

Accelerated Bridge Construction in Connecticut



Accelerated Bridge Construction

ConnDOT Practices

Consultant Engineering Memorandum 11-05 issued April 29, 2011 - encouraged consideration of ABC design methodologies for following reasons

- **Improve work zone Safety**
- **Minimize disruption to traveling public & surrounding area**
- **Maintain and improve construction quality**
- **Reduce Construction duration**
- **Reduce life cycle costs and environmental impact**





Southington - Out with the old

Connecticut Department of Transportation





Southington – In with the new

Connecticut Department of Transportation







[http://www.ct.gov/dot/cwp/view.asp?a=1410
&q=540374](http://www.ct.gov/dot/cwp/view.asp?a=1410&q=540374)





Middletown weekend replacement

Connecticut Department of Transportation



2014



**CONNECTICUT DEPARTMENT OF TRANSPORTATION
NEWS RELEASE**

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**Another Successful DOT Accelerated Bridge Replacement Project: Route 17 Bridge
Over Long Hill Brook in Middletown**

The Connecticut Department of Transportation has completed another successful Accelerated Bridge Construction (ABC) project – this one in Middletown. The Route 17 Bridge over Long Hill Brook was replaced over the weekend and reopened nine hours ahead of schedule.

“With a lot of pre-planning, hard work by the project personnel and support services along with good weather, Route 17 was able to reopen in time for morning commuter traffic and school buses at 6:15 a.m. Monday,” said DOT Commissioner James P. Redeker. “Nine hours may not seem like a big deal, but to commuters, school kids, emergency services and area residents, any time saved is a good thing.”

<http://www.ct.gov/dot/cwp/view.asp?A=1373&Q=552610>

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Weston – Bridge in a backpack

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Weston – 2 month detour

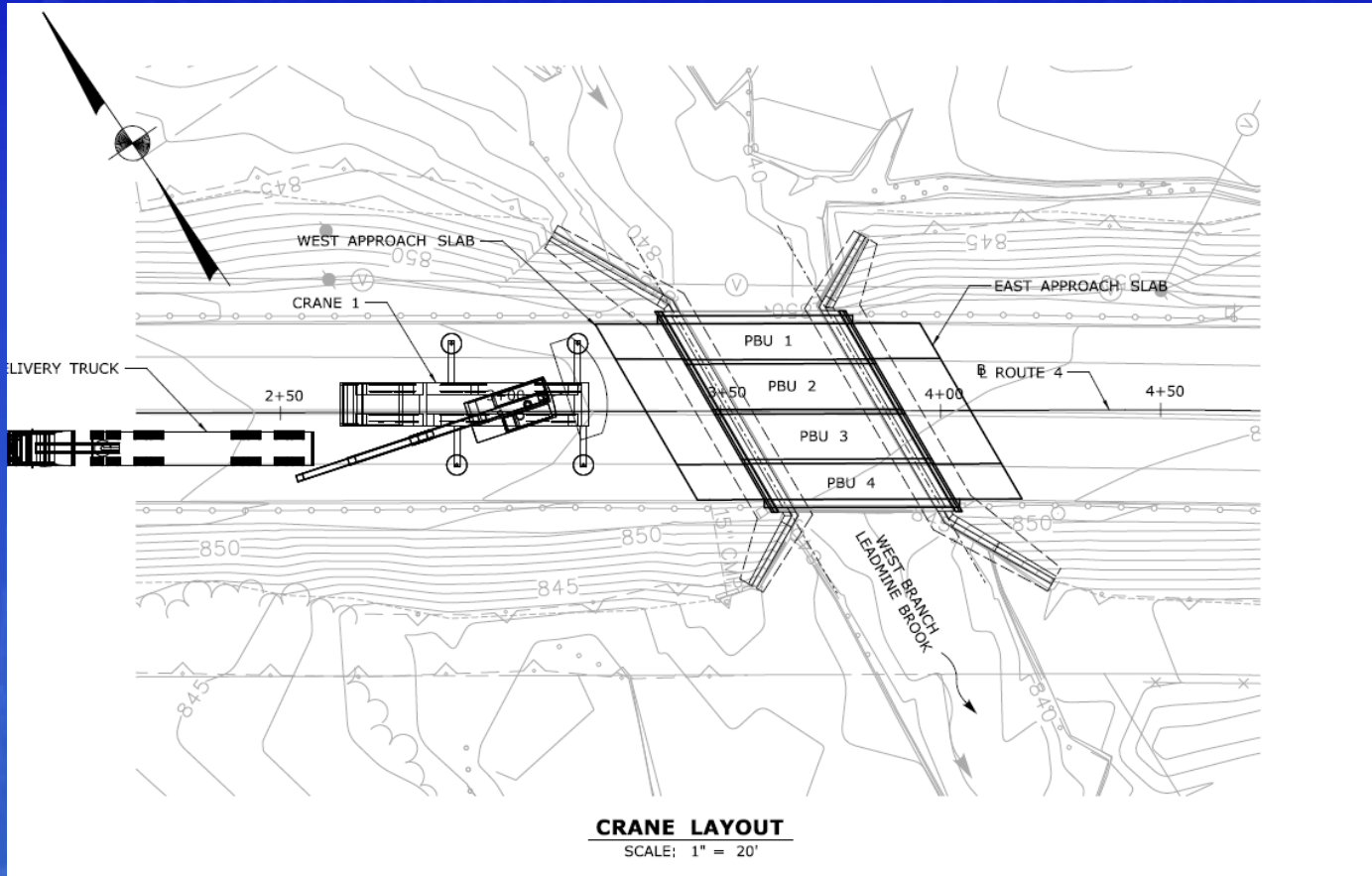
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What will CTDOT be doing?

- PBUs – Route 4, Harwinton
- GRS-IBS abutments – I-84 off-ramp, Manchester
- Slide – I-95, Waterford
- SPMTs -Route 1/I-95, Stamford

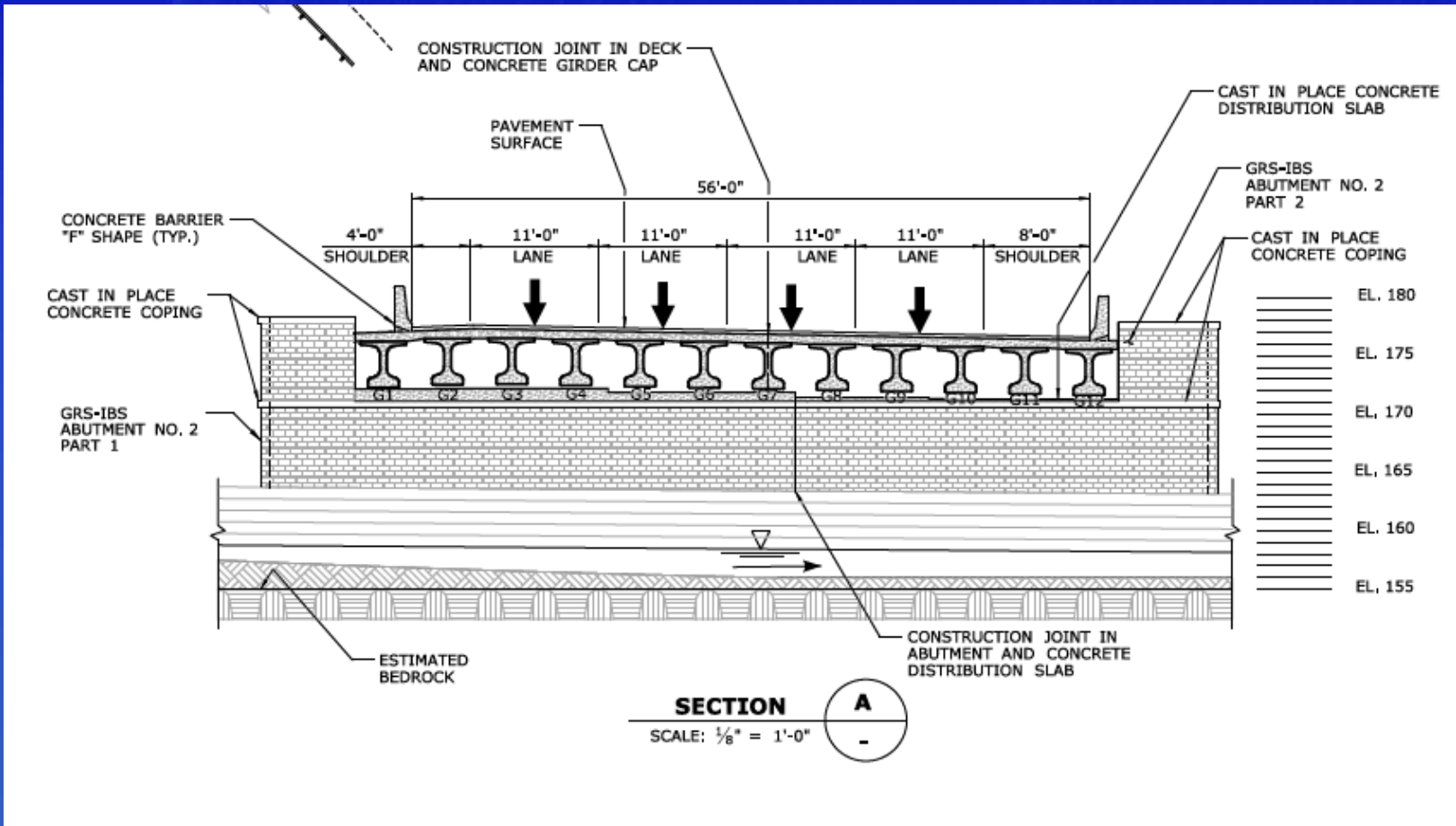




Harwinton – PBUs

Connecticut Department of Transportation





Manchester – GRS-IBS Abutments



Accelerated Bridge Construction

Decision Matrix

- ConnDOT ABC decision matrix soon to be released
- ConnDOT Decision Matrix based on Utah Example but
 - Included estimated construction inspection overhead costs associated with differing project durations for conventional versus ABC construction.
 - Included measures to weigh:

Cost of conventional construction with overbuild and/or temporary construction with minor long term traffic impact

vs.

Cost of ABC project with road closure, detour or more significant short term traffic impact.



Accelerated Bridge Construction

Decision Matrix

**Review Sample Project No. 152-157, Waterford
For ABC potential**

Project Data, plans are finalized

- **I-95 NB and SB over Oil Mill Road**
- **Bridge Nos. 00352A and 00352B**
- **Twin Short and Narrow Single Span Structures**
- **Superstructure replacement required**



ABC Decision Matrix

Site Information

Project Description: Project No 152-157, Waterford, I-95 over Dill Mill Road Bridges Nos. 352A & 352B Superstructure replacements

Prop. ABC Method: NEXT Beams - lateral Slide

Conventional Construction Method: Stage construction (3 stages)

Roadway on Bridge I-95

Average Daily Traffic 56900 vehicles per day

Conventional Construction

Delay Time 0.10 minutes

Construction Impact Duration 730 Days

Aggregate Impact Time 2885 Person Days

ABC

Delay Time 15 minutes

Construction Impact Duration 4 Days

Aggregate Impact Time 2371 Person Days

Roadway Below Bridge Dill Mill Road

Average Daily Traffic 400 vehicles per day

Conventional Construction

Delay Time 0.25 minutes

Construction Impact Duration 730 Days

Aggregate Impact Time 51 Person Days

ABC

Delay Time 10 minutes

Construction Impact Duration 8 Days

Aggregate Impact Time 22 Person Days

Percent Reduction in Aggregate Impact Time

Conventional Construction

Total Aggregate Impact Time 2395 Person Days

ABC

Total Aggregate Impact Time 2393 Person Days

User Impact Reduction 18%

Preliminary Cost Evaluation

Estimated conventional construction project cost =

Required Bridge \$2,000,000

Overbuild \$2,000,000

Total conventional bridge cost \$4,000,000

Estimated CE&I Costs per month

Field office monthly cost \$5,000

CE&I staff monthly cost (field plus main office) \$20,000

Total CE&I Monthly Cost \$25,000

Notes: Small field office = \$300 per month
Medium office = \$300 per month
Large office = \$300 per month
Staff = \$20,000 per person per month

Net time savings for ABC = 12.0 months

Estimated Percent Premium for ABC = 40%

MPT savings with ABC

Things that you can eliminate from conventional construction by using ABC

Overbuild for staging \$2,000,000

Temporary bridge \$0

Temporary signal \$0

Other \$0

Total MPT Savings with ABC \$2,000,000

Cost analysis

Premium for ABC = \$800,000

CEI Cost Savings = \$300,000

MPT savings with ABC = \$2,000,000

Net cost change for ABC = -\$1,500,000

ABC is less expensive than conventional

Net percentage of conventional cost = -75%

ABC Rating procedure

Enter values for each aspect of the project. Attach back-up data if applicable

Average Daily Traffic 2

0 No traffic impacts
1 Less than 10000
2 10000 to 40000
3 40000 to 70000
4 70000 to 100000
5 More than 100000

User Impact Reduction 1

0 Zero
1 1% to 20%
2 21% to 40%
3 41% to 60%
4 61% to 80%
5 81% to 100%

Bridge Classification 3

1 Normal Bridge (entry of 1 = not considered in score)
2 Essential Bridge Interstate
3 Curved bridges
4 Skewed Bridges
5 Single geometry well suited for typical details

Bridge Location 4

0 Rural Bridge away from town center
1 Rural bridge near town center
2 Suburban bridge away from town center
3 Suburban bridge near major traffic generators
4 Urban Bridge near major traffic generators
5 Urban Bridge near emergency services

Use of Typical Details 5

1 Complex and unfavorable geometry
2 Curved and skewed bridges
3 Curved bridges
4 Skewed Bridges
5 Single geometry well suited for typical details

Work Zone Geomet 4

1 Short duration project with good geometry & flow
2 Short duration project with moderate geometry & flow
3 Average project duration with average geometry & flow
4 Long duration project with moderate geometry & flow
5 Long duration project with complex geometry & flow

Site Conditions 4

0 significant limitations on work
1 moderate construction limitations for portions of the work
2 minor construction limitations
3 No Restrictions

Railroad Impacts 0

0 No Railroad (entry of 0 = not considered in score)
1 Freight Siding (Less than 1 train per week)
2 Light Freight (1 Train per week to 1 Train per day)
3 Heavy Freight (More than 1 Train per day)
4 Commuter rail
5 Electrified Commuter Rail

Cost Analysis 5

0 >40%
1 30% < Factor < 40%
2 20% < Factor < 30%
3 10% < Factor < 20%
4 0% < Factor < 10%
5 Factor < 0%

Envir. /Water Handl 0

0 No Restrictions (entry of 0 = not considered in score)
1 minor construction limitations
2 moderate construction limitations for portions of the work
3 significant limitations on work

Waterway Limitation 0

0 No impact (entry of 0 = not considered in score)
1 Minor impacts
2 Seasonal recreational impacts
3 Significant recreational impacts
4 Significant commercial impacts

ABC Rating

	Score	Weight Factor	Adjusted Score	Maximum Score	Adjusted Score
Average Daily Traffic	2	10	20	5	50
User Impact Reduction	1	30	30	5	150
Bridge Classification	3	5	15	5	25
Bridge Location	4	5	20	5	25
Use of Typical Details	5	5	25	5	25
Work Zone Geometry	4	8	32	5	40
Site Conditions	4	5	20	5	25
Railroad Impacts	0	5	0	0	0
Cost Analysis	5	40	200	5	200
Envir. /Water Handling	0	5	0	0	0
Waterway Limitations	0	5	0	0	0
Total Score			362	Max. Score	540

ABC Rating 67

ABC Rating Scale

60-100 Use ABC
40-60 Consider ABC
0-40 Do not use ABC

Note: Weight factors determined by CTDOT. Do not adjust factors without prior consultation.



ABC Rating

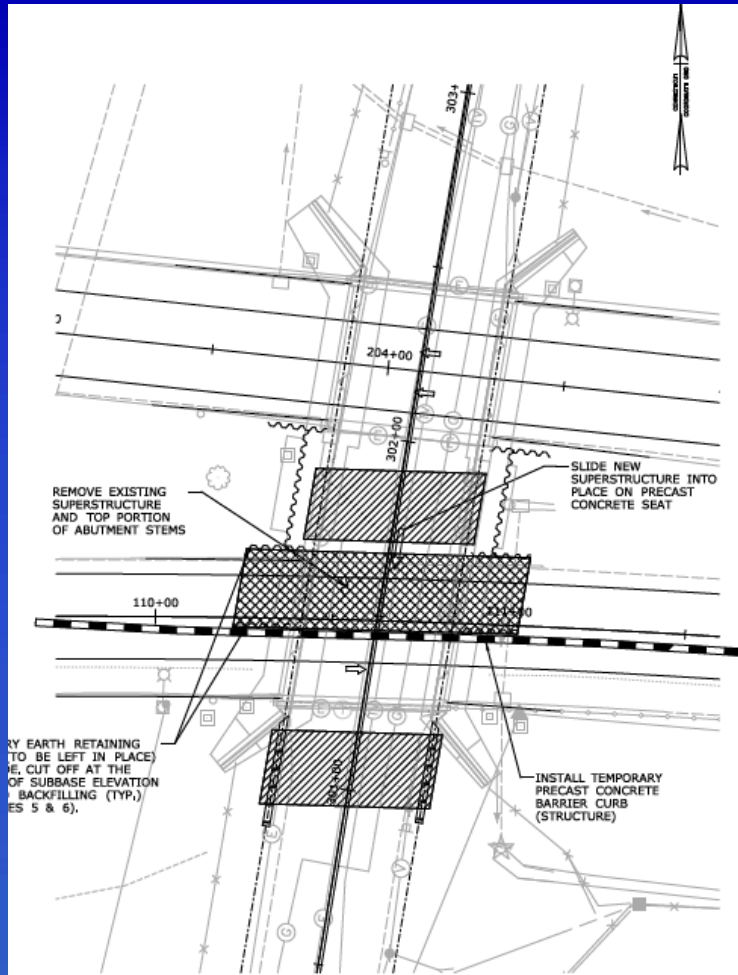
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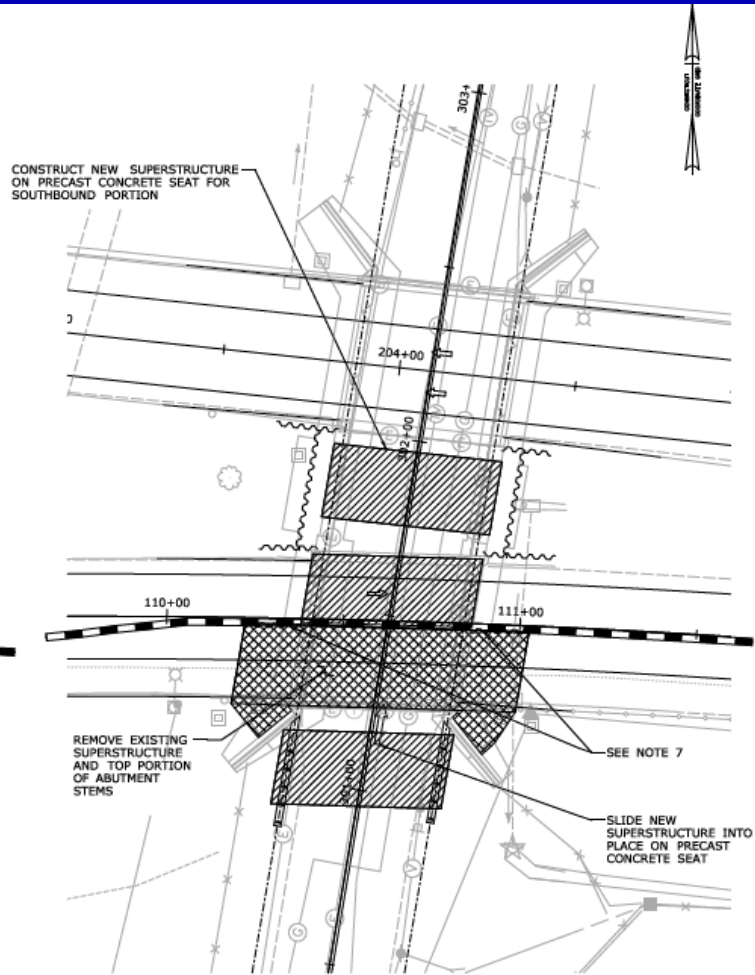
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**STAGE 1 - DEMOLITION AND HORIZONTAL BRIDGE SLIDE-1
(34 HOUR PERIOD)**



**STAGE 2 - DEMOLITION AND HORIZONTAL BRIDGE SLIDE-2
(34 HOUR PERIOD)**

Waterford – Slide

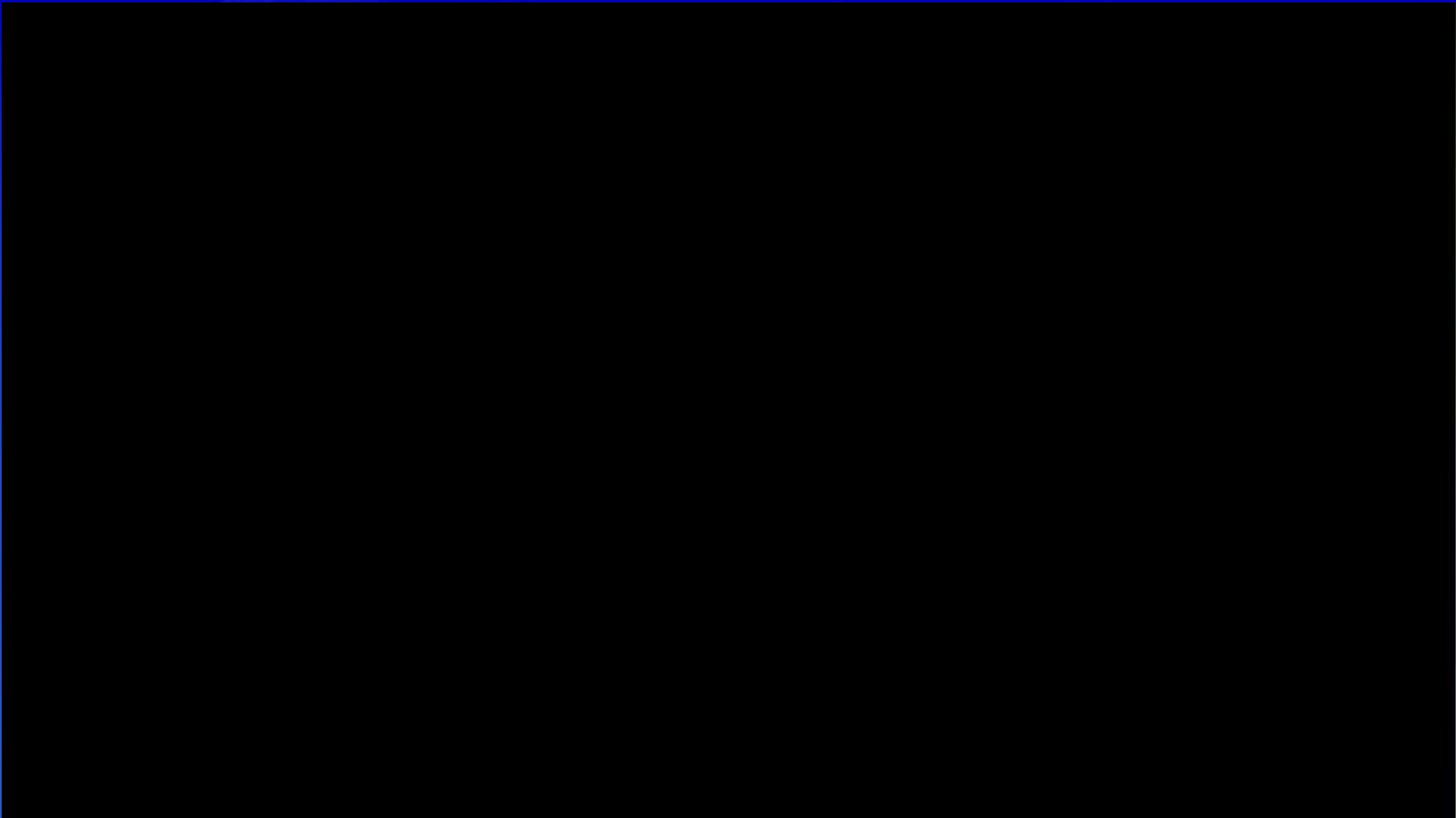




SPMTs - Bridge 00037 **U.S. Route 1 over I-95, Stamford**

Connecticut Department of Transportation





Atlantic Street, Stamford

Connecticut Department of Transportation





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