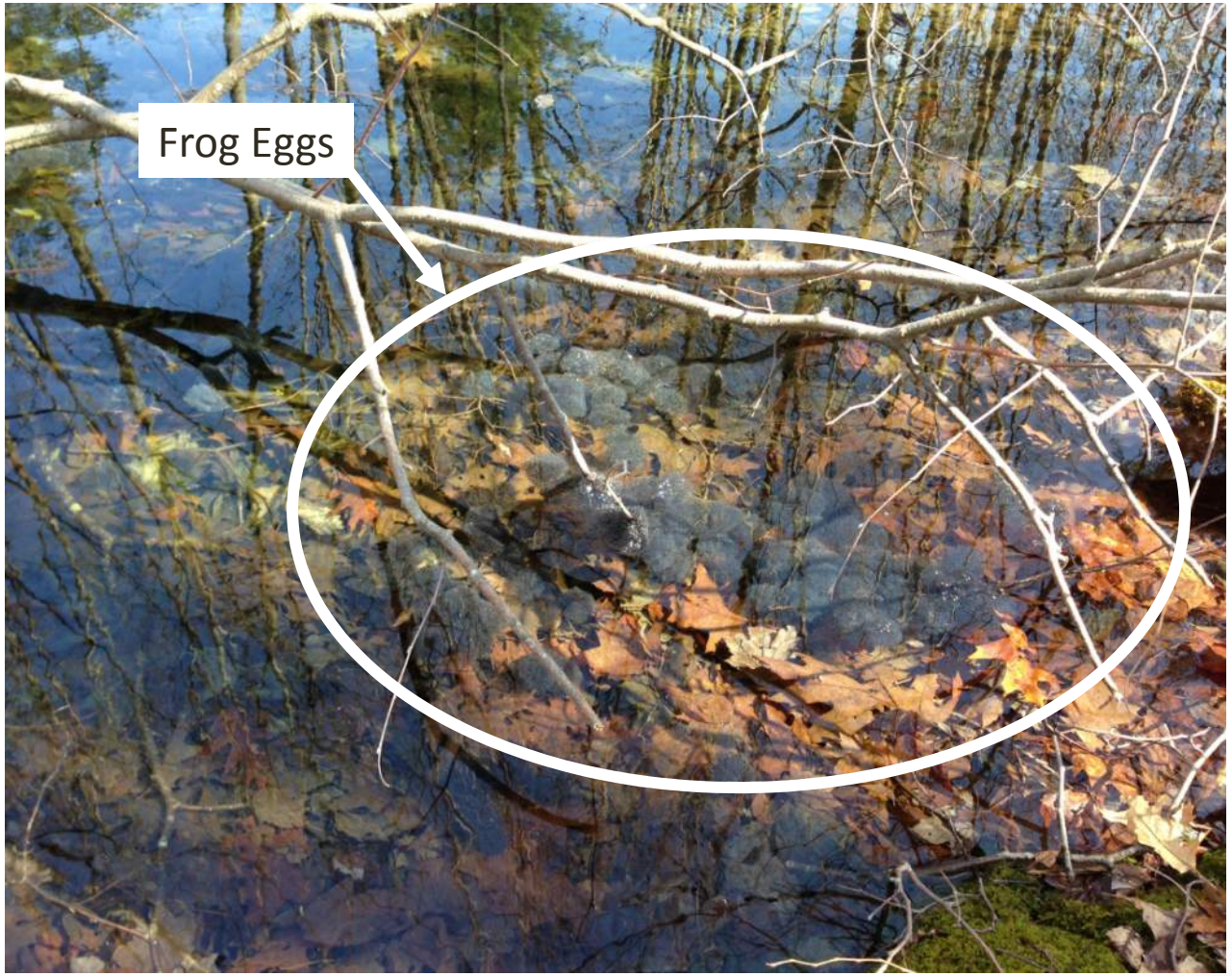
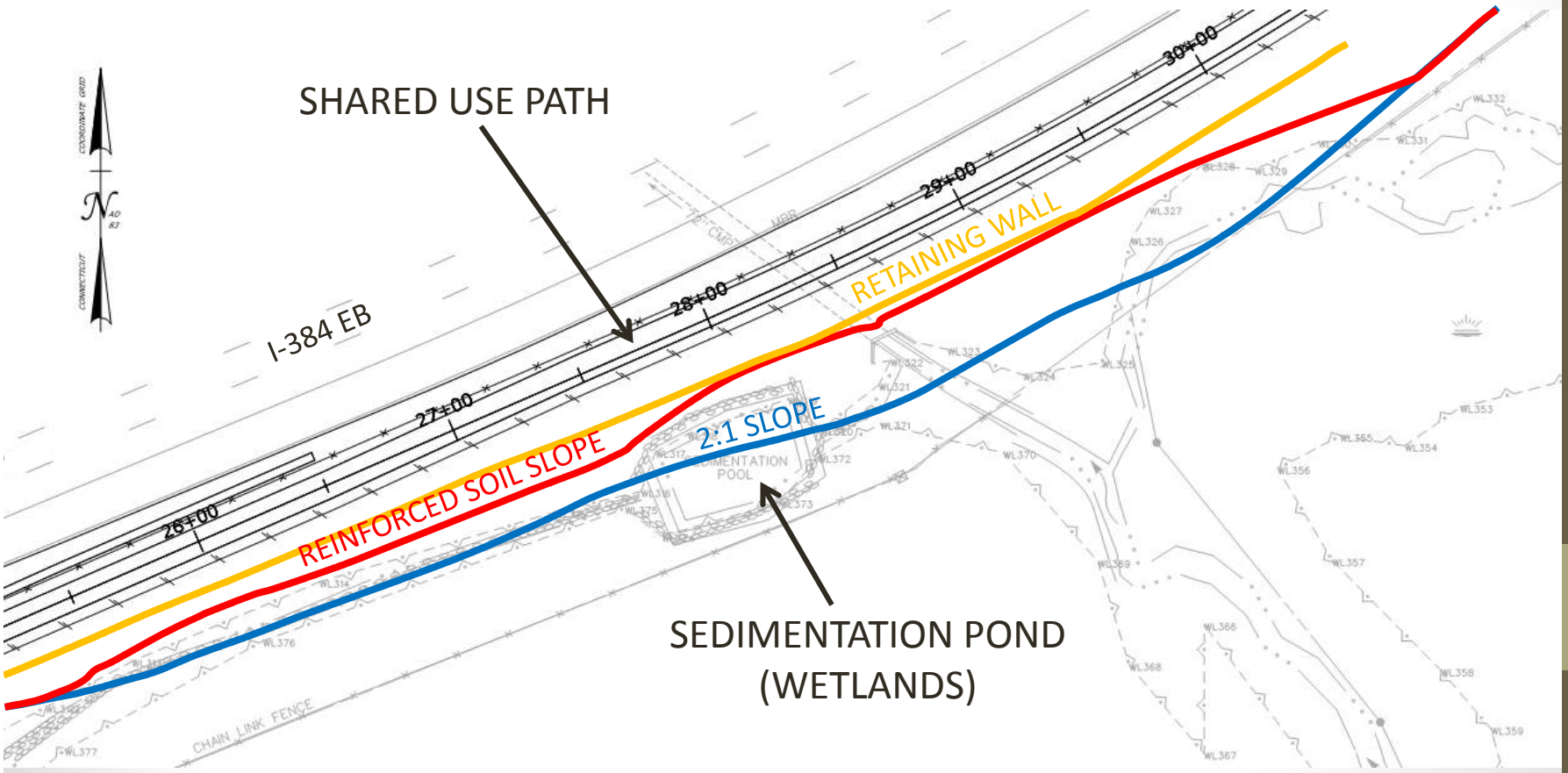


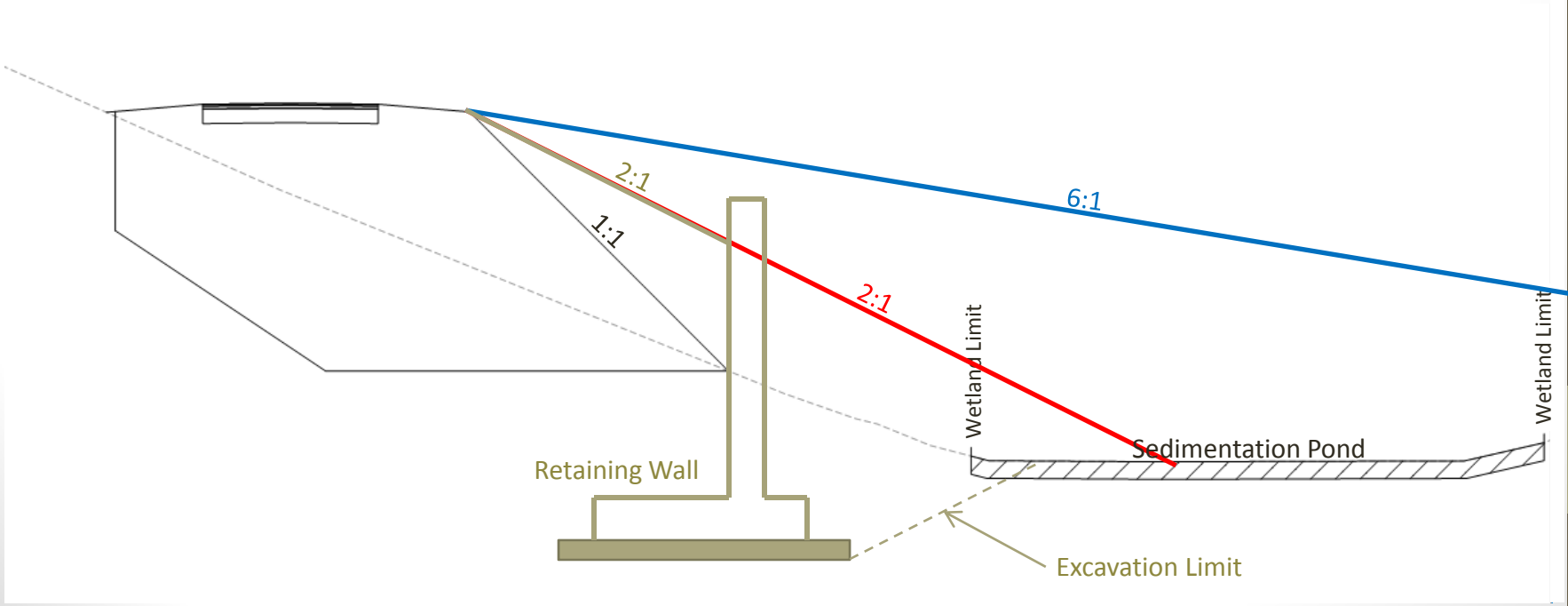
Reinforced Soil Slope

- Alternatives



Reinforced Soil Slope

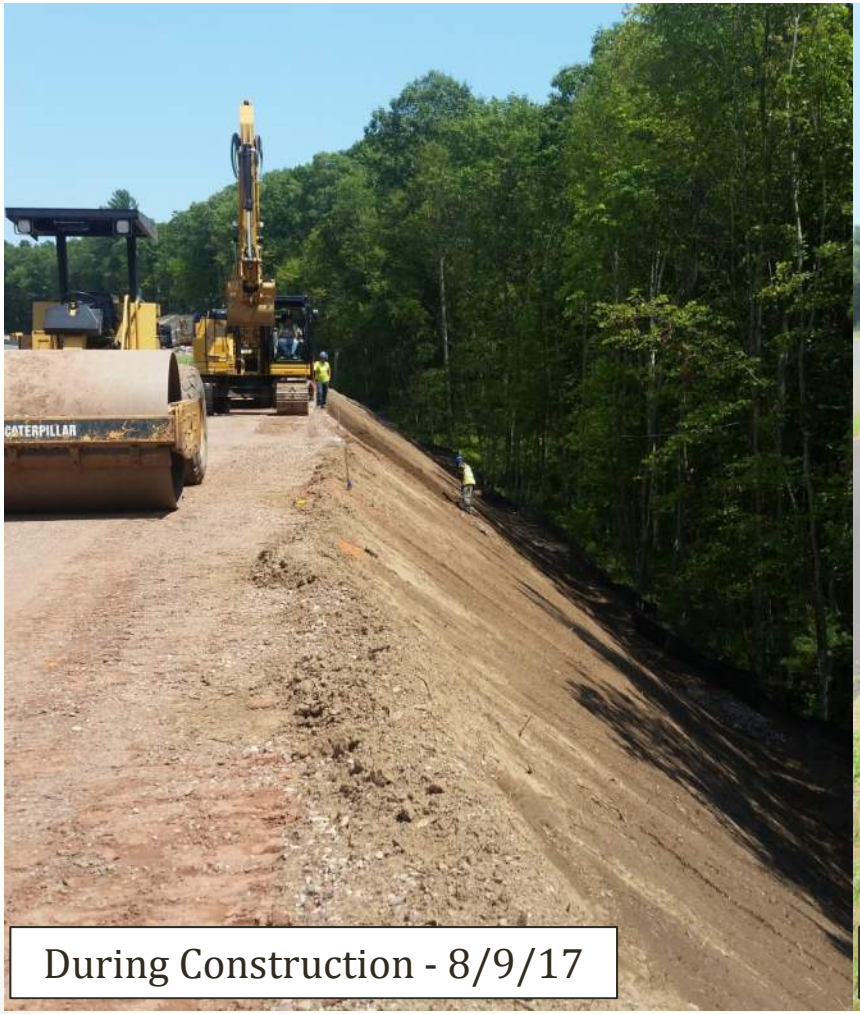
- Alternatives
  - 1:1 Reinforced Soil Slope – zero wetland impacts
  - 6:1 Slope – completely filled the wetland area
  - 2:1 Slope – partially covered the wetland area
  - Concrete retaining wall – wetland area impacted during construction



RSS Photos

During Construction - 8/4/17

RSS Photos



During Construction - 8/9/17

Post Construction - 8/10/18

Summary

- We analyze alternatives for many aspects of the roadway design
- We work with many different units, agencies and municipalities
- There is no “one size fits all” design
- Each design unit wants what’s best for their design
  - Comes with tradeoffs

Thank you!