



APPENDIX C

BENEFIT COST ANALYSIS & ADAPTATION ALTERNATIVE COST ESTIMATE

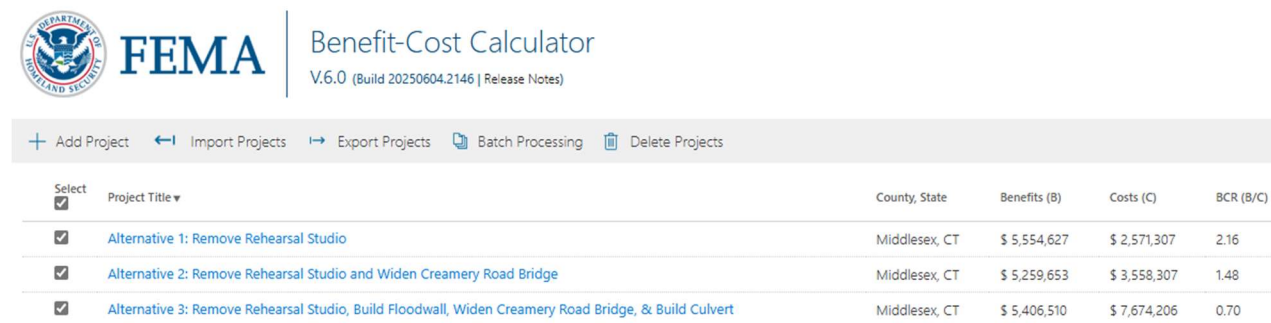
Resilient East Haddam

BENEFIT-COST ANALYSIS

This section includes the results of the planning-level benefit-cost analysis for the three Succor Brook flood mitigation alternatives carried out by Kleinfelder using the FEMA BCA Toolkit. Note that the analyses presented herein are based on conceptual-level cost estimates for each alternative and should be considered as initial calculations of costs and benefits only, to be used for planning purposes to facilitate potential future grant funding applications. Certain elevations used to estimate building first floor levels were based on lidar data and should be replaced with field survey data to confirm building flood impacts.

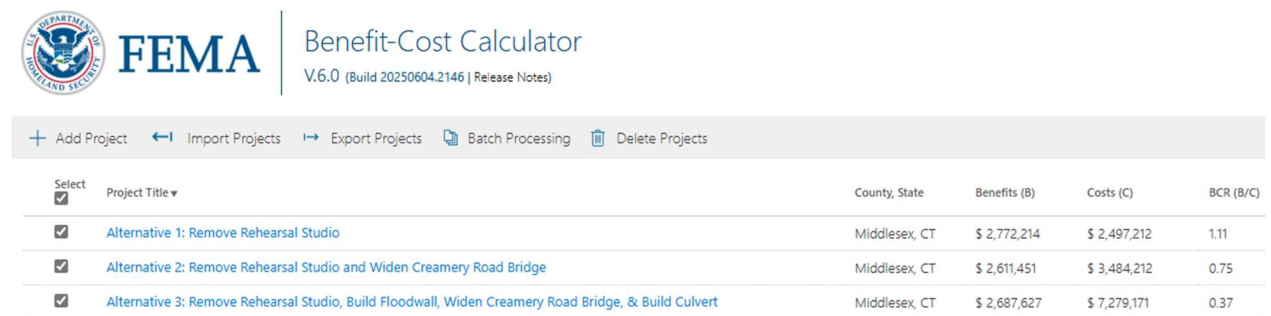
As of June 2025, the BCA calculator was updated to reflect the latest FEMA guidance, which requires the use of a discount rate of 7.0% to carry out the analysis. Prior to this revision, FEMA recommended the use of a 3.1% discount rate. Results for Alternatives 1, 2, and 3 with both discount rates are provided in this section. In general, using a higher discount rate reduces the value of future benefits. The result of the BCA was a Benefit/Cost Ratio (BCR) for each alternative. Projects with a BCR > 1.00 are considered cost-effective by FEMA and are eligible for FEMA grant funding. The BCR results using each discount rate are presented below:

BCR Results (Discount Rate = 3.1%)



Select	Project Title ▼	County, State	Benefits (B)	Costs (C)	BCR (B/C)
☒	Alternative 1: Remove Rehearsal Studio	Middlesex, CT	\$ 5,554,627	\$ 2,571,307	2.16
☒	Alternative 2: Remove Rehearsal Studio and Widen Creamery Road Bridge	Middlesex, CT	\$ 5,259,653	\$ 3,558,307	1.48
☒	Alternative 3: Remove Rehearsal Studio, Build Floodwall, Widen Creamery Road Bridge, & Build Culvert	Middlesex, CT	\$ 5,406,510	\$ 7,674,206	0.70

BCR Results (Discount Rate = 7.0%)



Select	Project Title ▼	County, State	Benefits (B)	Costs (C)	BCR (B/C)
☒	Alternative 1: Remove Rehearsal Studio	Middlesex, CT	\$ 2,772,214	\$ 2,497,212	1.11
☒	Alternative 2: Remove Rehearsal Studio and Widen Creamery Road Bridge	Middlesex, CT	\$ 2,611,451	\$ 3,484,212	0.75
☒	Alternative 3: Remove Rehearsal Studio, Build Floodwall, Widen Creamery Road Bridge, & Build Culvert	Middlesex, CT	\$ 2,687,627	\$ 7,279,171	0.37

Complete printouts from the BCA Toolkit (including input assumptions) for the 7.0% Discount Rate analysis are included in the following pages. The same assumptions were used for both discount rates.

Cost estimates for each flood mitigation alternative and an estimate of the replacement value of the Tenney Rehearsal Studio based on RSMeans data are also provided in this section.



Benefit-Cost Calculator
V.6.0 (Build 20250604.2146) | Release Notes

Benefit-Cost Analysis

Project Name: Alternative 1: Remove Rehearsal Studio



Map Marker #	Mitigation Title	Property Type	Hazard	Discount Rate (%)	Benefits (B)	Costs (C)	BCR (B/C)
1	Acquisition @ 21 Norwich Rd, East Haddam, Connecticut, 06423		Riverine Flood	7.0	\$ 1940,358	\$ 1934,212	1.00
2	Floodplain and Stream Restoration @ 128 Norwich Rd, East Haddam, Connecticut, 06423		Riverine Flood	7.0	\$ 57,992	\$ 0	0.00
3	Floodplain and Stream Restoration @ 12E Norwich Rd, East Haddam, Connecticut, 06423		Riverine Flood	7.0	\$ 7,743	\$ 0	0.00
4	Floodplain and Stream Restoration @ 12K Norwich Rd, East Haddam, Connecticut, 06423		Riverine Flood	7.0	\$ 921	\$ 0	0.00
5	Floodplain and Stream Restoration @ 12F Norwich Rd, East Haddam, Connecticut, 06423		Riverine Flood	7.0	\$ 17,545	\$ 0	0.00
6	Floodplain and Stream Restoration @ 12G Norwich Rd, East Haddam, Connecticut, 06423		Riverine Flood	7.0	\$ 5,251	\$ 0	0.00
7	Floodplain and Stream Restoration @ 12H Norwich Rd, East Haddam, Connecticut, 06423		Riverine Flood	7.0	\$ 130,969	\$ 0	0.00
8	Floodplain and Stream Restoration @ 12I Norwich Rd, East Haddam, Connecticut, 06423		Riverine Flood	7.0	\$ 5,557	\$ 0	0.00
9	Elevation @ 62 Creamery Rd, East Haddam, Connecticut, 06423		Riverine Flood	7.0	\$ 17,901	\$ 201,000	0.09
10	Elevation @ 59 Creamery Rd, East Haddam, Connecticut, 06423		Riverine Flood	7.0	\$ 271,305	\$ 362,000	0.75
11	Floodplain and Stream Restoration @ 20 Norwich Rd, East Haddam, Connecticut, 06423		Riverine Flood	7.0	\$ 316,672	\$ 0	0.00
TOTAL (SELECTED)					\$ 2,772,214	\$ 2,497,212	1.11
TOTAL					\$ 2,772,214	\$ 2,497,212	1.11

Property Configuration

Property Title:	Acquisition @ 21 Norwich Rd, East Haddam, Connecticut, 06423
Property Location:	06423, Middlesex, Connecticut
Property Coordinates:	41.4551689663638, -72.45905179170229
Hazard Type:	Riverine Flood
Mitigation Action Type:	Acquisition
Property Type:	Non-Residential Building
Analysis Method Type:	Modeled Damages

Cost Estimation

Acquisition @ 21 Norwich Rd, East Haddam, Connecticut, 06423

Discount Rate (%):	7.0%	Use Default:Yes
Project Useful Life (years):	100	
Project Cost:	\$1,870,000	
Number of Maintenance Years:	100	Use Default:Yes
Annual Maintenance Cost:	\$4,500	

Comments

-

Mitigation Project Cost:

Includes existing rehearsal studio removal, channel widening/restoration, and construction of new studio on alternate property owned by Goodspeed.

-

Annual Maintenance Cost:

Assumed maintenance cost of retaining wall segments.

Hazard Probabilities Parameters - Flood

Acquisition @ 21 Norwich Rd, East Haddam, Connecticut, 06423

Lowest Floor Elevation of the Property (ft):	40.7
Streambed Elevation at the Property Location (ft):	33.8
Use Default Recurrence Intervals:	Use Default:Yes

Comments

-

Lowest Floor Elevation:

Based on 2024 survey by Martinez Couch & Associates, LLC (MCA).

-

Streambed Elevation:

Based on 2024 survey by Martinez Couch & Associates, LLC (MCA).

Discharge

Acquisition @ 21 Norwich Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION		
Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)
10	43.19	533
50	44.69	971
100	45.28	1188
500	46.44	1584

AFTER MITIGATION		
Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)
10	43.19	533
50	44.69	971
100	45.28	1188
500	46.44	1584

Estimated Annual Damages by Category
Acquisition @ 21 Norwich Rd, East Haddam, Connecticut, 06423

Before Mitigation						
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)	
-2	0.33	\$ 0	\$ 0	\$ 0	\$ 0	
-1.02	1.11	\$ 0	\$ 0	\$ 0	\$ 0	
0	1.52	\$ 0	\$ 0	\$ 0	\$ 0	
0.53	2	\$ 34,327	\$ 10,726	\$ 0	\$ 0	
1.78	5	\$ 15,966	\$ 6,866	\$ 0	\$ 0	
2.29	8	\$ 6,014	\$ 3,304	\$ 0	\$ 0	
2.53	1006	\$ 13,154	\$ 7,748	\$ 0	\$ 0	
3.18	20	\$ 4,978	\$ 2,938	\$ 0	\$ 0	
3.53	30	\$ 2,656	\$ 1,536	\$ 0	\$ 0	
3.78	40	\$ 1,645	\$ 939	\$ 0	\$ 0	
3.87	49.85	\$ 1,564	\$ 658	\$ 0	\$ 0	
4.12	60	\$ 834	\$ 469	\$ 0	\$ 0	
4.24	70	\$ 635	\$ 355	\$ 0	\$ 0	
4.35	80	\$ 501	\$ 279	\$ 0	\$ 0	
4.45	90	\$ 250	\$ 139	\$ 0	\$ 0	
4.5	115.11	\$ 2,056	\$ 1,126	\$ 0	\$ 0	
5.06	200	\$ 665	\$ 357	\$ 0	\$ 0	
5.38	300	\$ 342	\$ 181	\$ 0	\$ 0	
5.59	400	\$ 268	\$ 141	\$ 0	\$ 0	
5.81	537.72	\$ 1,971	\$ 493	\$ 0	\$ 0	
Total (\$)		\$ 87,527	\$ 48,455	\$ 0	\$ 0	

After Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
Total (\$)		\$ 0	\$ 0	\$ 0	\$ 0

Building Information
Acquisition @ 21 Norwich Rd, East Haddam, Connecticut, 06423

Non-Residential Occupancy Type:

COM8: Commercial - Entertainment and Recreation

Building is outside hundred-year flood area:

No

Building Type:

Recreation

Building Is Engineered:

Yes

NFIP:

No

Comments

-
- Structure Type:**
Per the BCA Toolkit documentation, Recreational building types can include structures such as fitness studios. The rehearsal studio has a large room used for rehearsals of choreography for stage performances, with smaller rooms used for music and line rehearsals, which is similar to a fitness studio.
-
- Outside Hundred-Year Flood Zone:**
The building is within the 100-year floodplain based on the 2024 Kleinfelder H&H Model.
-
- Is Engineered:**
The building was formerly a manufacturing facility purpose-built to use water power from Succor Brook. Historic use of the building is documented in the National Register of Historic Places entry for the East Haddam Historic District.
-
- :
- The building does not have a

Building Damages
Acquisition @ 21 Norwich Rd, East Haddam, Connecticut, 06423

Depth Damage Curve:

Recreation (Default)

Use Default:Yes

Building Size (sq.ft):

3,245

Building Replacement Value (BRV) (\$/sq.ft):

\$327

Use Default: No

Demolition Threshold (%):

50.00%

Use Default:Yes

Expected Annual Losses due to Building Damages before Mitigation:

\$87,527

Expected Annual Losses due to Building Damages after Mitigation:

\$0

Expected Annual Benefits - Building:

\$87,527

Comments

-
- First Floor Area:**
Based on 2024 survey by Martinez Couch & Associates, LLC (MCA).
-
- Building Replacement Value:**
Based on RSMeans estimate for building replacement with a one-story brick office building. Office building was chosen as the closest category in RSMeans' database to the rehearsal studio that allowed entry of a 3,245 SF building.

Depth Damage Curve - Building
Acquisition @ 21 Norwich Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION					AFTER MITIGATION				
	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)		
-2	0	0	0	0	0	0	0	0		
-1	0	0	0	0	0	0	0	0		
0	0	0	0	0	0	0	0	0		
1	11.6	126,187.53	0	0	0	0	0	0		
2	20.2	214,715.80	0	0	0	0	0	0		
3	26	275,594.60	0	0	0	0	0	0		
4	32.2	341,313.31	0	0	0	0	0	0		
5	36.8	390,072.36	0	0	0	0	0	0		
6	40.7	431,491.55	0	0	0	0	0	0		
7	43.4	460,030.99	0	0	0	0	0	0		
8	47.4	502,430.16	0	0	0	0	0	0		
9	49.4	523,629.74	0	0	0	0	0	0		
10	51.6	1,059,979.25	0	0	0	0	0	0		
11	51.6	1,059,979.25	0	0	0	0	0	0		
12	51.6	1,059,979.25	0	0	0	0	0	0		
13	51.6	1,059,979.25	0	0	0	0	0	0		
14	51.6	1,059,979.25	0	0	0	0	0	0		
15	51.6	1,059,979.25	0	0	0	0	0	0		
16	51.6	1,059,979.25	0	0	0	0	0	0		

Contents Damages
Acquisition @ 21 Norwich Rd, East Haddam, Connecticut, 06423

Contents Value in Dollars:

\$0

Use Default:Yes

Expected Annual Losses due to Contents Damages before Mitigation:

\$48,455

Expected Annual Losses due to Contents Damages after Mitigation:

\$0

Expected Annual Benefits - Contents:

\$48,455

Depth Damage Curve - Contents
Acquisition @ 21 Norwich Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION			AFTER MITIGATION		
Flood Depth (ft)	Percent (%)	Damage Value (\$)	Percent (%)	Damage Value (\$)	Damage Value (\$)
-2	0	0	0	0	
-1	0	0	0	0	
0	0	0	0	0	
1	26	68,898.65	0	0	
2	44	186,587.71	0	0	
3	69	386,946.73	0	0	
4	73	393,446.21	0	0	
5	80	278,995.85	0	0	
6	84	222,595.64	0	0	
7	91	241,145.27	0	0	
8	95	251,745.07	0	0	
9	95	251,745.07	0	0	
10	95	251,745.07	0	0	
11	95	251,745.07	0	0	
12	95	251,745.07	0	0	
13	95	251,745.07	0	0	
14	95	251,745.07	0	0	
15	95	251,745.07	0	0	
16	95	251,745.07	0	0	

Displacement Costs Avoided
Acquisition @ 21 Norwich Rd, East Haddam, Connecticut, 06423

Monthly Displacement Cost (\$/sq.ft/month):	☒ Use Default: No
One-Time Displacement Cost (\$/sq.ft):	☐ Use Default: Yes
Expected Annual Losses due to Displacement Damages before mitigation:	\$0
Expected Annual Losses due to Displacement Damages after Mitigation:	\$0
Expected Annual Losses - Displacement:	\$0

Comments

-

Monthly Displacement Cost:

No displacement costs were assumed for this building.

Depth Damage Curve - Displacement
Acquisition @ 21 Norwich Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION			AFTER MITIGATION		
Flood Depth (ft)	Days	Damage Value (\$)	Days	Damage Value (\$)	Damage Value (\$)
-2	0	0	0	0	
-1	0	0	0	0	
0	0	0	0	0	
1	45	0	0	0	
2	90	0	0	0	
3	135	0	0	0	
4	180	0	0	0	
5	225	0	0	0	
6	270	0	0	0	
7	315	0	0	0	
8	360	0	0	0	
9	405	0	0	0	
10	450	0	0	0	
11	450	0	0	0	
12	450	0	0	0	
13	450	0	0	0	
14	450	0	0	0	
15	450	0	0	0	
16	450	0	0	0	

Loss of Function/Loss of Income Avoided
Acquisition @ 21 Norwich Rd, East Haddam, Connecticut, 06423

Annual Operating Budget:	\$0
Loss of Function/Loss of Income Per Day:	\$0
Expected Annual Losses due to Loss of Function/Loss of Income before mitigation:	\$0
Expected Annual Losses due to Loss of Function/Loss of Income after mitigation:	\$0
Expected Annual Benefits - Loss of Function/Loss of Income Avoided:	\$0

Depth Damage Curve - Loss of Function/Loss of Income
Acquisition @ 21 Norwich Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION			AFTER MITIGATION		
Flood Depth (ft)	Days	Damage Value (\$)	Days	Damage Value (\$)	Damage Value (\$)
-2	0	0	0	0	
-1	0	0	0	0	
0	0	0	0	0	
1	45	0	0	0	
2	90	0	0	0	
3	135	0	0	0	
4	180	0	0	0	
5	225	0	0	0	
6	270	0	0	0	
7	315	0	0	0	
8	360	0	0	0	
9	405	0	0	0	
10	450	0	0	0	
11	450	0	0	0	
12	450	0	0	0	
13	450	0	0	0	
14	450	0	0	0	
15	450	0	0	0	
16	450	0	0	0	

Volunteer Costs Avoided
Acquisition @ 21 Norwich Rd, East Haddam, Connecticut, 06423

Number of Volunteers (volunteers/event):	0
Number of Days of Lodging:	0
Expected Annual Volunteer Benefits:	\$0

Ecosystem Services Losses Avoided
Acquisition @ 21 Norwich Rd, East Haddam, Connecticut, 06423

Total Project Area (acres):	0
Percentage of Urban Green Open Space:	0.00%
Percentage of Rural Green Open Space:	0.00%
Percentage of Riparian:	0.00%
Percentage of Inland Wetlands:	0.00%
Percentage of Forests:	0.00%
Percentage of Coral Reefs:	0.00%
Percentage of Shellfish Reefs:	0.00%
Percentage of Beaches and Dunes:	0.00%
Expected Annual Ecosystem Services Benefits:	\$0

Benefits-Costs Summary
Acquisition @ 21 Norwich Rd, East Haddam, Connecticut, 06423

Discount Rate (%):	7.0% Use Default: Yes
Total Project Benefits:	\$1,940,359
Total Project Cost:	\$1,934,212
Benefit-Cost Ratio:	1.00

Property Configuration

Property Title:	Floodplain and Stream Restoration @ 128 Norwich Rd, East Haddam, Connecticut, 06423
Property Location:	06423, Middlesex, Connecticut
Property Coordinates:	41.45438196885874, -72.45918517190287
Hazard Type:	Riverine Flood
Mitigation Action Type:	Floodplain and Stream Restoration
Property Type:	Residential Building
Analysis Method Type:	Modeled Damages

Cost Estimation

Floodplain and Stream Restoration @ 128 Norwich Rd, East Haddam, Connecticut, 06423

Discount Rate (%):	7.0%	Use Default:Yes
Project Useful Life (years):	30	
Project Cost:	\$0	
Number of Maintenance Years:	30	Use Default:Yes
Annual Maintenance Cost:	\$0	

Comments

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Project Useful Life:
Default PUL for Floodplain and Stream Restoration.

•

Mitigation Project Cost:
Costs not included in this entry.

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Annual Maintenance Cost:
Costs not included in this entry.

Hazard Probabilities Parameters - Flood

Floodplain and Stream Restoration @ 128 Norwich Rd, East Haddam, Connecticut, 06423

Lowest Floor Elevation of the Property (ft):	34.3
Streambed Elevation at the Property Location (ft):	25.5
Use Default Recurrence Intervals:	Use Default:Yes

Comments

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Lowest Floor Elevation:
Per 2024 MCA survey.

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Streambed Elevation:
Based on CT ECO 2016 Lidar DEM.

Discharge

Floodplain and Stream Restoration @ 128 Norwich Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION			
Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)	
10	32.53	533	
50	32.47	971	
100	32.56	1188	
500	33.06	1884	

AFTER MITIGATION			
Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)	
10	29.21	533	
50	31.47	971	
100	32.06	1188	
500	32.81	1884	

Estimated Annual Damages by Category

Floodplain and Stream Restoration @ 128 Norwich Rd, East Haddam, Connecticut, 06423

Before Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-2.62	1/11	\$ 0	\$ 0	\$ 0	\$ 0
-2.24	2	\$ 0	\$ 0	\$ 0	\$ 0
-2.03	5	\$ 0	\$ 0	\$ 0	\$ 0
-2	5.82	\$ 683	\$ 690	\$ 0	\$ 0
-1.94	8	\$ 389	\$ 384	\$ 0	\$ 0
-1.9	10/96	\$ 787	\$ 799	\$ 0	\$ 0
-1.78	20	\$ 278	\$ 569	\$ 0	\$ 0
-1.72	30	\$ 143	\$ 197	\$ 0	\$ 0
-1.7	40	\$ 86	\$ 83	\$ 0	\$ 0
-1.67	49.85	\$ 60	\$ 57	\$ 0	\$ 0
-1.65	60	\$ 43	\$ 41	\$ 0	\$ 0
-1.62	70	\$ 32	\$ 31	\$ 0	\$ 0
-1.6	80	\$ 25	\$ 24	\$ 0	\$ 0
-1.6	90	\$ 13	\$ 12	\$ 0	\$ 0
-1.58	95.93	\$ 102	\$ 96	\$ 0	\$ 0
-1.51	200	\$ 32	\$ 30	\$ 0	\$ 0
-1.47	300	\$ 16	\$ 15	\$ 0	\$ 0
-1.44	400	\$ 13	\$ 12	\$ 0	\$ 0
-1.41	537.72	\$ 48	\$ 41	\$ 0	\$ 0
0	10070727221194	\$ 0	\$ 0	\$ 0	\$ 0
Total (\$)		\$ 2,762	\$ 2,682	\$ 0	\$ 0

After Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-7.46	1/11	\$ 0	\$ 0	\$ 0	\$ 0
-6.51	2	\$ 0	\$ 0	\$ 0	\$ 0
-5.52	5	\$ 0	\$ 0	\$ 0	\$ 0
-5.04	8	\$ 0	\$ 0	\$ 0	\$ 0
-4.82	10	\$ 0	\$ 0	\$ 0	\$ 0
-4.16	30	\$ 0	\$ 0	\$ 0	\$ 0
-3.77	30	\$ 0	\$ 0	\$ 0	\$ 0
-3.49	40	\$ 0	\$ 0	\$ 0	\$ 0
-3.29	49.85	\$ 0	\$ 0	\$ 0	\$ 0
-3.11	60	\$ 0	\$ 0	\$ 0	\$ 0
-2.96	70	\$ 0	\$ 0	\$ 0	\$ 0
-2.83	80	\$ 0	\$ 0	\$ 0	\$ 0
-2.71	90	\$ 0	\$ 0	\$ 0	\$ 0
-2.65	95.93	\$ 0	\$ 0	\$ 0	\$ 0
-2	183.56	\$ 7	\$ 7	\$ 0	\$ 0
-1.9	200	\$ 29	\$ 28	\$ 0	\$ 0
-1.48	300	\$ 17	\$ 16	\$ 0	\$ 0
-1.18	400	\$ 15	\$ 14	\$ 0	\$ 0
-0.88	537.72	\$ 30	\$ 25	\$ 0	\$ 0
0	1219	\$ 396	\$ 198	\$ 0	\$ 0
Total (\$)		\$ 494	\$ 287	\$ 0	\$ 0

Building Information
Floodplain and Stream Restoration @ 128 Norwich Rd, East Haddam, Connecticut, 06423

Building Type:	Two or More Stories
Foundation Type:	
Building Has Basement:	Yes
NFIP:	No

Comments

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Building Type:

Per field observations.

-

Buiding has basement:

Per Town of East Haddam Assessor's Database.

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Has NFIP:

The default value for this input is "No".

Building Damages
Floodplain and Stream Restoration @ 128 Norwich Rd, East Haddam, Connecticut, 06423

Depth Damage Curve:	USACE - Chicago: two story, w/ basement	Use Default: Yes
Building Size (sq.ft):	3,030	
Building Replacement Value (BRV) (\$/sq.ft):	\$159	Use Default: No
Demolition Threshold (%):	50.00%	Use Default: Yes
Expected Annual Losses due to Building Damages before Mitigation:	\$2,762	
Expected Annual Losses due to Building Damages after Mitigation:	\$494	
Expected Annual Benefits - Building:	\$2,268	

Comments

-

Damage Curve:

For residential buildings with two stories and an unfinished basement/enclosed space below the lowest , three available depth-damage curves were available: USACE Generic, USACE Chicago, and FEMA FIA. USACE Generic was considered inappropriate as it assumed a contents value equal to 100% of the BRV by default. Comparing USACE Chicago to FEMA FIA, the estimated benefits using USACE Chicago were more conservative, therefore USACE Chicago curves were selected.

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Building Size:

Per Town of East Haddam Assessor's Database.

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Building Replacement Value:

Based on the "replacement cost" for the building listed on the Town of East Haddam Assessor's Database.

Depth Damage Curve - Building
Floodplain and Stream Restoration @ 128 Norwich Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION					AFTER MITIGATION				
Flood Depth (ft)	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)	
-2	3	14,473.09	0	0	3	14,473.09	0	0	
-1	5	24,321.83	0	0	5	24,321.83	0	0	
0	7	33,770.56	0	0	7	33,770.56	0	0	
1	11	53,068.02	0	0	11	53,068.02	0	0	
2	17	82,014.22	0	0	17	82,014.22	0	0	
3	22	106,136.05	0	0	22	106,136.05	0	0	
4	28	135,082.24	0	0	28	135,082.24	0	0	
5	33	159,204.07	0	0	33	159,204.07	0	0	
6	35	168,852.81	0	0	35	168,852.81	0	0	
7	38	183,325.90	0	0	38	183,325.90	0	0	
8	40	192,974.64	0	0	40	192,974.64	0	0	
9	44	212,272.10	0	0	44	212,272.10	0	0	
10	46	221,920.83	0	0	46	221,920.83	0	0	
11	48	231,569.56	0	0	48	231,569.56	0	0	
12	50	482,436.6	0	0	50	482,436.6	0	0	
13	52	482,436.6	0	0	52	482,436.6	0	0	
14	54	482,436.6	0	0	54	482,436.6	0	0	
15	54	482,436.6	0	0	54	482,436.6	0	0	
16	54	482,436.6	0	0	54	482,436.6	0	0	

Contents Damages
Floodplain and Stream Restoration @ 128 Norwich Rd, East Haddam, Connecticut, 06423

Contents Value in Dollars:	\$0	Use Default: Yes
Utilities Elevated:	No	
Expected Annual Losses due to Contents Damages before Mitigation:	\$2,692	
Expected Annual Losses due to Contents Damages after Mitigation:	\$287	
Expected Annual Benefits - Contents:	\$2,405	

Comments

-

Utilities Elevated:

The default value for this input is "No".

Depth Damage Curve - Contents
Floodplain and Stream Restoration @ 128 Norwich Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION					AFTER MITIGATION				
Flood Depth (ft)	Percent (%)	Damage Value (\$)	Percent (%)	Damage Value (\$)	Percent (%)	Damage Value (\$)	Percent (%)	Damage Value (\$)	
-2	6	14,473.09	6	14,473.09					
-1	9	23,709.64	9	23,709.64					
0	11	26,534.01	11	26,534.01					
1	17	41,007.11	17	41,007.11					
2	22	53,068.02	22	53,068.02					
3	28	67,541.12	28	67,541.12					
4	33	79,602.03	33	79,602.03					
5	39	94,075.13	39	94,075.13					
6	44	106,136.05	44	106,136.05					
7	49	118,196.96	49	118,196.96					
8	55	132,670.06	55	132,670.06					
9	61	147,143.16	61	147,143.16					
10	64	154,379.71	64	154,379.71					
11	71	171,264.99	71	171,264.99					
12	76	183,325.90	76	183,325.90					
13	78	188,150.27	78	188,150.27					
14	79	190,562.45	79	190,562.45					
15	79	190,562.45	79	190,562.45					
16	87	209,659.92	87	209,659.92					

Displacement Costs Avoided
Floodplain and Stream Restoration @ 12B Norwich Rd, East Haddam, Connecticut, 06423

Lodging Per Diem:	\$110	Use Default:Yes
Meals Per Diem:	\$68	Use Default:Yes
Population Affected:	0	
Duration of Displacement (days):	365	Use Default:Yes
Total Residential Displacement Cost:	\$0	
Expected Annual Losses due to Displacement Damages before mitigation:	\$0	
Expected Annual Losses due to Displacement Damages after Mitigation:	\$0	
Expected Annual Losses - Displacement:	\$0	

Depth Damage Curve - Displacement
Floodplain and Stream Restoration @ 12B Norwich Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION		AFTER MITIGATION	
	Days	Damage Value (\$)	Days	Damage Value (\$)
-2	0	0	0	0
-1	0	0	0	0
0	0	0	0	0
1	45	0	45	0
2	90	0	90	0
3	135	0	135	0
4	180	0	180	0
5	225	0	225	0
6	270	0	270	0
7	315	0	315	0
8	360	0	360	0
9	405	0	405	0
10	450	0	450	0
11	495	0	495	0
12	540	0	540	0
13	585	0	585	0
14	630	0	630	0
15	675	0	675	0
16	720	0	720	0

Street Maintenance Costs Avoided
Floodplain and Stream Restoration @ 12B Norwich Rd, East Haddam, Connecticut, 06423

Total Annual Street Maintenance Budget:	\$0
Total Number of Street Miles Maintained:	0
Street Miles that will not require future maintenance:	0
Expected Annual Benefits - Street Maintenance:	\$0

Volunteer Costs Avoided
Floodplain and Stream Restoration @ 12B Norwich Rd, East Haddam, Connecticut, 06423

Number of Volunteers (volunteers/event):	0
Number of Days of Lodging:	0
Expected Annual Volunteer Benefits:	\$0

Ecosystem Services Losses Avoided
Floodplain and Stream Restoration @ 12B Norwich Rd, East Haddam, Connecticut, 06423

Total Project Area (acres):	0
Percentage of Urban Green Open Space:	0.00%
Percentage of Rural Green Open Space:	0.00%
Percentage of Riparian:	0.00%
Percentage of Coastal Wetlands:	0.00%
Percentage of Inland Wetlands:	0.00%
Percentage of Forests:	0.00%
Percentage of Coral Reefs:	0.00%
Percentage of Shellfish Reefs:	0.00%
Percentage of Beaches and Dunes:	0.00%
Expected Annual Ecosystem Services Benefits:	\$0

Benefits-Costs Summary
Floodplain and Stream Restoration @ 12B Norwich Rd, East Haddam, Connecticut, 06423

Discount Rate (%):	7.0% Use Default:Yes
Total Project Benefits:	\$57,992
Total Project Cost:	\$0
Benefit-Cost Ratio:	0

Property Configuration

Property Title:	Floodplain and Stream Restoration @ 12E Norwich Rd, East Haddam, Connecticut, 06423
Property Location:	06423, Middlesex, Connecticut
Property Coordinates:	41.45438196885874, -72.45918517190287
Hazard Type:	Riverine Flood
Mitigation Action Type:	Floodplain and Stream Restoration
Property Type:	Residential Building
Analysis Method Type:	Modeled Damages

Cost Estimation

Floodplain and Stream Restoration @ 12E Norwich Rd, East Haddam, Connecticut, 06423

Discount Rate (%):	7.0%	Use Default:Yes
Project Useful Life (years):	30	
Project Cost:	\$0	
Number of Maintenance Years:	30	Use Default:Yes
Annual Maintenance Cost:	\$0	

Comments

-

Project Useful Life:
Default PUL for Floodplain and Stream Restoration.

-

Mitigation Project Cost:
Costs not included in this entry.

-

Annual Maintenance Cost:
Costs not included in this entry.

Hazard Probabilities Parameters - Flood

Floodplain and Stream Restoration @ 12E Norwich Rd, East Haddam, Connecticut, 06423

Lowest Floor Elevation of the Property (ft):	27.1
Streambed Elevation at the Property Location (ft):	15.1
Use Default Recurrence Intervals:	Use Default:Yes

Comments

-

Lowest Floor Elevation:
Per 2024 MCA survey.

-

Streambed Elevation:
Based on CT ECO 2016 Lidar DEM.

Discharge

Floodplain and Stream Restoration @ 12E Norwich Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION			
Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)	
10	24.87	533	
50	25.34	971	
100	25.5	1188	
500	25.88	1884	

AFTER MITIGATION			
Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)	
10	19.82	533	
50	23.44	971	
100	24.03	1188	
500	25.25	1884	

Estimated Annual Damages by Category

Floodplain and Stream Restoration @ 12E Norwich Rd, East Haddam, Connecticut, 06423

Before Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-3.43	1	\$ 0	\$ 0	\$ 0	\$ 0
-2.8	2	\$ 0	\$ 0	\$ 0	\$ 0
-2.38	5	\$ 0	\$ 0	\$ 0	\$ 0
-2.22	8	\$ 0	\$ 0	\$ 0	\$ 0
-2.15	10,06	\$ 0	\$ 0	\$ 0	\$ 0
-2	16,95	\$ 80	\$ 80	\$ 0	\$ 0
-1.94	20	\$ 196	\$ 53	\$ 0	\$ 0
-1.85	30	\$ 62	\$ 80	\$ 0	\$ 0
-1.78	40	\$ 30	\$ 49	\$ 0	\$ 0
-1.73	49,85	\$ 36	\$ 34	\$ 0	\$ 0
-1.67	60	\$ 25	\$ 24	\$ 0	\$ 0
-1.65	70	\$ 19	\$ 18	\$ 0	\$ 0
-1.62	80	\$ 15	\$ 15	\$ 0	\$ 0
-1.58	90	\$ 8	\$ 7	\$ 0	\$ 0
-1.58	95,93	\$ 63	\$ 59	\$ 0	\$ 0
-1.43	200	\$ 21	\$ 19	\$ 0	\$ 0
-1.35	300	\$ 11	\$ 10	\$ 0	\$ 0
-1.28	400	\$ 8	\$ 8	\$ 0	\$ 0
-1.24	537,72	\$ 31	\$ 26	\$ 0	\$ 0
0	2240453.13	\$ 0	\$ 0	\$ 0	\$ 0
Total (\$)		\$ 605	\$ 582	\$ 0	\$ 0
After Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-10.5	1	\$ 0	\$ 0	\$ 0	\$ 0
-9.23	2	\$ 0	\$ 0	\$ 0	\$ 0
-7.85	5	\$ 0	\$ 0	\$ 0	\$ 0
-7.37	8	\$ 0	\$ 0	\$ 0	\$ 0
-6.85	10,06	\$ 0	\$ 0	\$ 0	\$ 0
-5.88	30	\$ 0	\$ 0	\$ 0	\$ 0
-5.3	40	\$ 0	\$ 0	\$ 0	\$ 0
-4.9	40	\$ 0	\$ 0	\$ 0	\$ 0
-4.56	49,85	\$ 0	\$ 0	\$ 0	\$ 0
-4.29	60	\$ 0	\$ 0	\$ 0	\$ 0
-4.06	70	\$ 0	\$ 0	\$ 0	\$ 0
-3.87	80	\$ 0	\$ 0	\$ 0	\$ 0
-3.68	90	\$ 0	\$ 0	\$ 0	\$ 0
-3.58	95,93	\$ 0	\$ 0	\$ 0	\$ 0
-2.44	200	\$ 0	\$ 0	\$ 0	\$ 0
-2	266.57	\$ 4	\$ 4	\$ 0	\$ 0
-1.79	300	\$ 9	\$ 9	\$ 0	\$ 0
-1.32	400	\$ 9	\$ 8	\$ 0	\$ 0
-0.83	537,72	\$ 13	\$ 11	\$ 0	\$ 0
0	883.53	\$ 331	\$ 166	\$ 0	\$ 0
Total (\$)		\$ 366	\$ 197	\$ 0	\$ 0

Building Information
Floodplain and Stream Restoration @ 12E Norwich Rd, East Haddam, Connecticut, 06423

Building Type:	Two or More Stories
Foundation Type:	
Building Has Basement:	Yes
NFIP:	No

Comments

-

Building Type:

Per field observations.

-

Buiding has basement:

Per Town of East Haddam Assessor's Database.

-

Has NFIP:

The default value for this input is "No".

Building Damages
Floodplain and Stream Restoration @ 12E Norwich Rd, East Haddam, Connecticut, 06423

Depth Damage Curve:	USACE - Chicago: two story, w/ basement	Use Default: Yes
Building Size (sq.ft):	1,426	
Building Replacement Value (BRV) (\$/sq.ft):	\$205	Use Default: No
Demolition Threshold (%):	50.00%	Use Default: Yes
Expected Annual Losses due to Building Damages before Mitigation:	\$605	
Expected Annual Losses due to Building Damages after Mitigation:	\$366	
Expected Annual Benefits - Building:	\$239	

Comments

-

Damage Curve:

For residential buildings with two stories and an unfinished basement/enclosed space below the lowest finished, three available depth-damage curves were available: USACE Generic, USACE Chicago, and FEMA FIA. USACE Generic was considered inappropriate as it assumed a contents value equal to 100% of the BRV by default. Comparing USACE Chicago to FEMA FIA, the estimated benefits using USACE Chicago were more conservative, therefore USACE Chicago curves were selected.

-

Building Size:

Per Town of East Haddam Assessor's Database.

-

Building Replacement Value:

Calculated based on the building size and the "replacement cost" for the building listed on the Town of East Haddam Assessor's Database.

Depth Damage Curve - Building
Floodplain and Stream Restoration @ 12E Norwich Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION				AFTER MITIGATION			
	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)
-2	3	8,774.60	0	0	3	8,774.60	0	0
-1	5	14,624.34	0	0	5	14,624.34	0	0
0	7	20,474.08	0	0	7	20,474.08	0	0
1	11	32,173.55	0	0	11	32,173.55	0	0
2	17	49,722.76	0	0	17	49,722.76	0	0
3	22	64,347.10	0	0	22	64,347.10	0	0
4	28	81,896.32	0	0	28	81,896.32	0	0
5	33	96,520.66	0	0	33	96,520.66	0	0
6	35	102,370.40	0	0	35	102,370.40	0	0
7	38	111,045.00	0	0	38	111,045.00	0	0
8	40	116,994.74	0	0	40	116,994.74	0	0
9	44	128,694.21	0	0	44	128,694.21	0	0
10	46	134,543.95	0	0	46	134,543.95	0	0
11	48	140,393.69	0	0	48	140,393.69	0	0
12	50	292,486.86	0	0	50	292,486.86	0	0
13	52	292,486.86	0	0	52	292,486.86	0	0
14	54	292,486.86	0	0	54	292,486.86	0	0
15	54	292,486.86	0	0	54	292,486.86	0	0
16	54	292,486.86	0	0	54	292,486.86	0	0

Contents Damages
Floodplain and Stream Restoration @ 12E Norwich Rd, East Haddam, Connecticut, 06423

Contents Value in Dollars:	\$0	Use Default: Yes
Utilities Elevated:	No	
Expected Annual Losses due to Contents Damages before Mitigation:	\$582	
Expected Annual Losses due to Contents Damages after Mitigation:	\$197	
Expected Annual Benefits - Contents:	\$385	

Comments

-

Utilities Elevated:

The default value for this input is "No".

Depth Damage Curve - Contents
Floodplain and Stream Restoration @ 12E Norwich Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION			AFTER MITIGATION	
	Percent (%)	Damage Value (\$)		Percent (%)	Damage Value (\$)
-2	6	8,774.60		6	8,774.60
-1	9	13,901.90		9	13,901.90
0	11	16,086.77		11	16,086.77
1	17	24,801.38		17	24,801.38
2	22	32,173.55		22	32,173.55
3	28	40,948.16		28	40,948.16
4	33	48,260.33		33	48,260.33
5	39	57,034.93		39	57,034.93
6	44	64,347.10		44	64,347.10
7	49	71,659.28		49	71,659.28
8	55	80,433.88		55	80,433.88
9	61	89,208.49		61	89,208.49
10	64	93,595.79		64	93,595.79
11	71	101,812.83		71	101,812.83
12	76	111,145.00		76	111,145.00
13	78	114,069.87		78	114,069.87
14	79	115,532.30		79	115,532.30
15	79	115,532.30		79	115,532.30
16	87	127,231.78		87	127,231.78

Displacement Costs Avoided
Floodplain and Stream Restoration @ 12E Norwich Rd, East Haddam, Connecticut, 06423

Lodging Per Diem:	\$110	Use Default:Yes
Meals Per Diem:	\$68	Use Default:Yes
Population Affected:	0	
Duration of Displacement (days):	365	Use Default:Yes
Total Residential Displacement Cost:	\$0	
Expected Annual Losses due to Displacement Damages before mitigation:	\$0	
Expected Annual Losses due to Displacement Damages after Mitigation:	\$0	
Expected Annual Losses - Displacement:	\$0	

Depth Damage Curve - Displacement
Floodplain and Stream Restoration @ 12E Norwich Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION		AFTER MITIGATION	
	Days	Damage Value (\$)	Days	Damage Value (\$)
-2	0	0	0	0
-1	0	0	0	0
0	0	0	0	0
1	45	0	45	0
2	90	0	90	0
3	135	0	135	0
4	180	0	180	0
5	225	0	225	0
6	270	0	270	0
7	315	0	315	0
8	360	0	360	0
9	405	0	405	0
10	450	0	450	0
11	495	0	495	0
12	540	0	540	0
13	585	0	585	0
14	630	0	630	0
15	675	0	675	0
16	720	0	720	0

Street Maintenance Costs Avoided
Floodplain and Stream Restoration @ 12E Norwich Rd, East Haddam, Connecticut, 06423

Total Annual Street Maintenance Budget:	\$0
Total Number of Street Miles Maintained:	0
Street Miles that will not require future maintenance:	0
Expected Annual Benefits - Street Maintenance:	\$0

Volunteer Costs Avoided
Floodplain and Stream Restoration @ 12E Norwich Rd, East Haddam, Connecticut, 06423

Number of Volunteers (volunteers/event):	0
Number of Days of Lodging:	0
Expected Annual Volunteer Benefits:	\$0

Ecosystem Services Losses Avoided
Floodplain and Stream Restoration @ 12E Norwich Rd, East Haddam, Connecticut, 06423

Total Project Area (acres):	0
Percentage of Urban Green Open Space:	0.00%
Percentage of Rural Green Open Space:	0.00%
Percentage of Riparian:	0.00%
Percentage of Coastal Wetlands:	0.00%
Percentage of Inland Wetlands:	0.00%
Percentage of Forests:	0.00%
Percentage of Coral Reefs:	0.00%
Percentage of Shellfish Reefs:	0.00%
Percentage of Beaches and Dunes:	0.00%
Expected Annual Ecosystem Services Benefits:	\$0

Benefits-Costs Summary
Floodplain and Stream Restoration @ 12E Norwich Rd, East Haddam, Connecticut, 06423

Discount Rate (%):	7.0%	Use Default:Yes
Total Project Benefits:	\$7,743	
Total Project Cost:	\$0	
Benefit-Cost Ratio:	0	

Property Configuration	
Property Title:	Floodplain and Stream Restoration @ 12K Norwich Rd, East Haddam, Connecticut, 06423
Property Location:	06423, Middlesex, Connecticut
Property Coordinates:	41.45438196885874, -72.45918517190287
Hazard Type:	Riverine Flood
Mitigation Action Type:	Floodplain and Stream Restoration
Property Type:	Non-Residential Building
Analysis Method Type:	Modeled Damages

Cost Estimation Floodplain and Stream Restoration @ 12K Norwich Rd, East Haddam, Connecticut, 06423	
Discount Rate (%):	7.0% Use Default:Yes
Project Useful Life (years):	30
Project Cost:	\$0
Number of Maintenance Years:	30 Use Default:Yes
Annual Maintenance Cost:	\$0

Comments

•

Project Useful Life:
Default PUL for Floodplain and Stream Restoration.

•

Mitigation Project Cost:
Costs not included in this entry.

•

Annual Maintenance Cost:
Costs not included in this entry.

Hazard Probabilities Parameters - Flood Floodplain and Stream Restoration @ 12K Norwich Rd, East Haddam, Connecticut, 06423	
Lowest Floor Elevation of the Property (ft):	21.6
Streambed Elevation at the Property Location (ft):	12.3
Use Default Recurrence Intervals:	Use Default:Yes

Comments

•

Lowest Floor Elevation:
Per 2024 MCA survey.

•

Streambed Elevation:
Based on CT ECO 2016 Lidar DEM.

Discharge
Floodplain and Stream Restoration @ 12K Norwich Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION		
Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)
10	21.19	533
50	21.72	971
100	21.78	1188
500	21.81	1884

AFTER MITIGATION		
Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)
10	16.77	533
50	20.16	971
100	20.58	1188
500	21.72	1884

Estimated Annual Damages by Category
Floodplain and Stream Restoration @ 12K Norwich Rd, East Haddam, Connecticut, 06423

Before Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-2	0.33	\$0	\$0	\$0	\$0
-1.23	1.11	\$0	\$0	\$0	\$0
-0.79	2	\$13	\$0	\$0	\$0
-0.48	5	\$6	\$0	\$0	\$0
-0.36	8	\$2	\$0	\$0	\$0
-0.31	1006	\$5	\$0	\$0	\$0
-0.17	20	\$2	\$0	\$0	\$0
-0.08	30	\$1	\$0	\$0	\$0
-0.03	40	\$1	\$0	\$0	\$0
-0.01	49.85	\$0	\$0	\$0	\$0
0	53.74	\$0	\$0	\$0	\$0
0.02	60	\$1	\$1	\$5	\$0
0.04	70	\$1	\$1	\$4	\$0
0.06	80	\$1	\$1	\$3	\$0
0.08	90	\$1	\$1	\$2	\$0
0.09	95.93	\$10	\$10	\$12	\$0
0.2	200	\$5	\$5	\$4	\$0
0.25	300	\$3	\$3	\$2	\$0
0.29	400	\$3	\$3	\$1	\$0
0.33	537.72	\$251	\$166	\$7	\$0
Total (\$)		\$308	\$192	\$40	\$0

After Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-8.5	1.11	\$0	\$0	\$0	\$0
-7.51	2	\$0	\$0	\$0	\$0
-6.28	5	\$0	\$0	\$0	\$0
-5.84	8	\$0	\$0	\$0	\$0
-5.3	1006	\$0	\$0	\$0	\$0
-4.31	30	\$0	\$0	\$0	\$0
-3.68	30	\$0	\$0	\$0	\$0
-3.22	40	\$0	\$0	\$0	\$0
-2.84	49.85	\$0	\$0	\$0	\$0
-2.53	60	\$0	\$0	\$0	\$0
-2.28	70	\$0	\$0	\$0	\$0
-2.05	80	\$0	\$0	\$0	\$0
-2	82.34	\$0	\$0	\$0	\$0
-1.84	90	\$0	\$0	\$0	\$0
-1.71	95.93	\$0	\$0	\$0	\$0
-0.36	200	\$0	\$0	\$0	\$0
0	240.46	\$1	\$0	\$0	\$0
0.44	300	\$7	\$0	\$2	\$0
1.03	400	\$10	\$11	\$2	\$0
1.65	537.72	\$251	\$166	\$7	\$0
Total (\$)		\$269	\$185	\$11	\$0

Building Information
Floodplain and Stream Restoration @ 12K Norwich Rd, East Haddam, Connecticut, 06423

Non-Residential Occupancy Type:

IND2: Industrial - Light

Building Type:

Service Station

Building Is Engineered:

Yes

NFIP:

No

Comments

-

Structure Type:

Building is a maintenance shed with two garage bays. Service Station was the closest building type to this building.

-

Is Engineered:

Architectural/engineering plans for the building were developed.

-

Has NFIP:

The default value for this input is "No".

Building Damages
Floodplain and Stream Restoration @ 12K Norwich Rd, East Haddam, Connecticut, 06423

Depth Damage Curve:

Service Station (Default)

Use Default:Yes

Building Size (sq.ft):

1,680

Building Replacement Value (BRV) (\$/sq.ft):

\$188

Use Default: No

Demolition Threshold (%):

50.00%

Use Default:Yes

Expected Annual Losses due to Building Damages before Mitigation:

\$308

Expected Annual Losses due to Building Damages after Mitigation:

\$269

Expected Annual Benefits - Building:

\$38

Comments

-

First Floor Area:

Per Town of East Haddam Assessor's Database.

-

Building Size:

Per Town of East Haddam Assessor's Database.

-

Building Replacement Value:

Calculated based on the First Floor Area and the "replacement cost" for the building listed on the Town of East Haddam Assessor's Database.

Depth Damage Curve - Building
Floodplain and Stream Restoration @ 12K Norwich Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION					AFTER MITIGATION				
Flood Depth (ft)	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)	
-2	0	0	0	0	0	0	0	0	
-1	0	0	0	0	0	0	0	0	
0	0.1	135.07	0	0	0.1	135.07	0	0	
1	9.7	13,302.68	0	0	9.7	13,302.68	0	0	
2	15.3	20,667.31	0	0	15.3	20,667.31	0	0	
3	18.9	25,529.96	0	0	18.9	25,529.96	0	0	
4	24	32,419.00	0	0	24	32,419.00	0	0	
5	27.9	37,687.09	0	0	27.9	37,687.09	0	0	
6	31	41,874.55	0	0	31	41,874.55	0	0	
7	34.8	47,007.56	0	0	34.8	47,007.56	0	0	
8	39.1	52,815.96	0	0	39.1	52,815.96	0	0	
9	40.8	55,192.31	0	0	40.8	55,192.31	0	0	
10	43	58,084.05	0	0	43	58,084.05	0	0	
11	43	58,084.05	0	0	43	58,084.05	0	0	
12	43	58,084.05	0	0	43	58,084.05	0	0	
13	43	58,084.05	0	0	43	58,084.05	0	0	
14	43	58,084.05	0	0	43	58,084.05	0	0	
15	43	58,084.05	0	0	43	58,084.05	0	0	
16	43	58,084.05	0	0	43	58,084.05	0	0	

Contents Damages
Floodplain and Stream Restoration @ 12K Norwich Rd, East Haddam, Connecticut, 06423

Contents Value in Dollars:

\$0

Use Default:Yes

Expected Annual Losses due to Contents Damages before Mitigation:

\$192

Expected Annual Losses due to Contents Damages after Mitigation:

\$185

Expected Annual Benefits - Contents:

\$7

Depth Damage Curve - Contents
Floodplain and Stream Restoration @ 12K Norwich Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION				AFTER MITIGATION			
Flood Depth (ft)	Percent (%)	Damage Value (\$)		Percent (%)	Damage Value (\$)		
-2	0	0		0	0		
-1	0	0		0	0		
0	0	0		0	0		
1	16	14,264.36		16	14,264.36		
2	29	25,854.15		29	25,854.15		
3	41	36,552.43		41	36,552.43		
4	58	51,708.31		58	51,708.31		
5	63	56,165.93		63	56,165.93		
6	71	63,298.11		71	63,298.11		
7	79	70,410.29		79	70,410.29		
8	84	74,887.90		84	74,887.90		
9	87	77,562.47		87	77,562.47		
10	87	77,562.47		87	77,562.47		
11	87	77,562.47		87	77,562.47		
12	87	77,562.47		87	77,562.47		
13	87	77,562.47		87	77,562.47		
14	87	77,562.47		87	77,562.47		
15	87	77,562.47		87	77,562.47		
16	87	77,562.47		87	77,562.47		

Displacement Costs Avoided
Floodplain and Stream Restoration @ 12K Norwich Rd, East Haddam, Connecticut, 06423

Monthly Displacement Cost (\$/sq.ft/month):	0.37	Use Default:Yes
One-Time Displacement Cost (\$/sq.ft):	128	Use Default:Yes
Expected Annual Losses due to Displacement Damages before mitigation:	\$40	
Expected Annual Losses due to Displacement Damages after Mitigation:	\$11	
Expected Annual Losses - Displacement:	\$29	

Depth Damage Curve - Displacement
Floodplain and Stream Restoration @ 12K Norwich Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION		AFTER MITIGATION	
	Days	Damage Value (\$)	Days	Damage Value (\$)
-2	0	0	0	0
-1	0	0	0	0
0	0	0	0	0
1	45	383.17	45	383.17
2	90	766.35	90	766.35
3	135	1,149.53	135	1,149.53
4	180	1,532.71	180	1,532.71
5	225	1,915.89	225	1,915.89
6	270	2,299.06	270	2,299.06
7	315	2,682.24	315	2,682.24
8	360	3,065.42	360	3,065.42
9	405	3,448.60	405	3,448.60
10	450	3,831.78	450	3,831.78
11	450	3,831.78	450	3,831.78
12	450	3,831.78	450	3,831.78
13	450	3,831.78	450	3,831.78
14	450	3,831.78	450	3,831.78
15	450	3,831.78	450	3,831.78
16	450	3,831.78	450	3,831.78

Loss of Function/Loss of Income Avoided
Floodplain and Stream Restoration @ 12K Norwich Rd, East Haddam, Connecticut, 06423

Annual Operating Budget:	\$0
Loss of Function/Loss of Income Per Day:	\$0
Expected Annual Losses due to Loss of Function/Loss of Income before mitigation:	\$0
Expected Annual Losses due to Loss of Function/Loss of Income after mitigation:	\$0
Expected Annual Benefits - Loss of Function/Loss of Income Avoided:	\$0

Depth Damage Curve - Loss of Function/Loss of Income
Floodplain and Stream Restoration @ 12K Norwich Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION		AFTER MITIGATION	
	Days	Damage Value (\$)	Days	Damage Value (\$)
-2	0	0	0	0
-1	0	0	0	0
0	0	0	0	0
1	45	0	45	0
2	90	0	90	0
3	135	0	135	0
4	180	0	180	0
5	225	0	225	0
6	270	0	270	0
7	315	0	315	0
8	360	0	360	0
9	405	0	405	0
10	450	0	450	0
11	450	0	450	0
12	450	0	450	0
13	450	0	450	0
14	450	0	450	0
15	450	0	450	0
16	450	0	450	0

Volunteer Costs Avoided
Floodplain and Stream Restoration @ 12K Norwich Rd, East Haddam, Connecticut, 06423

Number of Volunteers (volunteers/event):	0
Number of Days of Lodging:	0
Expected Annual Volunteer Benefits:	\$0

Ecosystem Services Losses Avoided
Floodplain and Stream Restoration @ 12K Norwich Rd, East Haddam, Connecticut, 06423

Total Project Area (acres):	0
Percentage of Urban Green Open Space:	0.00%
Percentage of Rural Green Open Space:	0.00%
Percentage of Riparian:	0.00%
Percentage of Inland Wetlands:	0.00%
Percentage of Forests:	0.00%
Percentage of Coral Reefs:	0.00%
Percentage of Shellfish Reefs:	0.00%
Percentage of Beaches and Dunes:	0.00%
Expected Annual Ecosystem Services Benefits:	\$0

Benefits-Costs Summary
Floodplain and Stream Restoration @ 12K Norwich Rd, East Haddam, Connecticut, 06423

Discount Rate (%):	7.0%	Use Default:Yes
Total Project Benefits:	\$921	
Total Project Costs:	\$0	
Benefit-Cost Ratio:	0	

Property Configuration	
Property Title:	Floodplain and Stream Restoration @ 12F Norwich Rd, East Haddam, Connecticut, 06423
Property Location:	06423, Middlesex, Connecticut
Property Coordinates:	41.45438196885874, -72.45918517190287
Hazard Type:	Riverine Flood
Mitigation Action Type:	Floodplain and Stream Restoration
Property Type:	Residential Building
Analysis Method Type:	Modeled Damages

Cost Estimation Floodplain and Stream Restoration @ 12F Norwich Rd, East Haddam, Connecticut, 06423	
Discount Rate (%):	7.0% Use Default:Yes
Project Useful Life (years):	30
Project Cost:	\$0
Number of Maintenance Years:	30 Use Default:Yes
Annual Maintenance Cost:	\$0

Comments

•
Project Useful Life:
Default PUL for Floodplain and Stream Restoration.

•
Mitigation Project Cost:
Costs not included in this entry.

•
Annual Maintenance Cost:
Costs not included in this entry.

Hazard Probabilities Parameters - Flood Floodplain and Stream Restoration @ 12F Norwich Rd, East Haddam, Connecticut, 06423	
Lowest Floor Elevation of the Property (ft):	26
Streambed Elevation at the Property Location (ft):	13.9
Use Default Recurrence Intervals:	Use Default:Yes

Comments

•
Lowest Floor Elevation:
Per 2024 MCA survey.

•
Streambed Elevation:
Based on CT ECO 2016 Lidar DEM.

Discharge
Floodplain and Stream Restoration @ 12F Norwich Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION		
Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)
10	23.94	533
50	24.5	971
100	24.69	1188
500	25.09	1884

AFTER MITIGATION		
Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)
10	17.82	533
50	22.31	971
100	23.72	1188
500	24.38	1884

Estimated Annual Damages by Category
Floodplain and Stream Restoration @ 12F Norwich Rd, East Haddam, Connecticut, 06423

Before Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-3.64	1	\$ 0	\$ 0	\$ 0	\$ 0
-2.88	2	\$ 0	\$ 0	\$ 0	\$ 0
-2.34	5	\$ 0	\$ 0	\$ 0	\$ 0
-2.11	8	\$ 0	\$ 0	\$ 0	\$ 0
-2.03	10	\$ 0	\$ 0	\$ 0	\$ 0
-2	11.38	\$ 525	\$ 538	\$ 0	\$ 0
-1.8	20	\$ 266	\$ 546	\$ 0	\$ 0
-1.84	30	\$ 136	\$ 129	\$ 0	\$ 0
-1.56	40	\$ 84	\$ 79	\$ 0	\$ 0
-1.51	49.85	\$ 59	\$ 56	\$ 0	\$ 0
-1.44	60	\$ 43	\$ 40	\$ 0	\$ 0
-1.4	70	\$ 33	\$ 30	\$ 0	\$ 0
-1.36	80	\$ 26	\$ 24	\$ 0	\$ 0
-1.33	90	\$ 13	\$ 12	\$ 0	\$ 0
-1.31	95.93	\$ 107	\$ 98	\$ 0	\$ 0
-1.13	200	\$ 35	\$ 32	\$ 0	\$ 0
-1.03	300	\$ 18	\$ 16	\$ 0	\$ 0
-0.96	400	\$ 14	\$ 13	\$ 0	\$ 0
-0.89	537.72	\$ 48	\$ 40	\$ 0	\$ 0
0	36997.4	\$ 12	\$ 6	\$ 0	\$ 0
Total (\$)		\$ 1,408	\$ 1,338	\$ 0	\$ 0

After Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-11.19	1	\$ 0	\$ 0	\$ 0	\$ 0
-10.1	2	\$ 0	\$ 0	\$ 0	\$ 0
-8.7	5	\$ 0	\$ 0	\$ 0	\$ 0
-7.99	8	\$ 0	\$ 0	\$ 0	\$ 0
-7.63	10	\$ 0	\$ 0	\$ 0	\$ 0
-6.48	20	\$ 0	\$ 0	\$ 0	\$ 0
-5.79	30	\$ 0	\$ 0	\$ 0	\$ 0
-5.27	40	\$ 0	\$ 0	\$ 0	\$ 0
-4.86	49.85	\$ 0	\$ 0	\$ 0	\$ 0
-4.51	60	\$ 0	\$ 0	\$ 0	\$ 0
-4.21	70	\$ 0	\$ 0	\$ 0	\$ 0
-3.95	80	\$ 0	\$ 0	\$ 0	\$ 0
-3.7	90	\$ 0	\$ 0	\$ 0	\$ 0
-3.59	95.93	\$ 0	\$ 0	\$ 0	\$ 0
-2.03	200	\$ 0	\$ 0	\$ 0	\$ 0
-2	204.68	\$ 25	\$ 24	\$ 0	\$ 0
-1.13	300	\$ 19	\$ 17	\$ 0	\$ 0
-0.45	400	\$ 13	\$ 10	\$ 0	\$ 0
0	489.57	\$ 6	\$ 5	\$ 0	\$ 0
0.23	537.72	\$ 808	\$ 404	\$ 0	\$ 0
Total (\$)		\$ 872	\$ 460	\$ 0	\$ 0

Building Information
Floodplain and Stream Restoration @ 12F Norwich Rd, East Haddam, Connecticut, 06423

Building Type:	Two or More Stories
Foundation Type:	
Building Has Basement:	Yes
NFIP:	No

Comments

-

Building Type:

Per field observations.

-

Buiding has basement:

Per Town of East Haddam Assessor's Database.

-

Has NFIP:

The default value for this input is "No".

Building Damages
Floodplain and Stream Restoration @ 12F Norwich Rd, East Haddam, Connecticut, 06423

Depth Damage Curve:	USACE - Chicago: two story, w/ basement	Use Default:Yes
Building Size (sq.ft):	2,632	
Building Replacement Value (BRV) (\$/sq.ft):	\$165	Use Default: No
Demolition Threshold (%):	50.00%	Use Default:Yes
Expected Annual Losses due to Building Damages before Mitigation:	\$1,408	
Expected Annual Losses due to Building Damages after Mitigation:	\$872	
Expected Annual Benefits - Building:	\$536	

Comments

-

Damage Curve:

For residential buildings with two stories and an unfinished basement/enclosed space below the lowest finished floor, three available depth-damage curves were available: USACE Generic, USACE Chicago, and FEMA FIA. USACE Generic was considered inappropriate as it assumed a contents value equal to 100% of the BRV by default. Comparing USACE Chicago to FEMA FIA, the estimated benefits using USACE Chicago were more conservative, therefore USACE Chicago curves were selected.

-

Building Size:

Per Town of East Haddam Assessor's Database.

-

Building Replacement Value:

Calculated based on the building size and the "replacement cost" for the building listed on the Town of East Haddam Assessor's Database.

Depth Damage Curve - Building
Floodplain and Stream Restoration @ 12F Norwich Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION					AFTER MITIGATION				
Flood Depth (ft)	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)	
-2	3	13,036.29	0	0	3	13,036.29	0	0	
-1	5	21,727.16	0	0	5	21,727.16	0	0	
0	7	30,418.02	0	0	7	30,418.02	0	0	
1	11	47,799.75	0	0	11	47,799.75	0	0	
2	17	73,872.34	0	0	17	73,872.34	0	0	
3	22	95,399.50	0	0	22	95,399.50	0	0	
4	28	121,672.09	0	0	28	121,672.09	0	0	
5	33	143,399.25	0	0	33	143,399.25	0	0	
6	35	152,090.12	0	0	35	152,090.12	0	0	
7	38	165,126.41	0	0	38	165,126.41	0	0	
8	40	173,872.28	0	0	40	173,872.28	0	0	
9	44	191,199.00	0	0	44	191,199.00	0	0	
10	46	199,889.87	0	0	46	199,889.87	0	0	
11	48	208,580.73	0	0	48	208,580.73	0	0	
12	50	434,543.2	0	0	50	434,543.2	0	0	
13	52	434,543.2	0	0	52	434,543.2	0	0	
14	54	434,543.2	0	0	54	434,543.2	0	0	
15	54	434,543.2	0	0	54	434,543.2	0	0	
16	54	434,543.2	0	0	54	434,543.2	0	0	

Contents Damages
Floodplain and Stream Restoration @ 12F Norwich Rd, East Haddam, Connecticut, 06423

Contents Value in Dollars:	\$0	Use Default:Yes
Utilities Elevated:	No	
Expected Annual Losses due to Contents Damages before Mitigation:	\$1,338	
Expected Annual Losses due to Contents Damages after Mitigation:	\$460	
Expected Annual Benefits - Contents:	\$877	

Comments

-

Utilities Elevated:

The default value for this input is "No".

Depth Damage Curve - Contents
Floodplain and Stream Restoration @ 12F Norwich Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION					AFTER MITIGATION				
Flood Depth (ft)	Percent (%)	Damage Value (\$)	Percent (%)	Damage Value (\$)	Percent (%)	Damage Value (\$)	Percent (%)	Damage Value (\$)	
-2	6	13,036.29	6	13,036.29	6	13,036.29	6	13,036.29	
-1	9	19,554.44	9	19,554.44	9	19,554.44	9	19,554.44	
0	11	23,899.87	11	23,899.87	11	23,899.87	11	23,899.87	
1	17	36,936.17	17	36,936.17	17	36,936.17	17	36,936.17	
2	22	47,799.75	22	47,799.75	22	47,799.75	22	47,799.75	
3	28	60,836.04	28	60,836.04	28	60,836.04	28	60,836.04	
4	33	71,699.62	33	71,699.62	33	71,699.62	33	71,699.62	
5	39	84,735.92	39	84,735.92	39	84,735.92	39	84,735.92	
6	44	95,599.50	44	95,599.50	44	95,599.50	44	95,599.50	
7	49	106,463.08	49	106,463.08	49	106,463.08	49	106,463.08	
8	55	119,499.38	55	119,499.38	55	119,499.38	55	119,499.38	
9	61	132,535.67	61	132,535.67	61	132,535.67	61	132,535.67	
10	64	139,053.82	64	139,053.82	64	139,053.82	64	139,053.82	
11	71	154,262.83	71	154,262.83	71	154,262.83	71	154,262.83	
12	76	165,126.41	76	165,126.41	76	165,126.41	76	165,126.41	
13	78	169,471.84	78	169,471.84	78	169,471.84	78	169,471.84	
14	79	171,644.56	79	171,644.56	79	171,644.56	79	171,644.56	
15	79	171,644.56	79	171,644.56	79	171,644.56	79	171,644.56	
16	87	189,026.29	87	189,026.29	87	189,026.29	87	189,026.29	

Displacement Costs Avoided
Floodplain and Stream Restoration @ 12F Norwich Rd, East Haddam, Connecticut, 06423

Lodging Per Diem:	\$110	Use Default:Yes
Meals Per Diem:	\$68	Use Default:Yes
Population Affected:	0	
Duration of Displacement (days):	365	Use Default:Yes
Total Residential Displacement Cost:	\$0	
Expected Annual Losses due to Displacement Damages before mitigation:	\$0	
Expected Annual Losses due to Displacement Damages after Mitigation:	\$0	
Expected Annual Losses - Displacement:	\$0	

Comments

•

Number of Building Residents:

Building has two units.

Depth Damage Curve - Displacement
Floodplain and Stream Restoration @ 12F Norwich Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION		AFTER MITIGATION	
	Days	Damage Value (\$)	Days	Damage Value (\$)
-2	0	0	0	0
-1	0	0	0	0
0	0	0	0	0
1	45	0	45	0
2	90	0	90	0
3	135	0	135	0
4	180	0	180	0
5	225	0	225	0
6	270	0	270	0
7	315	0	315	0
8	360	0	360	0
9	405	0	405	0
10	450	0	450	0
11	495	0	495	0
12	540	0	540	0
13	585	0	585	0
14	630	0	630	0
15	675	0	675	0
16	720	0	720	0

Street Maintenance Costs Avoided
Floodplain and Stream Restoration @ 12F Norwich Rd, East Haddam, Connecticut, 06423

Total Annual Street Maintenance Budget:	\$0
Total Number of Street Miles Maintained:	0
Street Miles that will not require future maintenance:	0
Expected Annual Benefits - Street Maintenance:	\$0

Volunteer Costs Avoided
Floodplain and Stream Restoration @ 12F Norwich Rd, East Haddam, Connecticut, 06423

Number of Volunteers (volunteers/event):	0
Number of Days of Lodging:	0
Expected Annual Volunteer Benefits:	\$0

Ecosystem Services Losses Avoided
Floodplain and Stream Restoration @ 12F Norwich Rd, East Haddam, Connecticut, 06423

Total Project Area (acres):	0
Percentage of Urban Green Open Space:	0.00%
Percentage of Rural Green Open Space:	0.00%
Percentage of Riparian:	0.00%
Percentage of Coastal Wetlands:	0.00%
Percentage of Inland Wetlands:	0.00%
Percentage of Forests:	0.00%
Percentage of Coral Reefs:	0.00%
Percentage of Shellfish Reefs:	0.00%
Percentage of Beaches and Dunes:	0.00%
Expected Annual Ecosystem Services Benefits:	\$0

Benefits-Costs Summary
Floodplain and Stream Restoration @ 12F Norwich Rd, East Haddam, Connecticut, 06423

Discount Rate (%):	7.0% Use Default:Yes
Total Project Benefits:	\$17,545
Total Project Cost:	\$0
Benefit-Cost Ratio:	0

Property Configuration	
Property Title:	Floodplain and Stream Restoration @ 12G Norwich Rd, East Haddam, Connecticut, 06423
Property Location:	06423, Middlesex, Connecticut
Property Coordinates:	41.45438196885874, -72.45918517190287
Hazard Type:	Riverine Flood
Mitigation Action Type:	Floodplain and Stream Restoration
Property Type:	Residential Building
Analysis Method Type:	Modeled Damages

Cost Estimation Floodplain and Stream Restoration @ 12G Norwich Rd, East Haddam, Connecticut, 06423	
Discount Rate (%):	7.0% Use Default:Yes
Project Useful Life (years):	30
Project Cost:	\$0
Number of Maintenance Years:	30 Use Default:Yes
Annual Maintenance Cost:	\$0

Comments

•

Project Useful Life:
Default PUL for Floodplain and Stream Restoration.

•

Mitigation Project Cost:
Costs not included in this entry.

•

Annual Maintenance Cost:
Costs not included in this entry.

Hazard Probabilities Parameters - Flood Floodplain and Stream Restoration @ 12G Norwich Rd, East Haddam, Connecticut, 06423	
Lowest Floor Elevation of the Property (ft):	25
Streambed Elevation at the Property Location (ft):	13.7
Use Default Recurrence Intervals:	Use Default:Yes

Comments

•

Lowest Floor Elevation:
Per 2024 MCA survey.

•

Streambed Elevation:
Based on CT ECO 2016 Lidar DEM.

Discharge
Floodplain and Stream Restoration @ 12G Norwich Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION		
Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)
10	22.84	533
50	23.34	971
100	23.5	1188
500	23.81	1884

AFTER MITIGATION		
Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)
10	16.42	533
50	21.13	971
100	21.28	1188
500	23.28	1884

Estimated Annual Damages by Category
Floodplain and Stream Restoration @ 12G Norwich Rd, East Haddam, Connecticut, 06423

Before Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-3.5	111	\$ 0	\$ 0	\$ 0	\$ 0
-2.83	2	\$ 0	\$ 0	\$ 0	\$ 0
-2.36	5	\$ 0	\$ 0	\$ 0	\$ 0
-2.21	8	\$ 0	\$ 0	\$ 0	\$ 0
-2.11	1006	\$ 0	\$ 0	\$ 0	\$ 0
-2	15.64	\$ 119	\$ 119	\$ 0	\$ 0
-1.91	20	\$ 190	\$ 148	\$ 0	\$ 0
-1.8	30	\$ 80	\$ 77	\$ 0	\$ 0
-1.74	40	\$ 49	\$ 47	\$ 0	\$ 0
-1.67	49.85	\$ 35	\$ 33	\$ 0	\$ 0
-1.61	60	\$ 25	\$ 24	\$ 0	\$ 0
-1.6	70	\$ 19	\$ 18	\$ 0	\$ 0
-1.57	80	\$ 15	\$ 14	\$ 0	\$ 0
-1.54	90	\$ 8	\$ 7	\$ 0	\$ 0
-1.51	95.93	\$ 62	\$ 58	\$ 0	\$ 0
-1.36	200	\$ 20	\$ 19	\$ 0	\$ 0
-1.26	300	\$ 10	\$ 10	\$ 0	\$ 0
-1.2	400	\$ 8	\$ 8	\$ 0	\$ 0
-1.14	537.72	\$ 30	\$ 25	\$ 0	\$ 0
0	537730.48	\$ 1	\$ 0	\$ 0	\$ 0
Total (\$)		\$ 633	\$ 607	\$ 0	\$ 0

After Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-10.87	111	\$ 0	\$ 0	\$ 0	\$ 0
-10.12	2	\$ 0	\$ 0	\$ 0	\$ 0
-9.05	5	\$ 0	\$ 0	\$ 0	\$ 0
-8.44	8	\$ 0	\$ 0	\$ 0	\$ 0
-8.12	1006	\$ 0	\$ 0	\$ 0	\$ 0
-7.07	30	\$ 0	\$ 0	\$ 0	\$ 0
-6.4	30	\$ 0	\$ 0	\$ 0	\$ 0
-5.91	40	\$ 0	\$ 0	\$ 0	\$ 0
-5.49	49.85	\$ 0	\$ 0	\$ 0	\$ 0
-5.14	60	\$ 0	\$ 0	\$ 0	\$ 0
-4.85	70	\$ 0	\$ 0	\$ 0	\$ 0
-4.57	80	\$ 0	\$ 0	\$ 0	\$ 0
-4.34	90	\$ 0	\$ 0	\$ 0	\$ 0
-4.21	95.93	\$ 0	\$ 0	\$ 0	\$ 0
-2.36	200	\$ 0	\$ 0	\$ 0	\$ 0
-2	254.17	\$ 6	\$ 6	\$ 0	\$ 0
-1.57	300	\$ 10	\$ 10	\$ 0	\$ 0
-0.83	400	\$ 11	\$ 9	\$ 0	\$ 0
-0.03	537.72	\$ 1	\$ 1	\$ 0	\$ 0
0	547.37	\$ 510	\$ 255	\$ 0	\$ 0
Total (\$)		\$ 537	\$ 279	\$ 0	\$ 0

Building Information
Floodplain and Stream Restoration @ 12G Norwich Rd, East Haddam, Connecticut, 06423

Building Type:	Two or More Stories
Foundation Type:	
Building Has Basement:	Yes
NFIP:	No

Comments

-

Building Type:
Per field observations.

-

Buiding has basement:
Per Town of East Haddam Assessor's Database.

-

Has NFIP:
The default value for this input is "No".

Building Damages
Floodplain and Stream Restoration @ 12G Norwich Rd, East Haddam, Connecticut, 06423

Depth Damage Curve:	USACE - Chicago: two story, w/ basement	Use Default:Yes
Building Size (sq.ft):	1,426	
Building Replacement Value (BRV) (\$/sq.ft):	\$196	Use Default: No
Demolition Threshold (%):	50.00%	Use Default:Yes
Expected Annual Losses due to Building Damages before Mitigation:	\$633	
Expected Annual Losses due to Building Damages after Mitigation:	\$537	
Expected Annual Benefits - Building:	\$95	

Comments

-

Damage Curve:
For residential buildings with two stories and an unfinished basement/enclosed space below the lowest finished floor, three available depth-damage curves were available: USACE Generic, USACE Chicago, and FEMA FIA. USACE Generic was considered inappropriate as it assumed a contents value equal to 100% of the BRV by default. Comparing USACE Chicago to FEMA FIA, the estimated benefits using USACE Chicago were more conservative, therefore USACE Chicago curves were selected.

-

Building Size:
Per Town of East Haddam Assessor's Database.

-

Building Replacement Value:
Calculated based on the building size and the "replacement cost" for the building listed on the Town of East Haddam Assessor's Database.

Depth Damage Curve - Building
Floodplain and Stream Restoration @ 12G Norwich Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION					AFTER MITIGATION				
Flood Depth (ft)	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)	
-2	3	8,369.05	0	0	3	8,369.05	0	0	
-1	5	13,948.41	0	0	5	13,948.41	0	0	
0	7	19,527.78	0	0	7	19,527.78	0	0	
1	11	30,686.52	0	0	11	30,686.52	0	0	
2	17	47,424.62	0	0	17	47,424.62	0	0	
3	22	61,373.04	0	0	22	61,373.04	0	0	
4	28	78,111.14	0	0	28	78,111.14	0	0	
5	33	92,059.56	0	0	33	92,059.56	0	0	
6	35	97,638.93	0	0	35	97,638.93	0	0	
7	38	106,007.98	0	0	38	106,007.98	0	0	
8	40	111,587.35	0	0	40	111,587.35	0	0	
9	44	122,746.08	0	0	44	122,746.08	0	0	
10	46	128,325.45	0	0	46	128,325.45	0	0	
11	48	133,904.82	0	0	48	133,904.82	0	0	
12	50	278,968.38	0	0	50	278,968.38	0	0	
13	52	278,968.38	0	0	52	278,968.38	0	0	
14	54	278,968.38	0	0	54	278,968.38	0	0	
15	54	278,968.38	0	0	54	278,968.38	0	0	
16	54	278,968.38	0	0	54	278,968.38	0	0	

Contents Damages
Floodplain and Stream Restoration @ 12G Norwich Rd, East Haddam, Connecticut, 06423

Contents Value in Dollars:	\$0	Use Default:Yes
Utilities Elevated:	No	
Expected Annual Losses due to Contents Damages before Mitigation:	\$607	
Expected Annual Losses due to Contents Damages after Mitigation:	\$279	
Expected Annual Benefits - Contents:	\$328	

Comments

-

Utilities Elevated:
The default value for this input is "No".

Depth Damage Curve - Contents
Floodplain and Stream Restoration @ 12G Norwich Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION			AFTER MITIGATION		
Flood Depth (ft)	Percent (%)	Damage Value (\$)	Percent (%)	Damage Value (\$)	
-2	6	8,369.05	6	8,369.05	
-1	9	12,553.57	9	12,553.57	
0	11	15,343.26	11	15,343.26	
1	17	23,712.31	17	23,712.31	
2	22	30,686.52	22	30,686.52	
3	28	39,055.57	28	39,055.57	
4	33	46,029.78	33	46,029.78	
5	39	54,398.83	39	54,398.83	
6	44	61,373.04	44	61,373.04	
7	49	68,347.25	49	68,347.25	
8	55	76,716.30	55	76,716.30	
9	61	85,085.35	61	85,085.35	
10	64	98,269.88	64	98,269.88	
11	71	99,033.77	71	99,033.77	
12	76	106,007.98	76	106,007.98	
13	78	108,797.66	78	108,797.66	
14	79	110,192.51	79	110,192.51	
15	79	110,192.51	79	110,192.51	
16	87	121,351.24	87	121,351.24	

Displacement Costs Avoided
Floodplain and Stream Restoration @ 12G Norwich Rd, East Haddam, Connecticut, 06423

Lodging Per Diem:	\$110	Use Default:Yes
Meals Per Diem:	\$68	Use Default:Yes
Population Affected:	0	
Duration of Displacement (days):	365	Use Default:Yes
Total Residential Displacement Cost:	\$0	
Expected Annual Losses due to Displacement Damages before mitigation:	\$0	
Expected Annual Losses due to Displacement Damages after Mitigation:	\$0	
Expected Annual Losses - Displacement:	\$0	

Comments

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Number of Building Residents:

Building has two units.

Depth Damage Curve - Displacement
Floodplain and Stream Restoration @ 12G Norwich Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION		AFTER MITIGATION	
	Days	Damage Value (\$)	Days	Damage Value (\$)
-2	0	0	0	0
-1	0	0	0	0
0	0	0	0	0
1	45	0	45	0
2	90	0	90	0
3	135	0	135	0
4	180	0	180	0
5	225	0	225	0
6	270	0	270	0
7	315	0	315	0
8	360	0	360	0
9	405	0	405	0
10	450	0	450	0
11	495	0	495	0
12	540	0	540	0
13	585	0	585	0
14	630	0	630	0
15	675	0	675	0
16	720	0	720	0

Street Maintenance Costs Avoided
Floodplain and Stream Restoration @ 12G Norwich Rd, East Haddam, Connecticut, 06423

Total Annual Street Maintenance Budget:	\$0
Total Number of Street Miles Maintained:	0
Street Miles that will not require future maintenance:	0
Expected Annual Benefits - Street Maintenance:	\$0

Volunteer Costs Avoided
Floodplain and Stream Restoration @ 12G Norwich Rd, East Haddam, Connecticut, 06423

Number of Volunteers (volunteers/event):	0
Number of Days of Lodging:	0
Expected Annual Volunteer Benefits:	\$0

Ecosystem Services Losses Avoided
Floodplain and Stream Restoration @ 12G Norwich Rd, East Haddam, Connecticut, 06423

Total Project Area (acres):	0
Percentage of Urban Green Open Space:	0.00%
Percentage of Rural Green Open Space:	0.00%
Percentage of Riparian:	0.00%
Percentage of Coastal Wetlands:	0.00%
Percentage of Inland Wetlands:	0.00%
Percentage of Forests:	0.00%
Percentage of Coral Reefs:	0.00%
Percentage of Shellfish Reefs:	0.00%
Percentage of Beaches and Dunes:	0.00%
Expected Annual Ecosystem Services Benefits:	\$0

Benefits-Costs Summary
Floodplain and Stream Restoration @ 12G Norwich Rd, East Haddam, Connecticut, 06423

Discount Rate (%):	7.0% Use Default:Yes
Total Project Benefits:	\$5,251
Total Project Cost:	\$0
Benefit-Cost Ratio:	0

Property Configuration

Property Title:	Floodplain and Stream Restoration @ 12H Norwich Rd, East Haddam, Connecticut, 06423
Property Location:	06423, Middlesex, Connecticut
Property Coordinates:	41.45438196885874, -72.45918517190287
Hazard Type:	Riverine Flood
Mitigation Action Type:	Floodplain and Stream Restoration
Property Type:	Residential Building
Analysis Method Type:	Modeled Damages

Cost Estimation

Floodplain and Stream Restoration @ 12H Norwich Rd, East Haddam, Connecticut, 06423

Discount Rate (%):	7.0%	Use Default:Yes
Project Useful Life (years):	30	
Project Cost:	\$0	
Number of Maintenance Years:	30	Use Default:Yes
Annual Maintenance Cost:	\$0	

Comments

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Project Useful Life:
Default PUL for Floodplain and Stream Restoration.

•

Mitigation Project Cost:
Costs not included in this entry.

•

Annual Maintenance Cost:
Costs not included in this entry.

Hazard Probabilities Parameters - Flood

Floodplain and Stream Restoration @ 12H Norwich Rd, East Haddam, Connecticut, 06423

Lowest Floor Elevation of the Property (ft):	23.6
Streambed Elevation at the Property Location (ft):	13.5
Use Default Recurrence Intervals:	Use Default:Yes

Comments

•

Lowest Floor Elevation:
Per 2024 MCA survey.

•

Streambed Elevation:
Based on CT ECO 2016 Lidar DEM.

Discharge

Floodplain and Stream Restoration @ 12H Norwich Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION		
Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)
10	21.94	533
50	22.31	971
100	22.44	1188
500	22.53	1884

AFTER MITIGATION		
Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)
10	16.16	533
50	21.34	971
100	21.63	1188
500	22.25	1884

Estimated Annual Damages by Category

Floodplain and Stream Restoration @ 12H Norwich Rd, East Haddam, Connecticut, 06423

Before Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-2.5	111	\$ 0	\$ 0	\$ 0	\$ 0
-2.07	2	\$ 0	\$ 0	\$ 0	\$ 0
-2	2.38	\$ 2,884	\$ 2,837	\$ 0	\$ 0
-1.76	5	\$ 1,093	\$ 1,051	\$ 0	\$ 0
-1.65	8	\$ 389	\$ 371	\$ 0	\$ 0
-1.61	1006	\$ 780	\$ 744	\$ 0	\$ 0
-1.68	20	\$ 380	\$ 361	\$ 0	\$ 0
-1.41	30	\$ 144	\$ 134	\$ 0	\$ 0
-1.36	40	\$ 87	\$ 81	\$ 0	\$ 0
-1.31	49.85	\$ 61	\$ 56	\$ 0	\$ 0
-1.3	60	\$ 43	\$ 40	\$ 0	\$ 0
-1.26	70	\$ 33	\$ 30	\$ 0	\$ 0
-1.24	80	\$ 26	\$ 23	\$ 0	\$ 0
-1.24	90	\$ 13	\$ 12	\$ 0	\$ 0
-1.23	95.93	\$ 103	\$ 94	\$ 0	\$ 0
-1.13	200	\$ 33	\$ 30	\$ 0	\$ 0
-1.06	300	\$ 17	\$ 15	\$ 0	\$ 0
-1.04	400	\$ 13	\$ 12	\$ 0	\$ 0
-1	537.72	\$ 45	\$ 38	\$ 0	\$ 0
0	20934615.02	\$ 0	\$ 0	\$ 0	\$ 0
Total (\$)		\$ 6,054	\$ 5,827	\$ 0	\$ 0

After Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-9.82	111	\$ 0	\$ 0	\$ 0	\$ 0
-8.85	2	\$ 0	\$ 0	\$ 0	\$ 0
-7.75	5	\$ 0	\$ 0	\$ 0	\$ 0
-7.13	8	\$ 0	\$ 0	\$ 0	\$ 0
-6.81	1006	\$ 0	\$ 0	\$ 0	\$ 0
-5.81	20	\$ 0	\$ 0	\$ 0	\$ 0
-5.14	30	\$ 0	\$ 0	\$ 0	\$ 0
-4.65	40	\$ 0	\$ 0	\$ 0	\$ 0
-4.26	49.85	\$ 0	\$ 0	\$ 0	\$ 0
-3.82	60	\$ 0	\$ 0	\$ 0	\$ 0
-3.63	70	\$ 0	\$ 0	\$ 0	\$ 0
-3.37	80	\$ 0	\$ 0	\$ 0	\$ 0
-3.14	90	\$ 0	\$ 0	\$ 0	\$ 0
-3.03	95.93	\$ 0	\$ 0	\$ 0	\$ 0
-2	137.42	\$ 19	\$ 19	\$ 0	\$ 0
-1.47	200	\$ 33	\$ 30	\$ 0	\$ 0
-0.52	300	\$ 18	\$ 14	\$ 0	\$ 0
0	374.63	\$ 5	\$ 4	\$ 0	\$ 0
0.16	400	\$ 24	\$ 18	\$ 0	\$ 0
0.91	537.72	\$ 762	\$ 381	\$ 0	\$ 0
Total (\$)		\$ 961	\$ 466	\$ 0	\$ 0

Building Information
Floodplain and Stream Restoration @ 12H Norwich Rd, East Haddam, Connecticut, 06423

Building Type:	Two or More Stories
Foundation Type:	
Building Has Basement:	Yes
NFIP:	No

Comments

-

Building Type:

Per field observations.

-

Buiding has basement:

Per Town of East Haddam Assessor's Database.

-

Has NFIP:

The default value for this input is "No".

Building Damages
Floodplain and Stream Restoration @ 12H Norwich Rd, East Haddam, Connecticut, 06423

Depth Damage Curve:	USACE - Chicago: two story, w/ basement	Use Default:Yes
Building Size (sq.ft):	2,632	
Building Replacement Value (BRV) (\$/sq.ft):	\$156	Use Default: No
Demolition Threshold (%):	50.00%	Use Default:Yes
Expected Annual Losses due to Building Damages before Mitigation:	\$6,054	
Expected Annual Losses due to Building Damages after Mitigation:	\$861	
Expected Annual Benefits - Building:	\$5,193	

Comments

-

Damage Curve:

For residential buildings with two stories and an unfinished basement/enclosed space below the lowest finished floor, three available depth-damage curves were available: USACE Generic, USACE Chicago, and FEMA FIA. USACE Generic was considered inappropriate as it assumed a contents value equal to 100% of the BRV by default. Comparing USACE Chicago to FEMA FIA, the estimated benefits using USACE Chicago were more conservative, therefore USACE Chicago curves were selected.

-

Building Size:

Per Town of East Haddam Assessor's Database.

-

Building Replacement Value:

Calculated based on the building size and the "replacement cost" for the building listed on the Town of East Haddam Assessor's Database.

Depth Damage Curve - Building
Floodplain and Stream Restoration @ 12H Norwich Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION				AFTER MITIGATION			
	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)
-2	3	12,286.96	0	0	3	12,286.96	0	0
-1	5	20,478.27	0	0	5	20,478.27	0	0
0	7	28,669.58	0	0	7	28,669.58	0	0
1	11	45,052.20	0	0	11	45,052.20	0	0
2	17	69,626.13	0	0	17	69,626.13	0	0
3	22	90,104.41	0	0	22	90,104.41	0	0
4	28	114,678.34	0	0	28	114,678.34	0	0
5	33	135,156.62	0	0	33	135,156.62	0	0
6	35	143,347.93	0	0	35	143,347.93	0	0
7	38	155,634.89	0	0	38	155,634.89	0	0
8	40	163,826.20	0	0	40	163,826.20	0	0
9	44	180,208.82	0	0	44	180,208.82	0	0
10	46	188,400.13	0	0	46	188,400.13	0	0
11	48	196,591.44	0	0	48	196,591.44	0	0
12	50	409,565.52	0	0	50	409,565.52	0	0
13	52	409,565.52	0	0	52	409,565.52	0	0
14	54	409,565.52	0	0	54	409,565.52	0	0
15	54	409,565.52	0	0	54	409,565.52	0	0
16	54	409,565.52	0	0	54	409,565.52	0	0

Contents Damages
Floodplain and Stream Restoration @ 12H Norwich Rd, East Haddam, Connecticut, 06423

Contents Value in Dollars:	\$0	Use Default:Yes
Utilities Elevated:	No	
Expected Annual Losses due to Contents Damages before Mitigation:	\$5,827	
Expected Annual Losses due to Contents Damages after Mitigation:	\$466	
Expected Annual Benefits - Contents:	\$5,361	

Comments

-

Utilities Elevated:

The default value for this input is "No".

Depth Damage Curve - Contents
Floodplain and Stream Restoration @ 12H Norwich Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION			AFTER MITIGATION	
	Percent (%)	Damage Value (\$)		Percent (%)	Damage Value (\$)
-2	6	12,286.96		6	12,286.96
-1	9	18,430.44		9	18,430.44
0	11	22,526.10		11	22,526.10
1	17	34,813.06		17	34,813.06
2	22	45,052.20		22	45,052.20
3	28	57,339.17		28	57,339.17
4	33	67,578.31		33	67,578.31
5	39	79,865.27		39	79,865.27
6	44	90,104.41		44	90,104.41
7	49	100,343.55		49	100,343.55
8	55	110,630.51		55	110,630.51
9	61	124,917.48		61	124,917.48
10	64	130,060.96		64	130,060.96
11	71	145,395.75		71	145,395.75
12	76	155,634.89		76	155,634.89
13	78	159,730.55		78	159,730.55
14	79	161,778.38		79	161,778.38
15	79	161,778.38		79	161,778.38
16	87	178,161.00		87	178,161.00

Displacement Costs Avoided
Floodplain and Stream Restoration @ 12H Norwich Rd, East Haddam, Connecticut, 06423

Lodging Per Diem:	\$110	Use Default:Yes
Meals Per Diem:	\$68	Use Default:Yes
Population Affected:	0	
Duration of Displacement (days):	365	Use Default:Yes
Total Residential Displacement Cost:	\$0	
Expected Annual Losses due to Displacement Damages before mitigation:	\$0	
Expected Annual Losses due to Displacement Damages after Mitigation:	\$0	
Expected Annual Losses - Displacement:	\$0	

Depth Damage Curve - Displacement
Floodplain and Stream Restoration @ 12H Norwich Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION		AFTER MITIGATION	
	Days	Damage Value (\$)	Days	Damage Value (\$)
-2	0	0	0	0
-1	0	0	0	0
0	0	0	0	0
1	45	0	45	0
2	90	0	90	0
3	135	0	135	0
4	180	0	180	0
5	225	0	225	0
6	270	0	270	0
7	315	0	315	0
8	360	0	360	0
9	405	0	405	0
10	450	0	450	0
11	495	0	495	0
12	540	0	540	0
13	585	0	585	0
14	630	0	630	0
15	675	0	675	0
16	720	0	720	0

Street Maintenance Costs Avoided
Floodplain and Stream Restoration @ 12H Norwich Rd, East Haddam, Connecticut, 06423

Total Annual Street Maintenance Budget:	\$0
Total Number of Street Miles Maintained:	0
Street Miles that will not require future maintenance:	0
Expected Annual Benefits - Street Maintenance:	\$0

Volunteer Costs Avoided
Floodplain and Stream Restoration @ 12H Norwich Rd, East Haddam, Connecticut, 06423

Number of Volunteers (volunteers/event):	0
Number of Days of Lodging:	0
Expected Annual Volunteer Benefits:	\$0

Ecosystem Services Losses Avoided
Floodplain and Stream Restoration @ 12H Norwich Rd, East Haddam, Connecticut, 06423

Total Project Area (acres):	0
Percentage of Urban Green Open Space:	0.00%
Percentage of Rural Green Open Space:	0.00%
Percentage of Riparian:	0.00%
Percentage of Coastal Wetlands:	0.00%
Percentage of Inland Wetlands:	0.00%
Percentage of Forests:	0.00%
Percentage of Coral Reefs:	0.00%
Percentage of Shellfish Reefs:	0.00%
Percentage of Beaches and Dunes:	0.00%
Expected Annual Ecosystem Services Benefits:	\$0

Benefits-Costs Summary
Floodplain and Stream Restoration @ 12H Norwich Rd, East Haddam, Connecticut, 06423

Discount Rate (%):	7.0%	Use Default:Yes
Total Project Benefits:	\$130,969	
Total Project Cost:	\$0	
Benefit-Cost Ratio:	0	

Property Configuration

Property Title:	Floodplain and Stream Restoration @ 121 Norwich Rd, East Haddam, Connecticut, 06423
Property Location:	06423, Middlesex, Connecticut
Property Coordinates:	41.45438196885874, -72.45918517190287
Hazard Type:	Riverine Flood
Mitigation Action Type:	Floodplain and Stream Restoration
Property Type:	Residential Building
Analysis Method Type:	Modeled Damages

Cost Estimation

Floodplain and Stream Restoration @ 121 Norwich Rd, East Haddam, Connecticut, 06423

Discount Rate (%):	7.0%	Use Default:Yes
Project Useful Life (years):	30	
Project Cost:	\$0	
Number of Maintenance Years:	30	Use Default:Yes
Annual Maintenance Cost:	\$0	

Comments

•

Project Useful Life:
Default PUL for Floodplain and Stream Restoration.

•

Mitigation Project Cost:
Costs not included in this entry.

•

Annual Maintenance Cost:
Costs not included in this entry.

Hazard Probabilities Parameters - Flood

Floodplain and Stream Restoration @ 121 Norwich Rd, East Haddam, Connecticut, 06423

Lowest Floor Elevation of the Property (ft):	25
Streambed Elevation at the Property Location (ft):	12.7
Use Default Recurrence Intervals:	Use Default:Yes

Comments

•

Lowest Floor Elevation:
Per 2024 MCA survey.

•

Streambed Elevation:
Based on CT ECO 2016 Lidar DEM.

Discharge

Floodplain and Stream Restoration @ 121 Norwich Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION			
Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)	
10	22.78	533	
50	23.28	971	
100	23.44	1188	
500	23.75	1884	

AFTER MITIGATION			
Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)	
10	16	533	
50	20.56	971	
100	20.72	1188	
500	23.25	1884	

Estimated Annual Damages by Category

Floodplain and Stream Restoration @ 121 Norwich Rd, East Haddam, Connecticut, 06423

Before Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-3.55	1/11	\$ 0	\$ 0	\$ 0	\$ 0
-2.91	2	\$ 0	\$ 0	\$ 0	\$ 0
-2.45	5	\$ 0	\$ 0	\$ 0	\$ 0
-2.26	8	\$ 0	\$ 0	\$ 0	\$ 0
-2.18	10/06	\$ 0	\$ 0	\$ 0	\$ 0
-2	10/18	\$ 27	\$ 26	\$ 0	\$ 0
-1.97	20	\$ 214	\$ 52	\$ 0	\$ 0
-1.86	30	\$ 113	\$ 111	\$ 0	\$ 0
-1.8	40	\$ 70	\$ 68	\$ 0	\$ 0
-1.74	49/05	\$ 49	\$ 47	\$ 0	\$ 0
-1.68	60	\$ 35	\$ 34	\$ 0	\$ 0
-1.65	70	\$ 27	\$ 26	\$ 0	\$ 0
-1.61	80	\$ 21	\$ 20	\$ 0	\$ 0
-1.6	90	\$ 11	\$ 10	\$ 0	\$ 0
-1.57	95/93	\$ 89	\$ 83	\$ 0	\$ 0
-1.42	200	\$ 29	\$ 27	\$ 0	\$ 0
-1.32	300	\$ 15	\$ 14	\$ 0	\$ 0
-1.26	400	\$ 12	\$ 11	\$ 0	\$ 0
-1.2	537/72	\$ 43	\$ 36	\$ 0	\$ 0
0	876/460/75	\$ 0	\$ 0	\$ 0	\$ 0
Total (\$)		\$ 756	\$ 725	\$ 0	\$ 0

After Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-11.71	1/11	\$ 0	\$ 0	\$ 0	\$ 0
-10.81	2	\$ 0	\$ 0	\$ 0	\$ 0
-9.6	5	\$ 0	\$ 0	\$ 0	\$ 0
-8.83	8	\$ 0	\$ 0	\$ 0	\$ 0
-8.59	10/06	\$ 0	\$ 0	\$ 0	\$ 0
-7.48	30	\$ 0	\$ 0	\$ 0	\$ 0
-6.78	30	\$ 0	\$ 0	\$ 0	\$ 0
-6.27	40	\$ 0	\$ 0	\$ 0	\$ 0
-5.84	49/05	\$ 0	\$ 0	\$ 0	\$ 0
-5.5	60	\$ 0	\$ 0	\$ 0	\$ 0
-5.19	70	\$ 0	\$ 0	\$ 0	\$ 0
-4.92	80	\$ 0	\$ 0	\$ 0	\$ 0
-4.68	90	\$ 0	\$ 0	\$ 0	\$ 0
-4.53	95/93	\$ 0	\$ 0	\$ 0	\$ 0
-2.82	200	\$ 0	\$ 0	\$ 0	\$ 0
-2	293/73	\$ 1	\$ 1	\$ 0	\$ 0
-1.89	300	\$ 19	\$ 12	\$ 0	\$ 0
-1.22	400	\$ 14	\$ 12	\$ 0	\$ 0
-0.45	537/72	\$ 8	\$ 6	\$ 0	\$ 0
0	635/54	\$ 644	\$ 322	\$ 0	\$ 0
Total (\$)		\$ 680	\$ 354	\$ 0	\$ 0

Building Information
Floodplain and Stream Restoration @ 121 Norwich Rd, East Haddam, Connecticut, 06423

Building Type:	Two or More Stories
Foundation Type:	
Building Has Basement:	Yes
NFIP:	No

Comments

-

Building Type:

Per field observations.

-

Buiding has basement:

Per Town of East Haddam Assessor's Database.

-

Has NFIP:

The default value for this input is "No".

Building Damages
Floodplain and Stream Restoration @ 121 Norwich Rd, East Haddam, Connecticut, 06423

Depth Damage Curve:	USACE - Chicago: two story, w/ basement	Use Default:Yes
Building Size (sq.ft):	2,632	
Building Replacement Value (BRV) (\$/sq.ft):	\$156	Use Default: No
Demolition Threshold (%):	50.00%	Use Default:Yes
Expected Annual Losses due to Building Damages before Mitigation:	\$756	
Expected Annual Losses due to Building Damages after Mitigation:	\$680	
Expected Annual Benefits - Building:	\$76	

Comments

-

Damage Curve:

For residential buildings with two stories and an unfinished basement/enclosed space below the lowest finished floor, three available depth-damage curves were available: USACE Generic, USACE Chicago, and FEMA FIA. USACE Generic was considered inappropriate as it assumed a contents value equal to 100% of the BRV by default. Comparing USACE Chicago to FEMA FIA, the estimated benefits using USACE Chicago were more conservative, therefore USACE Chicago curves were selected.

-

Building Size:

Per Town of East Haddam Assessor's Database.

-

Building Replacement Value:

Calculated based on the building size and the "replacement cost" for the building listed on the Town of East Haddam Assessor's Database.

Depth Damage Curve - Building
Floodplain and Stream Restoration @ 121 Norwich Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION				AFTER MITIGATION			
	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)
-2	3	12,286.96	0	0	3	12,286.96	0	0
-1	5	20,478.27	0	0	5	20,478.27	0	0
0	7	28,669.58	0	0	7	28,669.58	0	0
1	11	45,052.20	0	0	11	45,052.20	0	0
2	17	69,626.13	0	0	17	69,626.13	0	0
3	22	90,104.41	0	0	22	90,104.41	0	0
4	28	114,678.34	0	0	28	114,678.34	0	0
5	33	135,156.62	0	0	33	135,156.62	0	0
6	35	143,347.93	0	0	35	143,347.93	0	0
7	38	155,634.89	0	0	38	155,634.89	0	0
8	40	163,826.20	0	0	40	163,826.20	0	0
9	44	180,208.82	0	0	44	180,208.82	0	0
10	46	188,400.13	0	0	46	188,400.13	0	0
11	48	196,591.44	0	0	48	196,591.44	0	0
12	50	409,565.52	0	0	50	409,565.52	0	0
13	52	409,565.52	0	0	52	409,565.52	0	0
14	54	409,565.52	0	0	54	409,565.52	0	0
15	54	409,565.52	0	0	54	409,565.52	0	0
16	54	409,565.52	0	0	54	409,565.52	0	0

Contents Damages
Floodplain and Stream Restoration @ 121 Norwich Rd, East Haddam, Connecticut, 06423

Contents Value in Dollars:	\$0	Use Default:Yes
Utilities Elevated:	No	
Expected Annual Losses due to Contents Damages before Mitigation:	\$725	
Expected Annual Losses due to Contents Damages after Mitigation:	\$354	
Expected Annual Benefits - Contents:	\$372	

Comments

-

Utilities Elevated:

The default value for this input is "No".

Depth Damage Curve - Contents
Floodplain and Stream Restoration @ 121 Norwich Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION			AFTER MITIGATION	
	Percent (%)	Damage Value (\$)		Percent (%)	Damage Value (\$)
-2	6	12,286.96		6	12,286.96
-1	9	18,430.44		9	18,430.44
0	11	22,526.10		11	22,526.10
1	17	34,813.06		17	34,813.06
2	22	45,052.20		22	45,052.20
3	28	57,339.17		28	57,339.17
4	33	67,578.31		33	67,578.31
5	39	79,865.27		39	79,865.27
6	44	90,104.41		44	90,104.41
7	49	100,343.55		49	100,343.55
8	55	110,630.51		55	110,630.51
9	61	124,917.48		61	124,917.48
10	64	130,060.96		64	130,060.96
11	71	145,395.75		71	145,395.75
12	76	155,634.89		76	155,634.89
13	78	159,730.55		78	159,730.55
14	79	161,778.38		79	161,778.38
15	79	161,778.38		79	161,778.38
16	87	178,161.00		87	178,161.00

Displacement Costs Avoided Floodplain and Stream Restoration @ 121 Norwich Rd, East Haddam, Connecticut, 06423		
Lodging Per Diem:	\$110	Use Default:Yes
Meals Per Diem:	\$68	Use Default:Yes
Population Affected:	0	
Duration of Displacement (days):	365	Use Default:Yes
Total Residential Displacement Cost:	\$0	
Expected Annual Losses due to Displacement Damages before mitigation:	\$0	
Expected Annual Losses due to Displacement Damages after Mitigation:	\$0	
Expected Annual Losses - Displacement:	\$0	

Depth Damage Curve - Displacement Floodplain and Stream Restoration @ 121 Norwich Rd, East Haddam, Connecticut, 06423					
Flood Depth (ft)	BEFORE MITIGATION		AFTER MITIGATION		
	Days	Damage Value (\$)	Days	Damage Value (\$)	
-2	0	0	0	0	
-1	0	0	0	0	
0	0	0	0	0	
1	45	0	45	0	
2	90	0	90	0	
3	135	0	135	0	
4	180	0	180	0	
5	225	0	225	0	
6	270	0	270	0	
7	315	0	315	0	
8	360	0	360	0	
9	405	0	405	0	
10	450	0	450	0	
11	495	0	495	0	
12	540	0	540	0	
13	585	0	585	0	
14	630	0	630	0	
15	675	0	675	0	
16	720	0	720	0	

Street Maintenance Costs Avoided Floodplain and Stream Restoration @ 121 Norwich Rd, East Haddam, Connecticut, 06423	
Total Annual Street Maintenance Budget:	\$0
Total Number of Street Miles Maintained:	0
Street Miles that will not require future maintenance:	0
Expected Annual Benefits - Street Maintenance:	\$0

Volunteer Costs Avoided Floodplain and Stream Restoration @ 121 Norwich Rd, East Haddam, Connecticut, 06423	
Number of Volunteers (volunteers/event):	0
Number of Days of Lodging:	0
Expected Annual Volunteer Benefits:	\$0

Ecosystem Services Losses Avoided Floodplain and Stream Restoration @ 121 Norwich Rd, East Haddam, Connecticut, 06423	
Total Project Area (acres):	0
Percentage of Urban Green Open Space:	0.00%
Percentage of Rural Green Open Space:	0.00%
Percentage of Riparian:	0.00%
Percentage of Coastal Wetlands:	0.00%
Percentage of Inland Wetlands:	0.00%
Percentage of Forests:	0.00%
Percentage of Coral Reefs:	0.00%
Percentage of Shellfish Reefs:	0.00%
Percentage of Beaches and Dunes:	0.00%
Expected Annual Ecosystem Services Benefits:	\$0

Benefits-Costs Summary Floodplain and Stream Restoration @ 121 Norwich Rd, East Haddam, Connecticut, 06423	
Discount Rate (%):	7.0% Use Default:Yes
Total Project Benefits:	\$5.557
Total Project Cost:	\$0
Benefit-Cost Ratio:	0

Property Configuration	
Property Title:	Elevation @ 62 Creamery Rd, East Haddam, Connecticut, 06423
Property Location:	06423, Middlesex, Connecticut
Property Coordinates:	41.45280470673592, -72.459169197996
Hazard Type:	Riverine Flood
Mitigation Action Type:	Elevation
Property Type:	Non-Residential Building
Analysis Method Type:	Modeled Damages

Cost Estimation	
Elevation @ 62 Creamery Rd, East Haddam, Connecticut, 06423	
Discount Rate (%):	7.0% Use Default:Yes
Project Useful Life (years):	50
Project Cost:	\$201,000
Number of Maintenance Years:	50 Use Default:Yes
Annual Maintenance Cost:	\$0

Comments

•

Project Useful Life:

Building is a historic structure, therefore the standard PUL for a historic building (50 years) was used.

•

Mitigation Project Cost:

Cost of elevation assumed equivalent to the replacement value of the building, due to its historic nature. It is assumed this also includes costs due to temporary loss of business during the work period.

•

Annual Maintenance Cost:

No additional maintenance costs added for building elevation.

Hazard Probabilities Parameters - Flood	
Elevation @ 62 Creamery Rd, East Haddam, Connecticut, 06423	
Lowest Floor Elevation of the Property (ft):	16.4
Streambed Elevation at the Property Location (ft):	10.5
Feet to Raise First Floor:	19
Use Default Recurrence Intervals:	Use Default:Yes

Comments

•

Lowest Floor Elevation:

Approximate elevation based on Lidar Point cloud data at building threshold using 2023 Connecticut Statewide Lidar dataset.

•

Feet to Raise First Floor:

Building to be raised such that first floor is elevation 18.3 ft NAVD88, approximately 1 foot above the mid-century BFE predicted by the 2024 Kleinfelder H&H Model with the rehearsal studio removed.

•

Streambed Elevation:

Based on CT ECO 2016 Lidar DEM.

Discharge
Elevation @ 62 Creamery Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION			
Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)	
10	15.44	50	533
50	15.72		971
100	15.84		1188
500	16.75		1884
AFTER MITIGATION			
Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)	
10	15.44	50	533
50	15.72		971
100	15.84		1188
500	16.75		1884

Estimated Annual Damages by Category
Elevation @ 62 Creamery Rd, East Haddam, Connecticut, 06423

Before Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-2.54	1/11	\$ 0	\$ 0	\$ 0	\$ 0
-2	1/11	\$ 0	\$ 0	\$ 0	\$ 0
-1.87	2	\$ 0	\$ 0	\$ 0	\$ 0
-1.38	5	\$ 0	\$ 0	\$ 0	\$ 0
-1.18	8	\$ 0	\$ 0	\$ 0	\$ 0
-1.09	10/06	\$ 0	\$ 0	\$ 0	\$ 0
-0.84	20	\$ 0	\$ 0	\$ 0	\$ 0
-0.69	30	\$ 0	\$ 0	\$ 0	\$ 0
-0.6	40	\$ 0	\$ 0	\$ 0	\$ 0
-0.53	49.85	\$ 0	\$ 0	\$ 0	\$ 0
-0.49	60	\$ 0	\$ 0	\$ 0	\$ 0
-0.44	70	\$ 0	\$ 0	\$ 0	\$ 0
-0.4	80	\$ 0	\$ 0	\$ 0	\$ 0
-0.35	90	\$ 0	\$ 0	\$ 0	\$ 0
-0.35	95.93	\$ 0	\$ 0	\$ 0	\$ 0
-0.34	200	\$ 0	\$ 0	\$ 0	\$ 0
-0.31	300	\$ 0	\$ 0	\$ 0	\$ 0
0	1/11	\$ 0	\$ 0	\$ 0	\$ 0
0.05	400	\$ 1	\$ 1	\$ 1	\$ 0
0.13	537.72	\$ 373	\$ 93	\$ 828	\$ 0
Total (\$)		\$ 374	\$ 94	\$ 830	\$ 0
After Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-4.44	1/11	\$ 0	\$ 0	\$ 0	\$ 0
-3.78	2	\$ 0	\$ 0	\$ 0	\$ 0
-3.28	5	\$ 0	\$ 0	\$ 0	\$ 0
-3.08	8	\$ 0	\$ 0	\$ 0	\$ 0
-2.99	10/06	\$ 0	\$ 0	\$ 0	\$ 0
-2.74	20	\$ 0	\$ 0	\$ 0	\$ 0
-2.59	30	\$ 0	\$ 0	\$ 0	\$ 0
-2.49	40	\$ 0	\$ 0	\$ 0	\$ 0
-2.43	49.85	\$ 0	\$ 0	\$ 0	\$ 0
-2.39	60	\$ 0	\$ 0	\$ 0	\$ 0
-2.34	70	\$ 0	\$ 0	\$ 0	\$ 0
-2.3	80	\$ 0	\$ 0	\$ 0	\$ 0
-2.24	90	\$ 0	\$ 0	\$ 0	\$ 0
-2.25	95.93	\$ 0	\$ 0	\$ 0	\$ 0
-2.04	200	\$ 0	\$ 0	\$ 0	\$ 0
-2	219.64	\$ 0	\$ 0	\$ 0	\$ 0
-1.81	300	\$ 0	\$ 0	\$ 0	\$ 0
-1.85	400	\$ 0	\$ 0	\$ 0	\$ 0
-1.77	537.72	\$ 0	\$ 0	\$ 0	\$ 0
0	356448.37	\$ 0	\$ 0	\$ 0	\$ 0
Total (\$)		\$ 0	\$ 0	\$ 0	\$ 0

Building Information
Elevation @ 62 Creamery Rd, East Haddam, Connecticut, 06423

Non-Residential Occupancy Type:

COM8, Commercial – Entertainment and Recreation

Building is outside hundred-year flood area:

No

Building Type:

Recreation

Building Is Engineered:

Yes

NFIP:

No

Comments

-

Structure Type:

Building is a fitness studio.

-

Outside Hundred-Year Flood Zone:

The building is currently within the 100-year floodplain based on the 2024 Kleinfelder H&H Model.

-

Is Engineered:

This building is assumed to be engineered due to its prior use as a manufacturing facility.

-

Has NFIP:

The default value for this input is "No".

Building Damages
Elevation @ 62 Creamery Rd, East Haddam, Connecticut, 06423

Depth Damage Curve:

Recreation (Default) Use Default:Yes

Building Size (sq.ft):

5,088

Building Replacement Value (BRV) (\$/sq.ft):

\$79 Use Default: No

Demolition Threshold (%):

50.00% Use Default:Yes

Expected Annual Losses due to Building Damages before Mitigation:

\$374

Expected Annual Losses due to Building Damages after Mitigation:

\$0

Expected Annual Benefits - Building:

\$374

Comments

-

First Floor Area:

Per Town of East Haddam Assessor's Database.

-

Building Size:

Per Town of East Haddam Assessor's Database.

-

Building Replacement Value:

Calculated based on the First Floor Area and the "replacement cost" for the building listed on the Town of East Haddam Assessor's Database.

Depth Damage Curve - Building
Elevation @ 62 Creamery Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION				AFTER MITIGATION			
	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)
-2	0	0	0	0	0	0	0	0
-1	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
1	11.9	23,876.78	0	0	0	0	0	0
2	20.2	40,130.34	0	0	0	0	0	0
3	26	52,167.77	0	0	11.9	23,876.78	0	0
4	32.2	64,607.78	0	0	20.2	40,130.34	0	0
5	36.8	73,837.46	0	0	26	52,167.77	0	0
6	40.7	81,662.62	0	0	32.2	64,607.78	0	0
7	43.4	87,080.05	0	0	36.8	73,837.46	0	0
8	47.4	95,105.86	0	0	40.7	81,662.62	0	0
9	49.4	99,118.76	0	0	43.4	87,080.05	0	0
10	51.6	200,645.28	0	0	47.4	95,105.86	0	0
11	51.6	200,645.28	0	0	49.4	99,118.76	0	0
12	51.6	200,645.28	0	0	51.6	200,645.28	0	0
13	51.6	200,645.28	0	0	51.6	200,645.28	0	0
14	51.6	200,645.28	0	0	51.6	200,645.28	0	0
15	51.6	200,645.28	0	0	51.6	200,645.28	0	0
16	51.6	200,645.28	0	0	51.6	200,645.28	0	0

Contents Damages
Elevation @ 62 Creamery Rd, East Haddam, Connecticut, 06423

Contents Value in Dollars:

\$0 Use Default:Yes

Expected Annual Losses due to Contents Damages before Mitigation:

\$94

Expected Annual Losses due to Contents Damages after Mitigation:

\$0

Expected Annual Benefits - Contents:

\$94

Depth Damage Curve - Contents
Elevation @ 62 Creamery Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION			AFTER MITIGATION		
	Percent (%)	Damage Value (\$)		Percent (%)	Damage Value (\$)	
-2	0	0		0	0	
-1	0	0		0	0	
0	0	0		0	0	
1	26	13,041.94		0	0	
2	44	22,070.98		0	0	
3	63	31,601.63		26	13,041.94	
4	73	36,877.76		44	22,070.98	
5	80	40,129.05		63	31,601.63	
6	84	42,135.50		73	36,877.76	
7	91	45,646.80		80	40,129.05	
8	95	47,633.25		84	42,135.50	
9	95	47,633.25		91	45,646.80	
10	95	47,633.25		95	47,633.25	
11	95	47,633.25		95	47,633.25	
12	95	47,633.25		95	47,633.25	
13	95	47,633.25		95	47,633.25	
14	95	47,633.25		95	47,633.25	
15	95	47,633.25		95	47,633.25	
16	95	47,633.25		95	47,633.25	

Displacement Costs Avoided
Elevation @ 62 Creamery Rd, East Haddam, Connecticut, 06423

Monthly Displacement Cost (\$/sq.ft/month):

2.29

Use Default:Yes

One-Time Displacement Cost (\$/sq.ft):

0

Use Default:Yes

Expected Annual Losses due to Displacement Damages before mitigation:

\$830

Expected Annual Losses due to Displacement Damages after Mitigation:

\$0

Expected Annual Losses - Displacement:

\$829

Depth Damage Curve - Displacement
Elevation @ 62 Creamery Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION		AFTER MITIGATION	
	Days	Damage Value (\$)	Days	Damage Value (\$)
-2	0	0	0	0
-1	0	0	0	0
0	0	0	0	0
1	48	27,299.28	9	0
2	90	54,598.57	9	0
3	135	81,897.85	45	27,299.28
4	180	143,648.87	90	71,824.43
5	225	179,560.09	135	107,736.65
6	270	215,473.31	180	143,648.87
7	315	251,386.53	225	179,560.09
8	360	356,249.21	270	287,886.91
9	405	400,780.36	315	311,718.06
10	450	445,311.51	360	356,249.21
11	450	445,311.51	405	400,780.36
12	450	472,378.65	450	472,378.65
13	450	472,378.65	450	472,378.65
14	450	472,378.65	450	472,378.65
15	450	472,378.65	450	472,378.65
16	450	472,378.65	450	472,378.65

Loss of Function/Loss of Income Avoided
Elevation @ 62 Creamery Rd, East Haddam, Connecticut, 06423

Annual Operating Budget:

\$0

Loss of Function/Loss of Income Per Day:

\$0

Expected Annual Losses due to Loss of Function/Loss of Income before mitigation:

\$0

Expected Annual Losses due to Loss of Function/Loss of Income after mitigation:

\$0

Expected Annual Benefits - Loss of Function/Loss of Income Avoided:

\$0

Depth Damage Curve - Loss of Function/Loss of Income
Elevation @ 62 Creamery Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION		AFTER MITIGATION	
	Days	Damage Value (\$)	Days	Damage Value (\$)
-2	0	0	0	0
-1	0	0	0	0
0	0	0	0	0
1	45	0	9	0
2	90	0	9	0
3	135	0	45	0
4	180	0	90	0
5	225	0	135	0
6	270	0	180	0
7	315	0	225	0
8	360	0	270	0
9	405	0	315	0
10	450	0	360	0
11	450	0	405	0
12	450	0	450	0
13	450	0	450	0
14	450	0	450	0
15	450	0	450	0
16	450	0	450	0

Volunteer Costs Avoided
Elevation @ 62 Creamery Rd, East Haddam, Connecticut, 06423

Number of Volunteers (volunteers/event):

0

Number of Days of Lodging:

0

Expected Annual Volunteer Benefits:

\$0

Benefits-Costs Summary
Elevation @ 62 Creamery Rd, East Haddam, Connecticut, 06423

Discount Rate (%):

7.0%

Use Default:Yes

Total Project Benefits:

\$17,901

Total Project Cost:

\$201,000

Benefit-Cost Ratio:

0.09

Property Configuration

Property Title:	Elevation @ 59 Creamery Rd, East Haddam, Connecticut, 06423
Property Location:	06423, Middlesex, Connecticut
Property Coordinates:	41.45229504511332, -72.45890946707638
Hazard Type:	Riverine Flood
Mitigation Action Type:	Elevation
Property Type:	Residential Building
Analysis Method Type:	Modeled Damages

Cost Estimation

Elevation @ 59 Creamery Rd, East Haddam, Connecticut, 06423

Discount Rate (%):	7.0%	Use Default:Yes
Project Useful Life (years):	50	
Project Cost:	\$362,000	
Number of Maintenance Years:	50	Use Default:Yes
Annual Maintenance Cost:	\$0	

Comments

•

Project Useful Life:

Building is a historic structure, therefore the standard PUL for a historic building (50 years) was used.

•

Mitigation Project Cost:

Cost of elevation assumed equivalent to the replacement value of the building, due to its historic nature and brick façade. It is assumed this also includes costs due to temporary relocation of building residents during the work period.

•

Annual Maintenance Cost:

No additional maintenance costs added for building elevation.

Hazard Probabilities Parameters - Flood

Elevation @ 59 Creamery Rd, East Haddam, Connecticut, 06423

Lowest Floor Elevation of the Property (ft):	13.6
Streambed Elevation at the Property Location (ft):	5.2
Feet to Raise First Floor:	1.6
Use Default Recurrence Intervals:	Use Default:Yes

Comments

•

Lowest Floor Elevation:

Approximate elevation based on Lidar Point cloud data at building threshold using 2023 Connecticut Statewide Lidar dataset.

•

Feet to Raise First Floor:

Building to be raised such that first floor is elevation 15.2 ft NAVD88, approximately 1 foot above the mid-century BFE predicted by the 2024 Kleinfelder H&H Model with the rehearsal studio removed. This is also 1.3 feet above the estimated 2050 Connecticut River 100-year flood elevation.

•

Streambed Elevation:

Based on CT ECO 2016 Lidar DEM.

Discharge

Elevation @ 59 Creamery Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION			
Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)	
10	12.66	533	
50	13.38	971	
100	13.56	1188	
500	13.94	1884	

AFTER MITIGATION			
Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)	
10	12.66	533	
50	13.38	971	
100	13.56	1188	
500	13.94	1884	

Estimated Annual Damages by Category

Elevation @ 59 Creamery Rd, East Haddam, Connecticut, 06423

Before Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-2.55	1/11	\$ 0	\$ 0	\$ 0	\$ 0
-2	1/8	\$ 1,546	\$ 1,522	\$ 0	\$ 0
-1.78	2	\$ 4,306	\$ 4,050	\$ 0	\$ 0
-1.19	5	\$ 1,302	\$ 1,179	\$ 0	\$ 0
-0.97	8	\$ 474	\$ 422	\$ 0	\$ 0
-0.87	10/6	\$ 982	\$ 849	\$ 0	\$ 0
-0.6	20	\$ 366	\$ 299	\$ 0	\$ 0
-0.45	30	\$ 186	\$ 153	\$ 0	\$ 0
-0.37	40	\$ 113	\$ 92	\$ 0	\$ 0
-0.28	49.85	\$ 79	\$ 64	\$ 0	\$ 0
-0.22	60	\$ 57	\$ 46	\$ 0	\$ 0
-0.17	70	\$ 43	\$ 34	\$ 0	\$ 0
-0.14	80	\$ 34	\$ 27	\$ 0	\$ 0
-0.09	90	\$ 17	\$ 13	\$ 0	\$ 0
-0.07	95.93	\$ 65	\$ 51	\$ 0	\$ 0
0	127.75	\$ 74	\$ 58	\$ 0	\$ 0
0.13	200	\$ 47	\$ 37	\$ 0	\$ 0
0.25	300	\$ 20	\$ 19	\$ 0	\$ 0
0.33	400	\$ 20	\$ 15	\$ 0	\$ 0
0.41	537.72	\$ 673	\$ 336	\$ 0	\$ 0
Total (\$)		\$ 10,399	\$ 9,268	\$ 0	\$ 0

After Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-4.75	1/11	\$ 0	\$ 0	\$ 0	\$ 0
-3.38	2	\$ 0	\$ 0	\$ 0	\$ 0
-2.79	5	\$ 0	\$ 0	\$ 0	\$ 0
-2.37	8	\$ 0	\$ 0	\$ 0	\$ 0
-2.47	10/6	\$ 0	\$ 0	\$ 0	\$ 0
-2.2	30	\$ 0	\$ 0	\$ 0	\$ 0
-2.05	30	\$ 0	\$ 0	\$ 0	\$ 0
-2	36.64	\$ 0	\$ 0	\$ 0	\$ 0
-1.97	40	\$ 0	\$ 0	\$ 0	\$ 0
-1.88	49.85	\$ 0	\$ 0	\$ 0	\$ 0
-1.82	60	\$ 0	\$ 0	\$ 0	\$ 0
-1.77	70	\$ 0	\$ 0	\$ 0	\$ 0
-1.74	80	\$ 0	\$ 0	\$ 0	\$ 0
-1.69	90	\$ 0	\$ 0	\$ 0	\$ 0
-1.67	95.93	\$ 0	\$ 0	\$ 0	\$ 0
-1.45	200	\$ 0	\$ 0	\$ 0	\$ 0
-1.35	300	\$ 0	\$ 0	\$ 0	\$ 0
-1.27	400	\$ 0	\$ 0	\$ 0	\$ 0
-1.17	537.72	\$ 0	\$ 0	\$ 0	\$ 0
0	69988.93	\$ 3	\$ 3	\$ 0	\$ 0
Total (\$)		\$ 3	\$ 3	\$ 0	\$ 0

Building Information
Elevation @ 59 Creamery Rd, East Haddam, Connecticut, 06423

Building Type:	Two or More Stories
Foundation Type:	
Building Has Basement:	Yes
NFIP:	No

Comments

-

Building Type:

Per field observations.

-

Buiding has basement:

Per Town of East Haddam Assessor's Database.

-

Has NFIP:

The default value for this input is "No".

Building Damages
Elevation @ 59 Creamery Rd, East Haddam, Connecticut, 06423

Depth Damage Curve:	USACE - Chicago: two story, w/ basement	Use Default:Yes
Building Size (sq.ft):	2,179	
Building Replacement Value (BRV) (\$/sq.ft):	\$166	Use Default: No
Demolition Threshold (%):	50.00%	Use Default:Yes
Expected Annual Losses due to Building Damages before Mitigation:	\$10,399	
Expected Annual Losses due to Building Damages after Mitigation:	\$5	
Expected Annual Benefits - Building:	\$10,393	

Comments

-

Damage Curve:

For residential buildings with two stories and an unfinished basement/enclosed space below the lowest finished floor, three available depth-damage curves were available: USACE Generic, USACE Chicago, and FEMA FIA. USACE Generic was considered inappropriate as it assumed a contents value equal to 100% of the BRV by default. Comparing USACE Chicago to FEMA FIA, the estimated benefits using USACE Chicago were more conservative, therefore USACE Chicago curves were selected.

-

Building Size:

Per Town of East Haddam Assessor's Database.

-

Building Replacement Value:

Calculated based on the building size and the "replacement cost" for the building listed on the Town of East Haddam Assessor's Database.

Depth Damage Curve - Building
Elevation @ 59 Creamery Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION					AFTER MITIGATION				
Flood Depth (ft)	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)	
-2	3	10,851.42	0	0	0	0	0	0	
-1	5	18,085.7	0	0	0	0	0	0	
0	7	25,319.98	0	0	0	0	0	0	
1	11	38,788.54	0	0	0	0	0	0	
2	17	61,491.38	0	0	7	25,319.98	0	0	
3	22	79,577.08	0	0	11	38,788.54	0	0	
4	28	101,279.92	0	0	17	61,491.38	0	0	
5	33	119,365.62	0	0	22	79,577.08	0	0	
6	35	126,599.9	0	0	28	101,279.92	0	0	
7	38	137,451.32	0	0	33	119,365.62	0	0	
8	40	144,685.6	0	0	35	126,599.9	0	0	
9	44	159,154.16	0	0	38	137,451.32	0	0	
10	46	166,388.44	0	0	40	144,685.6	0	0	
11	48	173,622.72	0	0	44	159,154.16	0	0	
12	50	181,714	0	0	46	166,388.44	0	0	
13	52	181,714	0	0	48	173,622.72	0	0	
14	54	181,714	0	0	50	181,714	0	0	
15	54	181,714	0	0	52	181,714	0	0	
16	54	181,714	0	0	54	181,714	0	0	

Contents Damages
Elevation @ 59 Creamery Rd, East Haddam, Connecticut, 06423

Contents Value in Dollars:	\$0	Use Default:Yes
Utilities Elevated:	No	
Expected Annual Losses due to Contents Damages before Mitigation:	\$9,268	
Expected Annual Losses due to Contents Damages after Mitigation:	\$3	
Expected Annual Benefits - Contents:	\$9,265	

Comments

-

Utilities Elevated:

The default value for this input is "No".

Depth Damage Curve - Contents
Elevation @ 59 Creamery Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION				AFTER MITIGATION			
Flood Depth (ft)	Percent (%)	Damage Value (\$)		Percent (%)	Damage Value (\$)		
-2	6	10,851.42		0	0		
-1	9	16,277.0		0	0		
0	11	19,894.27		0	0		
1	17	30,743.69		0	0		
2	22	38,788.54		11	19,894.27		
3	28	50,639.96		17	30,743.69		
4	33	59,682.81		22	38,788.54		
5	39	70,534.23		28	50,639.96		
6	44	79,577.08		33	59,682.81		
7	49	88,619.93		39	70,534.23		
8	55	99,471.35		44	79,577.08		
9	61	110,322.77		49	88,619.93		
10	64	116,748.48		55	99,471.35		
11	71	128,408.47		61	110,322.77		
12	76	137,451.32		64	116,748.48		
13	78	141,068.46		71	128,408.47		
14	79	142,877.03		76	137,451.32		
15	79	142,877.03		78	141,068.46		
16	87	157,345.59		79	142,877.03		

Displacement Costs Avoided
Elevation @ 59 Creamery Rd, East Haddam, Connecticut, 06423

Lodging Per Diem:	\$110	Use Default:Yes
Meals Per Diem:	\$68	Use Default:Yes
Population Affected:	0	
Duration of Displacement (days):	365	Use Default:Yes
Total Residential Displacement Cost:	\$0	
Expected Annual Losses due to Displacement Damages before mitigation:	\$0	
Expected Annual Losses due to Displacement Damages after Mitigation:	\$0	
Expected Annual Losses - Displacement:	\$0	

Depth Damage Curve - Displacement
Elevation @ 59 Creamery Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION		AFTER MITIGATION	
	Days	Damage Value (\$)	Days	Damage Value (\$)
-2	0	0	0	0
-1	0	0	0	0
0	0	0	0	0
1	45	0	0	0
2	90	0	0	0
3	135	0	45	0
4	180	0	90	0
5	225	0	135	0
6	270	0	180	0
7	315	0	225	0
8	360	0	270	0
9	405	0	315	0
10	450	0	360	0
11	495	0	405	0
12	540	0	450	0
13	585	0	495	0
14	630	0	540	0
15	675	0	585	0
16	720	0	630	0

Street Maintenance Costs Avoided
Elevation @ 59 Creamery Rd, East Haddam, Connecticut, 06423

Total Annual Street Maintenance Budget:	\$0
Total Number of Street Miles Maintained:	0
Street Miles that will not require future maintenance:	0
Expected Annual Benefits - Street Maintenance:	\$0

Volunteer Costs Avoided
Elevation @ 59 Creamery Rd, East Haddam, Connecticut, 06423

Number of Volunteers (volunteers/event):	0
Number of Days of Lodging:	0
Expected Annual Volunteer Benefits:	\$0

Benefits-Costs Summary
Elevation @ 59 Creamery Rd, East Haddam, Connecticut, 06423

Discount Rate (%):	7.0%	Use Default:Yes
Total Project Benefits:	\$271,305	
Total Project Cost:	\$362,000	
Benefit-Cost Ratio:	0.75	

Property Configuration

Property Title:	Floodplain and Stream Restoration @ 20 Norwich Rd, East Haddam, Connecticut, 06423
Property Location:	06423, Middlesex, Connecticut
Property Coordinates:	41.45476900574508, -72.45860302469629
Hazard Type:	Riverine Flood
Mitigation Action Type:	Floodplain and Stream Restoration
Property Type:	Non-Residential Building
Analysis Method Type:	Modeled Damages

Cost Estimation
Floodplain and Stream Restoration @ 20 Norwich Rd, East Haddam, Connecticut, 06423

Discount Rate (%):	7.0%	Use Default:Yes
Project Useful Life (years):	30	
Project Cost:	\$0	
Number of Maintenance Years:	30	Use Default:Yes
Annual Maintenance Cost:	\$0	

Comments

-

Project Useful Life:
Default PUL for Floodplain and Stream Restoration.

-

Mitigation Project Cost:
Costs not included in this entry.

-

Annual Maintenance Cost:
Costs not included in this entry.

Hazard Probabilities Parameters - Flood
Floodplain and Stream Restoration @ 20 Norwich Rd, East Haddam, Connecticut, 06423

Lowest Floor Elevation of the Property (ft):	35.95
Streambed Elevation at the Property Location (ft):	29
Use Default Recurrence Intervals:	Use Default:Yes

Comments

-

Lowest Floor Elevation:
Based on record drawing prepared by Fuss & O'Neill Inc. dated 12/08/2003.

-

Streambed Elevation:
Based on CT ECO 2016 Lidar DEM.

Discharge
Floodplain and Stream Restoration @ 20 Norwich Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION			
Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)	
10	37.78	533	
50	38.22	971	
100	38.59	1188	
500	42.75	1884	

AFTER MITIGATION			
Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)	
10	38.29	533	
50	34.75	971	
100	34.78	1188	
500	37.88	1884	

Estimated Annual Damages by Category
Floodplain and Stream Restoration @ 20 Norwich Rd, East Haddam, Connecticut, 06423

Before Mitigation						
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)	
-2.75	1	\$ 0	\$ 0	\$ 0	\$ 0	
-2	138	\$ 0	\$ 0	\$ 0	\$ 0	
-1.15	2	\$ 0	\$ 0	\$ 0	\$ 0	
0	4.08	\$ 0	\$ 0	\$ 0	\$ 0	
0.28	5	\$ 3,902	\$ 398	\$ 0	\$ 0	
0.89	8	\$ 2,649	\$ 293	\$ 0	\$ 0	
1.59	1006	\$ 6,046	\$ 636	\$ 0	\$ 0	
1.98	20	\$ 2,998	\$ 254	\$ 0	\$ 0	
2.44	30	\$ 1,636	\$ 141	\$ 0	\$ 0	
2.75	40	\$ 1,027	\$ 90	\$ 0	\$ 0	
2.89	49.85	\$ 738	\$ 64	\$ 0	\$ 0	
3.19	60	\$ 539	\$ 46	\$ 0	\$ 0	
3.35	70	\$ 447	\$ 36	\$ 0	\$ 0	
3.5	80	\$ 333	\$ 28	\$ 0	\$ 0	
3.62	90	\$ 168	\$ 14	\$ 0	\$ 0	
3.69	95.93	\$ 1,408	\$ 176	\$ 0	\$ 0	
4.45	200	\$ 466	\$ 38	\$ 0	\$ 0	
4.87	300	\$ 341	\$ 19	\$ 0	\$ 0	
5.17	400	\$ 191	\$ 15	\$ 0	\$ 0	
5.47	537.72	\$ 1,485	\$ 89	\$ 0	\$ 0	
Total (\$)		\$ 25,164	\$ 2,238	\$ 0	\$ 0	

After Mitigation						
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)	
-6.23	1	\$ 0	\$ 0	\$ 0	\$ 0	
-5.4	2	\$ 0	\$ 0	\$ 0	\$ 0	
-4.37	5	\$ 0	\$ 0	\$ 0	\$ 0	
-3.86	8	\$ 0	\$ 0	\$ 0	\$ 0	
-3.6	1006	\$ 0	\$ 0	\$ 0	\$ 0	
-2.78	20	\$ 0	\$ 0	\$ 0	\$ 0	
-2.28	30	\$ 0	\$ 0	\$ 0	\$ 0	
-2	37.92	\$ 0	\$ 0	\$ 0	\$ 0	
-1.93	40	\$ 0	\$ 0	\$ 0	\$ 0	
-1.64	49.85	\$ 0	\$ 0	\$ 0	\$ 0	
-1.38	60	\$ 0	\$ 0	\$ 0	\$ 0	
-1.19	70	\$ 0	\$ 0	\$ 0	\$ 0	
-0.99	80	\$ 0	\$ 0	\$ 0	\$ 0	
-0.84	90	\$ 0	\$ 0	\$ 0	\$ 0	
-0.74	95.93	\$ 0	\$ 0	\$ 0	\$ 0	
0	162.12	\$ 0	\$ 0	\$ 0	\$ 0	
0.31	200	\$ 94	\$ 10	\$ 0	\$ 0	
0.94	300	\$ 94	\$ 9	\$ 0	\$ 0	
1.39	400	\$ 94	\$ 8	\$ 0	\$ 0	
1.88	537.72	\$ 1,485	\$ 89	\$ 0	\$ 0	
Total (\$)		\$ 1,766	\$ 176	\$ 0	\$ 0	

Building Information
Floodplain and Stream Restoration @ 20 Norwich Rd, East Haddam, Connecticut, 06423

Non-Residential Occupancy Type:	EDU: Education - Schools/Libraries
Building is outside hundred-year flood area:	No
Building Type:	Schools
Building Is Engineered:	Yes
NFIP:	No

Comments

-

Structure Type:
The "School" building type matches closest with the use of 20 Norwich Road. The building contains a library with viewing and listening equipment and a costume shop.

-

Outside Hundred-Year Flood Zone:
Based on the 2024 Kleinfelder H&H Study of Succor Brook.

-

Is Engineered:
The building was previously used for manufacturing and is therefore assumed to be engineered.

-

Has NFIP:
The default value for this input is "No".

Building Damages
Floodplain and Stream Restoration @ 20 Norwich Rd, East Haddam, Connecticut, 06423

Depth Damage Curve:	Schools (Default)	Use Default: Yes
Building Size (sq ft):	13,156	
Building Replacement Value (BRV) (\$/sq ft):	\$96	Use Default: No
Demolition Threshold (%):	50.00%	Use Default: Yes
Expected Annual Losses due to Building Damages before Mitigation:	\$25,164	
Expected Annual Losses due to Building Damages after Mitigation:	\$1,766	
Expected Annual Benefits - Building:	\$23,398	

Comments

-

First Floor Area:
Per Town of East Haddam Assessor's Database.

-

Building Size:
Per Town of East Haddam Assessor's Database.

-

Building Replacement Value:
Calculated based on the First Floor Area and the "replacement cost" for the building listed on the Town of East Haddam Assessor's Database.

Depth Damage Curve - Building
Floodplain and Stream Restoration @ 20 Norwich Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION				AFTER MITIGATION			
	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)
-2	0	0	0	0	0	0	0	0
-1	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
1	13	103,895.77	0	0	13	103,895.77	0	0
2	215	171,695.32	0	0	215	171,695.32	0	0
3	287	213,221.63	0	0	287	213,221.63	0	0
4	32.7	261,156.61	0	0	32.7	261,156.61	0	0
5	36.2	289,087.01	0	0	36.2	289,087.01	0	0
6	39.7	317,037.41	0	0	39.7	317,037.41	0	0
7	41.6	332,210.49	0	0	41.6	332,210.49	0	0
8	44.5	355,369.39	0	0	44.5	355,369.39	0	0
9	46.4	370,542.47	0	0	46.4	370,542.47	0	0
10	48.5	387,312.71	0	0	48.5	387,312.71	0	0
11	48.5	387,312.71	0	0	48.5	387,312.71	0	0
12	48.5	387,312.71	0	0	48.5	387,312.71	0	0
13	48.5	387,312.71	0	0	48.5	387,312.71	0	0
14	48.5	387,312.71	0	0	48.5	387,312.71	0	0
15	48.5	387,312.71	0	0	48.5	387,312.71	0	0
16	48.5	387,312.71	0	0	48.5	387,312.71	0	0

Contents Damages
Floodplain and Stream Restoration @ 20 Norwich Rd, East Haddam, Connecticut, 06423

Contents Value in Dollars: \$0 Use Default: Yes

Expected Annual Losses due to Contents Damages before Mitigation: \$2,238

Expected Annual Losses due to Contents Damages after Mitigation: \$116

Expected Annual Benefits - Contents: \$2,122

Depth Damage Curve - Contents
Floodplain and Stream Restoration @ 20 Norwich Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION			AFTER MITIGATION		
	Percent (%)	Damage Value (\$)		Percent (%)	Damage Value (\$)	
-2	0	0		0	0	
-1	0	0		0	0	
0	0	0		0	0	
1	22	10,541.29		22	10,541.29	
2	30	14,374.49		30	14,374.49	
3	39	18,686.84		39	18,686.84	
4	45	21,561.73		45	21,561.73	
5	48	22,999.18		48	22,999.18	
6	52	24,915.78		52	24,915.78	
7	56	26,832.38		56	26,832.38	
8	59	28,269.83		59	28,269.83	
9	61	29,228.13		61	29,228.13	
10	63	30,186.43		63	30,186.43	
11	63	30,186.43		63	30,186.43	
12	63	30,186.43		63	30,186.43	
13	63	30,186.43		63	30,186.43	
14	63	30,186.43		63	30,186.43	
15	63	30,186.43		63	30,186.43	
16	63	30,186.43		63	30,186.43	

Displacement Costs Avoided
Floodplain and Stream Restoration @ 20 Norwich Rd, East Haddam, Connecticut, 06423

Monthly Displacement Cost (\$/sq.ft/month): 0 Use Default: No

One-Time Displacement Cost (\$/sq.ft): 0 Use Default: No

Expected Annual Losses due to Displacement Damages before mitigation: \$0

Expected Annual Losses due to Displacement Damages after Mitigation: \$0

Expected Annual Losses - Displacement: \$0

Comments

-

:

No displacement costs were assumed for this building.

-

One-time Displacement Cost:

No displacement costs were assumed for this building.

Depth Damage Curve - Displacement
Floodplain and Stream Restoration @ 20 Norwich Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION		AFTER MITIGATION	
	Days	Damage Value (\$)	Days	Damage Value (\$)
-2	0	0	0	0
-1	0	0	0	0
0	0	0	0	0
1	45	0	45	0
2	90	0	90	0
3	135	0	135	0
4	180	0	180	0
5	225	0	225	0
6	270	0	270	0
7	315	0	315	0
8	360	0	360	0
9	405	0	405	0
10	450	0	450	0
11	450	0	450	0
12	450	0	450	0
13	450	0	450	0
14	450	0	450	0
15	450	0	450	0
16	450	0	450	0

Loss of Function/Loss of Income Avoided
Floodplain and Stream Restoration @ 20 Norwich Rd, East Haddam, Connecticut, 06423

Annual Operating Budget: \$0

Loss of Function/Loss of Income Per Day: \$0

Expected Annual Losses due to Loss of Function/Loss of Income before mitigation: \$0

Expected Annual Losses due to Loss of Function/Loss of Income after mitigation: \$0

Expected Annual Benefits - Loss of Function/Loss of Income Avoided: \$0

Depth Damage Curve - Loss of Function/Loss of Income
Floodplain and Stream Restoration @ 20 Norwich Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION		AFTER MITIGATION	
	Days	Damage Value (\$)	Days	Damage Value (\$)
-2	0	0	0	0
-1	0	0	0	0
0	0	0	0	0
1	45	0	45	0
2	90	0	90	0
3	135	0	135	0
4	180	0	180	0
5	225	0	225	0
6	270	0	270	0
7	315	0	315	0
8	360	0	360	0
9	405	0	405	0
10	450	0	450	0
11	450	0	450	0
12	450	0	450	0
13	450	0	450	0
14	450	0	450	0
15	450	0	450	0
16	450	0	450	0

Volunteer Costs Avoided
Floodplain and Stream Restoration @ 20 Norwich Rd, East Haddam, Connecticut, 06423

Number of Volunteers (volunteers/event):	0
Number of Days of Lodging:	0
Expected Annual Volunteer Benefits:	\$0

Ecosystem Services Losses Avoided
Floodplain and Stream Restoration @ 20 Norwich Rd, East Haddam, Connecticut, 06423

Total Project Area (acres):	0
Percentage of Urban Green Open Space:	0.00%
Percentage of Rural Green Open Space:	0.00%
Percentage of Riparian:	0.00%
Percentage of Coastal Wetlands:	0.00%
Percentage of Inland Wetlands:	0.00%
Percentage of Forests:	0.00%
Percentage of Coral Reefs:	0.00%
Percentage of Shellfish Reefs:	0.00%
Percentage of Beaches and Dunes:	0.00%
Expected Annual Ecosystem Services Benefits:	\$0

Benefits-Costs Summary
Floodplain and Stream Restoration @ 20 Norwich Rd, East Haddam, Connecticut, 06423

Discount Rate (%):	7.0%	Use Default:Yes
Total Project Benefits:	\$316,672	
Total Project Cost:	\$0	
Benefit-Cost Ratio:	0	



Benefit-Cost Calculator
V.6.0 (Build 20250604.2146) | Release Notes

Benefit-Cost Analysis

Project Name: Alternative 2: Remove Rehearsal Studio and Widen Creamery Road Bridge



Map Marker #	Mitigation Title	Property Type	Hazard	Discount Rate (%)	Benefits (B)	Costs (C)	BCR (B/C)
1	Acquisition @ 21 Norwich Rd, East Haddam, Connecticut, 06423		Riverine Flood	7.0	\$ 1,940,358	\$ 1,934,212	1.00
2	Floodplain and Stream Restoration @ 128 Norwich Rd, East Haddam, Connecticut, 06423		Riverine Flood	7.0	\$ 57,872	\$ 0	0.00
3	Floodplain and Stream Restoration @ 12E Norwich Rd, East Haddam, Connecticut, 06423		Riverine Flood	7.0	\$ 7,743	\$ 0	0.00
4	Floodplain and Stream Restoration @ 12K Norwich Rd, East Haddam, Connecticut, 06423		Riverine Flood	7.0	\$ 816	\$ 0	0.00
5	Floodplain and Stream Restoration @ 12F Norwich Rd, East Haddam, Connecticut, 06423		Riverine Flood	7.0	\$ 17,545	\$ 0	0.00
6	Floodplain and Stream Restoration @ 12G Norwich Rd, East Haddam, Connecticut, 06423		Riverine Flood	7.0	\$ 5,185	\$ 0	0.00
7	Floodplain and Stream Restoration @ 12H Norwich Rd, East Haddam, Connecticut, 06423		Riverine Flood	7.0	\$ 130,963	\$ 0	0.00
8	Floodplain and Stream Restoration @ 12I Norwich Rd, East Haddam, Connecticut, 06423		Riverine Flood	7.0	\$ 5,470	\$ 0	0.00
9	Floodplain and Stream Restoration @ 59 Creamery Rd, East Haddam, Connecticut, 06423		Riverine Flood	7.0	\$ 125,243	\$ 1,550,000	0.08
10	Floodplain and Stream Restoration @ 20 Norwich Rd, East Haddam, Connecticut, 06423		Riverine Flood	7.0	\$ 320,134	\$ 0	0.00
11	Floodplain and Stream Restoration @ 12D Norwich Rd, East Haddam, Connecticut, 06423		Riverine Flood	7.0	\$ 122	\$ 0	0.00
TOTAL (SELECTED)					\$ 2,611,451	\$ 3,484,212	0.75
TOTAL					\$ 2,611,451	\$ 3,484,212	0.75

Property Configuration

Property Title:

Acquisition @ 21 Norwich Rd, East Haddam, Connecticut, 06423

Property Location:

06423, Middlesex, Connecticut

Property Coordinates:

41.4551689663638, -72.45005179170229

Hazard Type:

Riverine Flood

Mitigation Action Type:

Acquisition

Property Type:

Non-Residential Building

Analysis Method Type:

Modeled Damages

Cost Estimation

Acquisition @ 21 Norwich Rd, East Haddam, Connecticut, 06423

Discount Rate (%):

7.0%

Use Default:Yes

Project Useful Life (years):

100

Project Cost:

\$1,870,000

Number of Maintenance Years:

100

Use Default:Yes

Annual Maintenance Cost:

\$4,500

Comments

-

Mitigation Project Cost:
Includes existing rehearsal studio removal, channel widening/restoration, and construction of new studio on alternate property owned by Goodspeed.

-

Annual Maintenance Cost:
Assumed maintenance cost of retaining wall segments.

Hazard Probabilities Parameters - Flood

Acquisition @ 21 Norwich Rd, East Haddam, Connecticut, 06423

Lowest Floor Elevation of the Property (ft):

40.7

Streambed Elevation at the Property Location (ft):

33.8

Use Default Recurrence Intervals:

Use Default:Yes

Comments

-

Lowest Floor Elevation:
Based on 2024 survey by Martinez Couch & Associates, LLC (MCA).

-

Streambed Elevation:
Based on 2024 survey by Martinez Couch & Associates, LLC (MCA).

Discharge

Acquisition @ 21 Norwich Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION		
Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)
10	43.19	533
50	44.69	971
100	45.28	1185
500	46.44	1584

AFTER MITIGATION		
Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)
10	43.19	533
50	44.69	971
100	45.28	1185
500	46.44	1584

Estimated Annual Damages by Category
Acquisition @ 21 Norwich Rd, East Haddam, Connecticut, 06423

Before Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-2	0.33	\$ 0	\$ 0	\$ 0	\$ 0
-1.02	1.11	\$ 0	\$ 0	\$ 0	\$ 0
0	152	\$ 0	\$ 0	\$ 0	\$ 0
0.53	2	\$ 34,327	\$ 10,726	\$ 0	\$ 0
1.78	5	\$ 15,966	\$ 6,866	\$ 0	\$ 0
2.29	8	\$ 6,014	\$ 3,304	\$ 0	\$ 0
2.53	1006	\$ 13,154	\$ 7,748	\$ 0	\$ 0
3.18	20	\$ 4,978	\$ 2,938	\$ 0	\$ 0
3.53	30	\$ 2,656	\$ 1,536	\$ 0	\$ 0
3.78	40	\$ 1,645	\$ 939	\$ 0	\$ 0
3.87	4985	\$ 1,564	\$ 658	\$ 0	\$ 0
4.12	60	\$ 834	\$ 469	\$ 0	\$ 0
4.24	70	\$ 635	\$ 355	\$ 0	\$ 0
4.35	80	\$ 501	\$ 279	\$ 0	\$ 0
4.45	90	\$ 250	\$ 139	\$ 0	\$ 0
4.5	11510	\$ 2,056	\$ 1,126	\$ 0	\$ 0
5.06	200	\$ 665	\$ 357	\$ 0	\$ 0
5.38	300	\$ 342	\$ 181	\$ 0	\$ 0
5.59	400	\$ 268	\$ 141	\$ 0	\$ 0
5.81	537.72	\$ 1,971	\$ 493	\$ 0	\$ 0
Total (\$)		\$ 87,527	\$ 48,455	\$ 0	\$ 0

After Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
Total (\$)		\$ 0	\$ 0	\$ 0	\$ 0

Building Information
Acquisition @ 21 Norwich Rd, East Haddam, Connecticut, 06423

Non-Residential Occupancy Type:

COM8: Commercial - Entertainment and Recreation

Building is outside hundred-year flood area:

No

Building Type:

Recreation

Building Is Engineered:

Yes

NFIP:

No

Comments

- Structure Type:**
Per the BCA Toolkit documentation, Recreational building types can include structures such as fitness studios. The rehearsal studio has a large room used for rehearsals of choreography for stage performances, with smaller rooms used for music and line rehearsals, which is similar to a fitness studio.
- Outside Hundred-Year Flood Zone:**
The building is within the 100-year floodplain based on the 2024 Kleinfelder H&H Model.
- Is Engineered:**
The building was formerly a manufacturing facility purpose-built to use water power from Succor Brook. Historic use of the building is documented in the National Register of Historic Places entry for the East Haddam Historic District.
- Has NFIP:**
The default value for this input is "No".

Building Damages
Acquisition @ 21 Norwich Rd, East Haddam, Connecticut, 06423

Depth Damage Curve:

Recreation (Default)

Use Default: Yes

Building Size (sq. ft.):

3,245

Building Replacement Value (BRV) (\$/sq. ft.):

\$327

Use Default: No

Demolition Threshold (%):

50.00%

Use Default: Yes

Expected Annual Losses due to Building Damages before Mitigation:

\$87,527

Expected Annual Losses due to Building Damages after Mitigation:

\$0

Expected Annual Benefits - Building:

\$87,527

Comments

- First Floor Area:**
Based on 2024 survey by Martinez Couch & Associates, LLC (MCA).
- Building Replacement Value:**
Based on RSMeans estimate for building replacement with a one-story brick office building. Office building was chosen as the closest category in RSMeans' database to the rehearsal studio that allowed entry of a 3,245 SF building.

Depth Damage Curve - Building
Acquisition @ 21 Norwich Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION				AFTER MITIGATION			
	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)
-2	0	0	0	0	0	0	0	0
-1	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
1	11.6	106,187.53	0	0	0	0	0	0
2	20.2	214,715.80	0	0	0	0	0	0
3	26	275,594.60	0	0	0	0	0	0
4	32.2	341,313.31	0	0	0	0	0	0
5	36.8	390,072.36	0	0	0	0	0	0
6	40.7	431,491.55	0	0	0	0	0	0
7	43.4	460,030.99	0	0	0	0	0	0
8	47.4	502,430.16	0	0	0	0	0	0
9	49.4	523,629.74	0	0	0	0	0	0
10	51.6	1,059,979.25	0	0	0	0	0	0
11	51.6	1,059,979.25	0	0	0	0	0	0
12	51.6	1,059,979.25	0	0	0	0	0	0
13	51.6	1,059,979.25	0	0	0	0	0	0
14	51.6	1,059,979.25	0	0	0	0	0	0
15	51.6	1,059,979.25	0	0	0	0	0	0
16	51.6	1,059,979.25	0	0	0	0	0	0

Contents Damages
Acquisition @ 21 Norwich Rd, East Haddam, Connecticut, 06423

Contents Value in Dollars:

\$0

Use Default: Yes

Expected Annual Losses due to Contents Damages before Mitigation:

\$48,455

Expected Annual Losses due to Contents Damages after Mitigation:

\$0

Expected Annual Benefits - Contents:

\$48,455

Depth Damage Curve - Contents
Acquisition @ 21 Norwich Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION			AFTER MITIGATION		
Flood Depth (ft)	Percent (%)	Damage Value (\$)	Percent (%)	Damage Value (\$)	
-2	0	0	0	0	
-1	0	0	0	0	
0	0	0	0	0	
1	26	68,898.65	0	0	
2	44	186,587.71	0	0	
3	60	386,946.73	0	0	
4	73	593,446.21	0	0	
5	80	778,995.85	0	0	
6	84	922,595.64	0	0	
7	91	1,241,145.27	0	0	
8	95	2,051,745.07	0	0	
9	95	2,051,745.07	0	0	
10	95	2,051,745.07	0	0	
11	95	2,051,745.07	0	0	
12	95	2,051,745.07	0	0	
13	95	2,051,745.07	0	0	
14	95	2,051,745.07	0	0	
15	95	2,051,745.07	0	0	
16	95	2,051,745.07	0	0	

Displacement Costs Avoided
Acquisition @ 21 Norwich Rd, East Haddam, Connecticut, 06423

Monthly Displacement Cost (\$/sq.ft/month):	☒ Use Default: No
One-Time Displacement Cost (\$/sq.ft):	☐ Use Default: Yes
Expected Annual Losses due to Displacement Damages before mitigation:	\$0
Expected Annual Losses due to Displacement Damages after Mitigation:	\$0
Expected Annual Losses - Displacement:	\$0

Depth Damage Curve - Displacement
Acquisition @ 21 Norwich Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION			AFTER MITIGATION		
Flood Depth (ft)	Days	Damage Value (\$)	Days	Damage Value (\$)	
-2	0	0	0	0	
-1	0	0	0	0	
0	0	0	0	0	
1	45	0	0	0	
2	90	0	0	0	
3	135	0	0	0	
4	180	0	0	0	
5	225	0	0	0	
6	270	0	0	0	
7	315	0	0	0	
8	360	0	0	0	
9	405	0	0	0	
10	450	0	0	0	
11	450	0	0	0	
12	450	0	0	0	
13	450	0	0	0	
14	450	0	0	0	
15	450	0	0	0	
16	450	0	0	0	

Loss of Function/Loss of Income Avoided
Acquisition @ 21 Norwich Rd, East Haddam, Connecticut, 06423

Annual Operating Budget:	\$0
Loss of Function/Loss of Income Per Day:	\$0
Expected Annual Losses due to Loss of Function/Loss of Income before mitigation:	\$0
Expected Annual Losses due to Loss of Function/Loss of Income after mitigation:	\$0
Expected Annual Benefits - Loss of Function/Loss of Income Avoided:	\$0

Depth Damage Curve - Loss of Function/Loss of Income
Acquisition @ 21 Norwich Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION			AFTER MITIGATION		
Flood Depth (ft)	Days	Damage Value (\$)	Days	Damage Value (\$)	
-2	0	0	0	0	
-1	0	0	0	0	
0	0	0	0	0	
1	45	0	0	0	
2	90	0	0	0	
3	135	0	0	0	
4	180	0	0	0	
5	225	0	0	0	
6	270	0	0	0	
7	315	0	0	0	
8	360	0	0	0	
9	405	0	0	0	
10	450	0	0	0	
11	450	0	0	0	
12	450	0	0	0	
13	450	0	0	0	
14	450	0	0	0	
15	450	0	0	0	
16	450	0	0	0	

Volunteer Costs Avoided
Acquisition @ 21 Norwich Rd, East Haddam, Connecticut, 06423

Number of Volunteers (volunteers/event):	0
Number of Days of Lodging:	0
Expected Annual Volunteer Benefits:	\$0

Ecosystem Services Losses Avoided
Acquisition @ 21 Norwich Rd, East Haddam, Connecticut, 06423

Total Project Area (acres):	0
Percentage of Urban Green Open Space:	0.00%
Percentage of Rural Green Open Space:	0.00%
Percentage of Riparian:	0.00%
Percentage of Coastal Wetlands:	0.00%
Percentage of Inland Wetlands:	0.00%
Percentage of Forests:	0.00%
Percentage of Coral Reefs:	0.00%
Percentage of Shellfish Reefs:	0.00%
Percentage of Beaches and Dunes:	0.00%
Expected Annual Ecosystem Services Benefits:	\$0

Benefits-Costs Summary
Acquisition @ 21 Norwich Rd, East Haddam, Connecticut, 06423

Discount Rate (%):	7.0% Use Default: Yes
Total Project Benefits:	\$1,940,358
Total Project Cost:	\$1,934,212
Benefit-Cost Ratio:	1.00

Property Configuration	
Property Title:	Floodplain and Stream Restoration @ 128 Norwich Rd, East Haddam, Connecticut, 06423
Property Location:	06423, Middlesex, Connecticut
Property Coordinates:	41.45438196885874, -72.45918517190287
Hazard Type:	Riverine Flood
Mitigation Action Type:	Floodplain and Stream Restoration
Property Type:	Residential Building
Analysis Method Type:	Modeled Damages

Cost Estimation Floodplain and Stream Restoration @ 128 Norwich Rd, East Haddam, Connecticut, 06423	
Discount Rate (%):	7.0% Use Default:Yes
Project Useful Life (years):	30
Project Cost:	\$0
Number of Maintenance Years:	30 Use Default:Yes
Annual Maintenance Cost:	\$0

Comments

•
Project Useful Life:
Default PUL for Floodplain and Stream Restoration.

•
Mitigation Project Cost:
Costs not included in this entry.

•
Annual Maintenance Cost:
Costs not included in this entry.

Hazard Probabilities Parameters - Flood Floodplain and Stream Restoration @ 128 Norwich Rd, East Haddam, Connecticut, 06423	
Lowest Floor Elevation of the Property (ft):	34.3
Streambed Elevation at the Property Location (ft):	25.5
Use Default Recurrence Intervals:	Use Default:Yes

Comments

•
Lowest Floor Elevation:
Per 2024 MCA survey.

•
Streambed Elevation:
Based on CT ECO 2016 Lidar DEM.

Discharge
Floodplain and Stream Restoration @ 128 Norwich Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION		
Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)
10	32.53	533
50	32.47	971
100	32.56	1188
500	33.06	1884

AFTER MITIGATION		
Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)
10	29.19	533
50	31.47	971
100	32.06	1188
500	32.81	1884

Estimated Annual Damages by Category
Floodplain and Stream Restoration @ 128 Norwich Rd, East Haddam, Connecticut, 06423

Before Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-2.62	1.11	\$ 0	\$ 0	\$ 0	\$ 0
-2.24	2	\$ 0	\$ 0	\$ 0	\$ 0
-2.03	5	\$ 0	\$ 0	\$ 0	\$ 0
-2	5.82	\$ 683	\$ 690	\$ 0	\$ 0
-1.94	8	\$ 389	\$ 384	\$ 0	\$ 0
-1.9	10.06	\$ 787	\$ 799	\$ 0	\$ 0
-1.78	20	\$ 278	\$ 569	\$ 0	\$ 0
-1.72	30	\$ 143	\$ 197	\$ 0	\$ 0
-1.7	40	\$ 86	\$ 83	\$ 0	\$ 0
-1.67	49.85	\$ 60	\$ 57	\$ 0	\$ 0
-1.65	60	\$ 43	\$ 41	\$ 0	\$ 0
-1.62	70	\$ 32	\$ 31	\$ 0	\$ 0
-1.6	80	\$ 25	\$ 24	\$ 0	\$ 0
-1.6	90	\$ 13	\$ 12	\$ 0	\$ 0
-1.58	95.93	\$ 102	\$ 96	\$ 0	\$ 0
-1.51	200	\$ 32	\$ 30	\$ 0	\$ 0
-1.47	300	\$ 16	\$ 15	\$ 0	\$ 0
-1.44	400	\$ 13	\$ 12	\$ 0	\$ 0
-1.41	537.72	\$ 48	\$ 41	\$ 0	\$ 0
0	10070727221194	\$ 0	\$ 0	\$ 0	\$ 0
Total (\$)		\$ 2,762	\$ 2,682	\$ 0	\$ 0

After Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-7.48	1.11	\$ 0	\$ 0	\$ 0	\$ 0
-6.53	2	\$ 0	\$ 0	\$ 0	\$ 0
-5.52	5	\$ 0	\$ 0	\$ 0	\$ 0
-5.06	8	\$ 0	\$ 0	\$ 0	\$ 0
-4.85	10.06	\$ 0	\$ 0	\$ 0	\$ 0
-4.17	30	\$ 0	\$ 0	\$ 0	\$ 0
-3.78	30	\$ 0	\$ 0	\$ 0	\$ 0
-3.49	40	\$ 0	\$ 0	\$ 0	\$ 0
-3.3	49.85	\$ 0	\$ 0	\$ 0	\$ 0
-3.12	60	\$ 0	\$ 0	\$ 0	\$ 0
-2.85	70	\$ 0	\$ 0	\$ 0	\$ 0
-2.82	80	\$ 0	\$ 0	\$ 0	\$ 0
-2.7	90	\$ 0	\$ 0	\$ 0	\$ 0
-2.64	95.93	\$ 0	\$ 0	\$ 0	\$ 0
-2	183.51	\$ 7	\$ 7	\$ 0	\$ 0
-1.9	200	\$ 28	\$ 28	\$ 0	\$ 0
-1.49	300	\$ 17	\$ 16	\$ 0	\$ 0
-1.17	400	\$ 15	\$ 14	\$ 0	\$ 0
-0.87	537.72	\$ 30	\$ 25	\$ 0	\$ 0
0	1198.8	\$ 402	\$ 201	\$ 0	\$ 0
Total (\$)		\$ 500	\$ 280	\$ 0	\$ 0

Building Information
Floodplain and Stream Restoration @ 128 Norwich Rd, East Haddam, Connecticut, 06423

Building Type:

Two or More Stories

Foundation Type:

Building Has Basement:

Yes

NFIP:

No

Comments

-

Building Type:
Per field observations.

-

Building has basement:
Per Town of East Haddam Assessor's Database.

-

Has NFIP:
The default value for this input is "No".

Building Damages
Floodplain and Stream Restoration @ 128 Norwich Rd, East Haddam, Connecticut, 06423

Depth Damage Curve:

USACE - Chicago: two story, w/ basement

Use Default:Yes

Building Size (sq.ft):

3,030

Building Replacement Value (BRV) (\$/sq.ft):

\$159

Use Default: No

Demolition Threshold (%):

50.00%

Use Default:Yes

Expected Annual Losses due to Building Damages before Mitigation:

\$2,762

Expected Annual Losses due to Building Damages after Mitigation:

\$500

Expected Annual Benefits - Building:

\$2,262

Depth Damage Curve - Building
Floodplain and Stream Restoration @ 128 Norwich Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION					AFTER MITIGATION				
Flood Depth (ft)	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)	
-2	3	14,473.09	0	0	3	14,473.09	0	0	
-1	5	24,121.83	0	0	5	24,121.83	0	0	
0	7	33,770.56	0	0	7	33,770.56	0	0	
1	11	53,068.02	0	0	11	53,068.02	0	0	
2	17	82,014.22	0	0	17	82,014.22	0	0	
3	22	106,136.05	0	0	22	106,136.05	0	0	
4	28	135,082.24	0	0	28	135,082.24	0	0	
5	33	159,204.07	0	0	33	159,204.07	0	0	
6	35	168,852.81	0	0	35	168,852.81	0	0	
7	38	183,325.90	0	0	38	183,325.90	0	0	
8	40	192,974.64	0	0	40	192,974.64	0	0	
9	44	212,272.19	0	0	44	212,272.19	0	0	
10	46	221,920.83	0	0	46	221,920.83	0	0	
11	48	231,569.56	0	0	48	231,569.56	0	0	
12	50	482,436.6	0	0	50	482,436.6	0	0	
13	52	482,436.6	0	0	52	482,436.6	0	0	
14	54	482,436.6	0	0	54	482,436.6	0	0	
15	54	482,436.6	0	0	54	482,436.6	0	0	
16	54	482,436.6	0	0	54	482,436.6	0	0	

Contents Damages
Floodplain and Stream Restoration @ 128 Norwich Rd, East Haddam, Connecticut, 06423

Contents Value in Dollars:

\$0

Use Default:Yes

Utilities Elevated:

No

Expected Annual Losses due to Contents Damages before Mitigation:

\$2,692

Expected Annual Losses due to Contents Damages after Mitigation:

\$290

Expected Annual Benefits - Contents:

\$2,402

Depth Damage Curve - Contents
Floodplain and Stream Restoration @ 128 Norwich Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION			AFTER MITIGATION		
Flood Depth (ft)	Percent (%)	Damage Value (\$)	Percent (%)	Damage Value (\$)	
-2	6	14,473.09	6	14,473.09	
-1	9	21,709.64	9	21,709.64	
0	11	28,514.01	11	28,514.01	
1	17	41,807.11	17	41,807.11	
2	22	53,068.02	22	53,068.02	
3	28	67,541.12	28	67,541.12	
4	33	79,602.03	33	79,602.03	
5	39	94,075.13	39	94,075.13	
6	44	106,136.05	44	106,136.05	
7	49	118,196.96	49	118,196.96	
8	55	132,670.06	55	132,670.06	
9	61	147,143.16	61	147,143.16	
10	64	154,379.71	64	154,379.71	
11	71	171,264.89	71	171,264.89	
12	76	183,325.90	76	183,325.90	
13	78	188,150.27	78	188,150.27	
14	79	190,562.45	79	190,562.45	
15	79	190,562.45	79	190,562.45	
16	87	209,859.52	87	209,859.52	

Displacement Costs Avoided
Floodplain and Stream Restoration @ 128 Norwich Rd, East Haddam, Connecticut, 06423

Lodging Per Diem:

\$110

Use Default:Yes

Meals Per Diem:

\$68

Use Default:Yes

Population Affected:

0

Duration of Displacement (days):

365

Use Default:Yes

Total Residential Displacement Cost:

\$0

Expected Annual Losses due to Displacement Damages before mitigation:

\$0

Expected Annual Losses due to Displacement Damages after Mitigation:

\$0

Expected Annual Losses - Displacement:

\$0

Depth Damage Curve - Displacement
Floodplain and Stream Restoration @ 12B Norwich Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION		AFTER MITIGATION	
	Days	Damage Value (\$)	Days	Damage Value (\$)
-2	0	0	0	0
-1	0	0	0	0
0	0	0	0	0
1	45	0	45	0
2	90	0	90	0
3	135	0	135	0
4	180	0	180	0
5	225	0	225	0
6	270	0	270	0
7	315	0	315	0
8	360	0	360	0
9	405	0	405	0
10	450	0	450	0
11	495	0	495	0
12	540	0	540	0
13	585	0	585	0
14	630	0	630	0
15	675	0	675	0
16	720	0	720	0

Street Maintenance Costs Avoided
Floodplain and Stream Restoration @ 12B Norwich Rd, East Haddam, Connecticut, 06423

Total Annual Street Maintenance Budget:	\$0
Total Number of Street Miles Maintained:	0
Street Miles that will not require future maintenance:	0
Expected Annual Benefits - Street Maintenance:	\$0

Volunteer Costs Avoided
Floodplain and Stream Restoration @ 12B Norwich Rd, East Haddam, Connecticut, 06423

Number of Volunteers (volunteers/event):	0
Number of Days of Lodging:	0
Expected Annual Volunteer Benefits:	\$0

Ecosystem Services Losses Avoided
Floodplain and Stream Restoration @ 12B Norwich Rd, East Haddam, Connecticut, 06423

Total Project Area (acres):	0
Percentage of Urban Green Open Space:	0.00%
Percentage of Rural Green Open Space:	0.00%
Percentage of Riparian:	0.00%
Percentage of Coastal Wetlands:	0.00%
Percentage of Inland Wetlands:	0.00%
Percentage of Forests:	0.00%
Percentage of Coral Reefs:	0.00%
Percentage of Shellfish Reefs:	0.00%
Percentage of Beaches and Dunes:	0.00%
Expected Annual Ecosystem Services Benefits:	\$0

Benefits-Costs Summary
Floodplain and Stream Restoration @ 12B Norwich Rd, East Haddam, Connecticut, 06423

Discount Rate (%):	7.0% Use Default:Yes
Total Project Benefits:	\$57,872
Total Project Cost:	\$0
Benefit-Cost Ratio:	0

Property Configuration

Property Title:	Floodplain and Stream Restoration @ 12E Norwich Rd, East Haddam, Connecticut, 06423
Property Location:	06423, Middlesex, Connecticut
Property Coordinates:	41.45438196885874, -72.45918517190287
Hazard Type:	Riverine Flood
Mitigation Action Type:	Floodplain and Stream Restoration
Property Type:	Residential Building
Analysis Method Type:	Modeled Damages

Cost Estimation
Floodplain and Stream Restoration @ 12E Norwich Rd, East Haddam, Connecticut, 06423

Discount Rate (%):	7.0% Use Default:Yes
Project Useful Life (years):	30
Project Cost:	\$0
Number of Maintenance Years:	30 Use Default:Yes
Annual Maintenance Cost:	\$0

Hazard Probabilities Parameters - Flood
Floodplain and Stream Restoration @ 12E Norwich Rd, East Haddam, Connecticut, 06423

Lowest Floor Elevation of the Property (ft):	27.1
Streambed Elevation at the Property Location (ft):	15.1
Use Default Recurrence Intervals:	Use Default:Yes

Discharge
Floodplain and Stream Restoration @ 12E Norwich Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION		
Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)
10	24.97	533
50	25.34	971
100	25.5	1189
500	25.88	1884

AFTER MITIGATION		
Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)
10	19.82	533
50	23.44	971
100	24.03	1189
500	25.25	1884

Estimated Annual Damages by Category
Floodplain and Stream Restoration @ 12E Norwich Rd, East Haddam, Connecticut, 06423

Before Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-3.43	1	\$ 0	\$ 0	\$ 0	\$ 0
-2.8	2	\$ 0	\$ 0	\$ 0	\$ 0
-2.38	5	\$ 0	\$ 0	\$ 0	\$ 0
-2.22	8	\$ 0	\$ 0	\$ 0	\$ 0
-2.15	10	\$ 0	\$ 0	\$ 0	\$ 0
-2	16.95	\$ 80	\$ 80	\$ 0	\$ 0
-1.94	20	\$ 156	\$ 153	\$ 0	\$ 0
-1.85	30	\$ 82	\$ 80	\$ 0	\$ 0
-1.78	40	\$ 50	\$ 49	\$ 0	\$ 0
-1.73	49.85	\$ 36	\$ 34	\$ 0	\$ 0
-1.67	60	\$ 25	\$ 24	\$ 0	\$ 0
-1.65	70	\$ 19	\$ 18	\$ 0	\$ 0
-1.62	80	\$ 15	\$ 15	\$ 0	\$ 0
-1.58	90	\$ 8	\$ 7	\$ 0	\$ 0
-1.58	95.93	\$ 63	\$ 59	\$ 0	\$ 0
-1.43	200	\$ 21	\$ 19	\$ 0	\$ 0
-1.35	300	\$ 11	\$ 10	\$ 0	\$ 0
-1.28	400	\$ 8	\$ 8	\$ 0	\$ 0
-1.24	537.72	\$ 31	\$ 26	\$ 0	\$ 0
0	2249453.13	\$ 0	\$ 0	\$ 0	\$ 0
Total (\$)		\$ 605	\$ 582	\$ 0	\$ 0

After Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-10.5	1	\$ 0	\$ 0	\$ 0	\$ 0
-9.23	2	\$ 0	\$ 0	\$ 0	\$ 0
-7.85	5	\$ 0	\$ 0	\$ 0	\$ 0
-7.17	8	\$ 0	\$ 0	\$ 0	\$ 0
-5.85	10.06	\$ 0	\$ 0	\$ 0	\$ 0
-5.88	20	\$ 0	\$ 0	\$ 0	\$ 0
-5.3	30	\$ 0	\$ 0	\$ 0	\$ 0
-4.9	40	\$ 0	\$ 0	\$ 0	\$ 0
-4.56	49.85	\$ 0	\$ 0	\$ 0	\$ 0
-4.29	60	\$ 0	\$ 0	\$ 0	\$ 0
-4.06	70	\$ 0	\$ 0	\$ 0	\$ 0
-3.87	80	\$ 0	\$ 0	\$ 0	\$ 0
-3.88	90	\$ 0	\$ 0	\$ 0	\$ 0
-3.58	95.93	\$ 0	\$ 0	\$ 0	\$ 0
-2.44	200	\$ 0	\$ 0	\$ 0	\$ 0
-2	266.57	\$ 4	\$ 4	\$ 0	\$ 0
-1.79	300	\$ 9	\$ 9	\$ 0	\$ 0
-1.32	400	\$ 9	\$ 8	\$ 0	\$ 0
-0.83	537.72	\$ 13	\$ 11	\$ 0	\$ 0
0	483.53	\$ 331	\$ 366	\$ 0	\$ 0
Total (\$)		\$ 366	\$ 387	\$ 0	\$ 0

Building Information
Floodplain and Stream Restoration @ 12E Norwich Rd, East Haddam, Connecticut, 06423

Building Type:	Two or More Stories
Foundation Type:	
Building Has Basement:	Yes
NFIP:	No

Building Damages
Floodplain and Stream Restoration @ 12E Norwich Rd, East Haddam, Connecticut, 06423

Depth Damage Curve:	USACE - Chicago: two story, w/ basement	Use Default:Yes
Building Size (sq.ft):	1436	
Building Replacement Value (BRV) (\$/sq.ft):	\$205	Use Default: No
Demolition Threshold (%):	50.00%	Use Default:Yes
Expected Annual Losses due to Building Damages before Mitigation:	\$605	
Expected Annual Losses due to Building Damages after Mitigation:	\$366	
Expected Annual Benefits - Building:	\$239	

Depth Damage Curve - Building
Floodplain and Stream Restoration @ 12E Norwich Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION						AFTER MITIGATION					
Flood Depth (ft)	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)		Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)		
-2	3	8,774.60	0	0		3	8,774.60	0	0		
-4	5	14,624.34	0	0		5	14,624.34	0	0		
0	7	20,474.08	0	0		7	20,474.08	0	0		
1	11	32,173.55	0	0		11	32,173.55	0	0		
2	17	49,722.76	0	0		17	49,722.76	0	0		
3	22	64,347.30	0	0		22	64,347.30	0	0		
4	28	81,896.32	0	0		28	81,896.32	0	0		
5	33	96,320.66	0	0		33	96,320.66	0	0		
6	35	102,370.40	0	0		35	102,370.40	0	0		
7	38	111,345.00	0	0		38	111,345.00	0	0		
8	40	116,994.74	0	0		40	116,994.74	0	0		
9	44	128,694.21	0	0		44	128,694.21	0	0		
10	46	134,543.95	0	0		46	134,543.95	0	0		
11	48	140,393.69	0	0		48	140,393.69	0	0		
12	50	146,243.43	0	0		50	146,243.43	0	0		
13	52	152,093.17	0	0		52	152,093.17	0	0		
14	54	157,942.91	0	0		54	157,942.91	0	0		
15	54	157,942.91	0	0		54	157,942.91	0	0		
16	54	157,942.91	0	0		54	157,942.91	0	0		

Contents Damages
Floodplain and Stream Restoration @ 12E Norwich Rd, East Haddam, Connecticut, 06423

Contents Value in Dollars:	\$0	Use Default:Yes
Utilities Elevated:	No	
Expected Annual Losses due to Contents Damages before Mitigation:	\$582	
Expected Annual Losses due to Contents Damages after Mitigation:	\$197	
Expected Annual Benefits - Contents:	\$385	

Depth Damage Curve - Contents
Floodplain and Stream Restoration @ 12E Norwich Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION			AFTER MITIGATION		
	Percent (%)	Damage Value (\$)		Percent (%)	Damage Value (\$)	
-2	6	8,774.60		6	8,774.60	
-1	9	13,901.90		9	13,901.90	
0	11	16,086.77		11	16,086.77	
1	17	24,803.38		17	24,803.38	
2	22	32,173.55		22	32,173.55	
3	28	40,948.16		28	40,948.16	
4	33	48,260.33		33	48,260.33	
5	39	57,034.93		39	57,034.93	
6	44	64,347.10		44	64,347.10	
7	49	71,659.28		49	71,659.28	
8	55	80,433.88		55	80,433.88	
9	61	89,208.49		61	89,208.49	
10	64	93,595.79		64	93,595.79	
11	71	103,882.83		71	103,882.83	
12	76	111,145.00		76	111,145.00	
13	78	114,069.87		78	114,069.87	
14	79	115,532.30		79	115,532.30	
15	79	115,532.30		79	115,532.30	
16	87	127,231.78		87	127,231.78	

Displacement Costs Avoided
Floodplain and Stream Restoration @ 12E Norwich Rd, East Haddam, Connecticut, 06423

Lodging Per Diem:	\$110	Use Default:Yes
Meals Per Diem:	\$68	Use Default:Yes
Population Affected:	0	
Duration of Displacement (days):	365	Use Default:Yes
Total Residential Displacement Cost:	\$0	
Expected Annual Losses due to Displacement Damages before mitigation:	\$0	
Expected Annual Losses due to Displacement Damages after Mitigation:	\$0	
Expected Annual Losses - Displacement:	\$0	

Comments

- Number of Building Residents:
Building has two units.

Depth Damage Curve - Displacement
Floodplain and Stream Restoration @ 12E Norwich Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION			AFTER MITIGATION		
	Days	Damage Value (\$)		Days	Damage Value (\$)	
-2	0	0		0	0	
-1	0	0		0	0	
0	0	0		0	0	
1	45	0		45	0	
2	90	0		90	0	
3	135	0		135	0	
4	180	0		180	0	
5	225	0		225	0	
6	270	0		270	0	
7	315	0		315	0	
8	360	0		360	0	
9	405	0		405	0	
10	450	0		450	0	
11	495	0		495	0	
12	540	0		540	0	
13	585	0		585	0	
14	630	0		630	0	
15	675	0		675	0	
16	720	0		720	0	

Street Maintenance Costs Avoided
Floodplain and Stream Restoration @ 12E Norwich Rd, East Haddam, Connecticut, 06423

Total Annual Street Maintenance Budget:	\$0
Total Number of Street Miles Maintained:	0
Street Miles that will not require future maintenance:	0
Expected Annual Benefits - Street Maintenance:	\$0

Volunteer Costs Avoided
Floodplain and Stream Restoration @ 12E Norwich Rd, East Haddam, Connecticut, 06423

Number of Volunteers (volunteers/event):	0
Number of Days of Lodging:	0
Expected Annual Volunteer Benefits:	\$0

Ecosystem Services Losses Avoided
Floodplain and Stream Restoration @ 12E Norwich Rd, East Haddam, Connecticut, 06423

Total Project Area (acres):	0
Percentage of Urban Green Open Space:	0.00%
Percentage of Rural Green Open Space:	0.00%
Percentage of Riparian:	0.00%
Percentage of Coastal Wetlands:	0.00%
Percentage of Inland Wetlands:	0.00%
Percentage of Forests:	0.00%
Percentage of Coral Reefs:	0.00%
Percentage of Shellfish Reefs:	0.00%
Percentage of Beaches and Dunes:	0.00%
Expected Annual Ecosystem Services Benefits:	\$0

Benefits-Costs Summary
Floodplain and Stream Restoration @ 12E Norwich Rd, East Haddam, Connecticut, 06423

Discount Rate (%):	7.0%	Use Default:Yes
Total Project Benefits:	\$7,743	
Total Project Cost:	\$0	
Benefit-Cost Ratio:	0	

Property Configuration

Property Title:

Floodplain and Stream Restoration @ 12K Norwich Rd, East Haddam, Connecticut, 06423

Property Location:

06423, Middlesex, Connecticut

Property Coordinates:

41.45438196885874, -72.45918517190287

Hazard Type:

Riverine Flood

Mitigation Action Type:

Floodplain and Stream Restoration

Property Type:

Non-Residential Building

Analysis Method Type:

Modeled Damages

Cost Estimation

Floodplain and Stream Restoration @ 12K Norwich Rd, East Haddam, Connecticut, 06423

Discount Rate (%):

7.0%

Use Default:Yes

Project Useful Life (years):

30

Project Cost:

\$0

Number of Maintenance Years:

30

Use Default:Yes

Annual Maintenance Cost:

\$0

Hazard Probabilities Parameters - Flood

Floodplain and Stream Restoration @ 12K Norwich Rd, East Haddam, Connecticut, 06423

Lowest Floor Elevation of the Property (ft):

21.6

Streambed Elevation at the Property Location (ft):

12.3

Use Default Recurrence Intervals:

Use Default:Yes

Discharge

Floodplain and Stream Restoration @ 12K Norwich Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION		
Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)
10	21.19	533
50	21.72	971
100	21.78	1188
500	21.81	1884

AFTER MITIGATION		
Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)
10	15.74	533
50	18.1	971
100	20.58	1188
500	23.72	1884

Estimated Annual Damages by Category

Floodplain and Stream Restoration @ 12K Norwich Rd, East Haddam, Connecticut, 06423

Before Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-2	0.33	\$0	\$0	\$0	\$0
-1.23	1.11	\$0	\$0	\$0	\$0
-0.79	2	\$0	\$0	\$0	\$0
-0.48	5	\$0	\$0	\$0	\$0
-0.36	8	\$0	\$0	\$0	\$0
-0.31	10.06	\$0	\$0	\$0	\$0
-0.17	20	\$0	\$0	\$0	\$0
-0.08	30	\$0	\$0	\$0	\$0
-0.03	40	\$0	\$0	\$0	\$0
-0.01	49.85	\$0	\$0	\$0	\$0
0	53.74	\$0	\$0	\$0	\$0
0.02	60	\$1	\$1	\$5	\$0
0.04	70	\$1	\$1	\$4	\$0
0.06	80	\$1	\$1	\$3	\$0
0.08	90	\$1	\$1	\$2	\$0
0.09	95.93	\$18	\$9	\$12	\$0
0.2	200	\$8	\$4	\$4	\$0
0.25	300	\$3	\$2	\$2	\$0
0.29	400	\$3	\$2	\$1	\$0
0.33	537.72	\$291	\$93	\$7	\$0
Total (\$)		\$277	\$112	\$40	\$0

After Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-8.62	1.11	\$0	\$0	\$0	\$0
-7.72	2	\$0	\$0	\$0	\$0
-6.58	5	\$0	\$0	\$0	\$0
-5.88	8	\$0	\$0	\$0	\$0
-5.68	10.06	\$0	\$0	\$0	\$0
-4.74	20	\$0	\$0	\$0	\$0
-4.13	30	\$0	\$0	\$0	\$0
-3.7	40	\$0	\$0	\$0	\$0
-3.34	49.85	\$0	\$0	\$0	\$0
-3.04	60	\$0	\$0	\$0	\$0
-2.8	70	\$0	\$0	\$0	\$0
-2.56	80	\$0	\$0	\$0	\$0
-2.36	90	\$0	\$0	\$0	\$0
-2.24	95.93	\$0	\$0	\$0	\$0
-2	111.87	\$0	\$0	\$0	\$0
-0.93	200	\$0	\$0	\$0	\$0
-0.16	300	\$0	\$0	\$0	\$0
0	325.48	\$0	\$0	\$0	\$0
0.42	400	\$6	\$4	\$2	\$0
1.03	537.72	\$291	\$93	\$7	\$0
Total (\$)		\$297	\$97	\$9	\$0

Building Information

Floodplain and Stream Restoration @ 12K Norwich Rd, East Haddam, Connecticut, 06423

Non-Residential Occupancy Type:

IND2: Industrial - Light

Building Type:

Warehouse-Non-Retig

Building Is Engineered:

Yes

NFIP:

No

Building Damages
Floodplain and Stream Restoration @ 12K Norwich Rd, East Haddam, Connecticut, 06423

Depth Damage Curve:	Warehouse, Non-Refrig (Default)	Use Default:Yes
Building Size (sq.ft):	1680	
Building Replacement Value (BRV) (\$/sq.ft):	\$188	Use Default: No
Demolition Threshold (%):	50.00%	Use Default:Yes
Expected Annual Losses due to Building Damages before Mitigation:	\$277	
Expected Annual Losses due to Building Damages after Mitigation:	\$257	
Expected Annual Benefits - Building:	\$20	

Depth Damage Curve - Building
Floodplain and Stream Restoration @ 12K Norwich Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION				AFTER MITIGATION			
	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)
-2	0	0	0	0	0	0	0	0
-1	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
1	10.2	13,778.07	0	0	10.2	13,778.07	0	0
2	16.7	22,558.22	0	0	16.7	22,558.22	0	0
3	20.4	27,556.15	0	0	20.4	27,556.15	0	0
4	25.5	34,445.19	0	0	25.5	34,445.19	0	0
5	28.7	40,788.52	0	0	28.7	40,788.52	0	0
6	32.8	44,305.97	0	0	32.8	44,305.97	0	0
7	35.5	47,953.11	0	0	35.5	47,953.11	0	0
8	39.6	53,491.36	0	0	39.6	53,491.36	0	0
9	42.5	57,408.66	0	0	42.5	57,408.66	0	0
10	44.5	60,710.24	0	0	44.5	60,710.24	0	0
11	44.5	60,710.24	0	0	44.5	60,710.24	0	0
12	44.5	60,710.24	0	0	44.5	60,710.24	0	0
13	44.5	60,710.24	0	0	44.5	60,710.24	0	0
14	44.5	60,710.24	0	0	44.5	60,710.24	0	0
15	44.5	60,710.24	0	0	44.5	60,710.24	0	0
16	44.5	60,710.24	0	0	44.5	60,710.24	0	0

Contents Damages
Floodplain and Stream Restoration @ 12K Norwich Rd, East Haddam, Connecticut, 06423

Contents Value in Dollars:	\$0	Use Default:Yes
Expected Annual Losses due to Contents Damages before Mitigation:	\$112	
Expected Annual Losses due to Contents Damages after Mitigation:	\$97	
Expected Annual Benefits - Contents:	\$15	

Depth Damage Curve - Contents
Floodplain and Stream Restoration @ 12K Norwich Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION			AFTER MITIGATION		
	Percent (%)	Damage Value (\$)		Percent (%)	Damage Value (\$)	
-2	0	0		0	0	
-1	0	0		0	0	
0	0	0		0	0	
1	21	10,495.65		21	10,495.65	
2	34	16,992.96		34	16,992.96	
3	47	23,490.27		47	23,490.27	
4	57	28,488.20		57	28,488.20	
5	66	32,896.34		66	32,896.34	
6	74	36,884.68		74	36,884.68	
7	81	40,483.23		81	40,483.23	
8	88	43,981.78		88	43,981.78	
9	92	45,980.95		92	45,980.95	
10	94	46,980.54		94	46,980.54	
11	94	46,980.54		94	46,980.54	
12	94	46,980.54		94	46,980.54	
13	94	46,980.54		94	46,980.54	
14	94	46,980.54		94	46,980.54	
15	94	46,980.54		94	46,980.54	
16	94	46,980.54		94	46,980.54	

Displacement Costs Avoided
Floodplain and Stream Restoration @ 12K Norwich Rd, East Haddam, Connecticut, 06423

Monthly Displacement Cost (\$/sq.ft/month):	0.37	Use Default:Yes
One-Time Displacement Cost (\$/sq.ft):	1.28	Use Default:Yes
Expected Annual Losses due to Displacement Damages before mitigation:	\$40	
Expected Annual Losses due to Displacement Damages after Mitigation:	\$9	
Expected Annual Losses - Displacement:	\$31	

Depth Damage Curve - Displacement
Floodplain and Stream Restoration @ 12K Norwich Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION			AFTER MITIGATION		
	Days	Damage Value (\$)		Days	Damage Value (\$)	
-2	0	0		0	0	
-1	0	0		0	0	
0	0	0		0	0	
1	45	383.17		45	383.17	
2	90	766.35		90	766.35	
3	135	1,149.53		135	1,149.53	
4	180	1,532.71		180	1,532.71	
5	225	1,915.89		225	1,915.89	
6	270	2,299.06		270	2,299.06	
7	315	2,682.24		315	2,682.24	
8	360	3,065.42		360	3,065.42	
9	405	3,448.60		405	3,448.60	
10	450	3,831.78		450	3,831.78	
11	450	3,831.78		450	3,831.78	
12	450	3,831.78		450	3,831.78	
13	450	3,831.78		450	3,831.78	
14	450	3,831.78		450	3,831.78	
15	450	3,831.78		450	3,831.78	
16	450	3,831.78		450	3,831.78	

Loss of Function/Loss of Income Avoided
Floodplain and Stream Restoration @ 12K Norwich Rd, East Haddam, Connecticut, 06423

Annual Operating Budget:	\$0
Loss of Function/Loss of Income Per Day:	\$0
Expected Annual Losses due to Loss of Function/Loss of Income before mitigation:	\$0
Expected Annual Losses due to Loss of Function/Loss of Income after mitigation:	\$0
Expected Annual Benefits - Loss of Function/Loss of Income Avoided:	\$0

Depth Damage Curve - Loss of Function/Loss of Income
Floodplain and Stream Restoration @ 12K Norwich Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION		AFTER MITIGATION	
	Days	Damage Value (\$)	Days	Damage Value (\$)
-2	0	0	0	0
-1	0	0	0	0
0	0	0	0	0
1	48	0	45	0
2	90	0	90	0
3	135	0	135	0
4	180	0	180	0
5	225	0	225	0
6	270	0	270	0
7	315	0	315	0
8	360	0	360	0
9	405	0	405	0
10	450	0	450	0
11	450	0	450	0
12	450	0	450	0
13	450	0	450	0
14	450	0	450	0
15	450	0	450	0
16	450	0	450	0

Volunteer Costs Avoided
Floodplain and Stream Restoration @ 12K Norwich Rd, East Haddam, Connecticut, 06423

Number of Volunteers (volunteers/event):	0
Number of Days of Lodging:	0
Expected Annual Volunteer Benefits:	\$0

Ecosystem Services Losses Avoided
Floodplain and Stream Restoration @ 12K Norwich Rd, East Haddam, Connecticut, 06423

Total Project Area (acres):	0
Percentage of Urban Green Open Space:	0.00%
Percentage of Rural Green Open Space:	0.00%
Percentage of Riparian:	0.00%
Percentage of Coastal Wetlands:	0.00%
Percentage of Inland Wetlands:	0.00%
Percentage of Forests:	0.00%
Percentage of Coral Reefs:	0.00%
Percentage of Shellfish Reefs:	0.00%
Percentage of Beaches and Dunes:	0.00%
Expected Annual Ecosystem Services Benefits:	\$0

Benefits-Costs Summary
Floodplain and Stream Restoration @ 12K Norwich Rd, East Haddam, Connecticut, 06423

Discount Rate (%):	7.0% Use Default:Yes
Total Project Benefits:	\$016
Total Project Cost:	\$0
Benefit-Cost Ratio:	0

Property Configuration

Property Title:	Floodplain and Stream Restoration @ 12F Norwich Rd, East Haddam, Connecticut, 06423
Property Location:	06423, Middlesex, Connecticut
Property Coordinates:	41.45438196885874, -72.45918517190287
Hazard Type:	Riverine Flood
Mitigation Action Type:	Floodplain and Stream Restoration
Property Type:	Residential Building
Analysis Method Type:	Modeled Damages

Cost Estimation
Floodplain and Stream Restoration @ 12F Norwich Rd, East Haddam, Connecticut, 06423

Discount Rate (%):	7.0% Use Default:Yes
Project Useful Life (years):	30
Project Cost:	\$0
Number of Maintenance Years:	30 Use Default:Yes
Annual Maintenance Cost:	\$0

Hazard Probabilities Parameters - Flood
Floodplain and Stream Restoration @ 12F Norwich Rd, East Haddam, Connecticut, 06423

Lowest Floor Elevation of the Property (ft):	26
Streambed Elevation at the Property Location (ft):	13.9
Use Default Recurrence Intervals:	Use Default:Yes

Discharge
Floodplain and Stream Restoration @ 12F Norwich Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION		
Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)
10	23.94	533
50	24.5	971
100	24.69	1189
500	25.09	1884
AFTER MITIGATION		
Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)
10	17.82	533
50	22.31	971
100	23.72	1189
500	24.38	1884

Estimated Annual Damages by Category
Floodplain and Stream Restoration @ 12F Norwich Rd, East Haddam, Connecticut, 06423

Before Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-3.64	1	\$ 0	\$ 0	\$ 0	\$ 0
-2.88	2	\$ 0	\$ 0	\$ 0	\$ 0
-2.34	5	\$ 0	\$ 0	\$ 0	\$ 0
-2.11	8	\$ 0	\$ 0	\$ 0	\$ 0
-2.03	1006	\$ 0	\$ 0	\$ 0	\$ 0
-2	11.38	\$ 525	\$ 518	\$ 0	\$ 0
-1.8	20	\$ 256	\$ 246	\$ 0	\$ 0
-1.84	30	\$ 136	\$ 129	\$ 0	\$ 0
-1.56	40	\$ 84	\$ 79	\$ 0	\$ 0
-1.51	48.85	\$ 59	\$ 56	\$ 0	\$ 0
-1.44	60	\$ 43	\$ 40	\$ 0	\$ 0
-1.4	70	\$ 33	\$ 30	\$ 0	\$ 0
-1.36	80	\$ 26	\$ 24	\$ 0	\$ 0
-1.33	90	\$ 13	\$ 12	\$ 0	\$ 0
-1.31	95.93	\$ 107	\$ 98	\$ 0	\$ 0
-1.13	200	\$ 35	\$ 32	\$ 0	\$ 0
-1.03	300	\$ 18	\$ 16	\$ 0	\$ 0
-0.96	400	\$ 14	\$ 13	\$ 0	\$ 0
-0.89	537.72	\$ 48	\$ 40	\$ 0	\$ 0
0	36997.4	\$ 12	\$ 6	\$ 0	\$ 0
Total (\$)		\$ 1,408	\$ 1,338	\$ 0	\$ 0

After Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-11.39	1	\$ 0	\$ 0	\$ 0	\$ 0
-10.1	2	\$ 0	\$ 0	\$ 0	\$ 0
-8.7	5	\$ 0	\$ 0	\$ 0	\$ 0
-7.99	8	\$ 0	\$ 0	\$ 0	\$ 0
-7.63	1006	\$ 0	\$ 0	\$ 0	\$ 0
-6.48	20	\$ 0	\$ 0	\$ 0	\$ 0
-5.79	30	\$ 0	\$ 0	\$ 0	\$ 0
-5.27	40	\$ 0	\$ 0	\$ 0	\$ 0
-4.86	48.85	\$ 0	\$ 0	\$ 0	\$ 0
-4.51	60	\$ 0	\$ 0	\$ 0	\$ 0
-4.21	70	\$ 0	\$ 0	\$ 0	\$ 0
-3.95	80	\$ 0	\$ 0	\$ 0	\$ 0
-3.7	90	\$ 0	\$ 0	\$ 0	\$ 0
-3.59	95.93	\$ 0	\$ 0	\$ 0	\$ 0
-2.03	200	\$ 0	\$ 0	\$ 0	\$ 0
-2	204.38	\$ 25	\$ 24	\$ 0	\$ 0
-1.13	300	\$ 19	\$ 17	\$ 0	\$ 0
-0.45	400	\$ 13	\$ 10	\$ 0	\$ 0
0	489.57	\$ 6	\$ 5	\$ 0	\$ 0
0.23	537.72	\$ 888	\$ 404	\$ 0	\$ 0
Total (\$)		\$ 872	\$ 480	\$ 0	\$ 0

Building Information
Floodplain and Stream Restoration @ 12F Norwich Rd, East Haddam, Connecticut, 06423

Building Type:	Two or More Stories
Foundation Type:	
Building Has Basement:	Yes
NFIP:	No

Building Damages
Floodplain and Stream Restoration @ 12F Norwich Rd, East Haddam, Connecticut, 06423

Depth Damage Curve:	USACE - Chicago: two story, w/ basement	Use Default:Yes
Building Size (sq.ft):	2,632	
Building Replacement Value (BRV) (\$/sq.ft):	\$165	Use Default: No
Demolition Threshold (%):	50.00%	Use Default:Yes
Expected Annual Losses due to Building Damages before Mitigation:	\$1,408	
Expected Annual Losses due to Building Damages after Mitigation:	\$872	
Expected Annual Benefits - Building:	\$536	

Depth Damage Curve - Building
Floodplain and Stream Restoration @ 12F Norwich Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION						AFTER MITIGATION					
Flood Depth (ft)	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)		Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)		
-2	3	13,036.29	0	0		3	13,036.29	0	0		
-4	5	21,727.16	0	0		5	21,727.16	0	0		
0	7	30,418.02	0	0		7	30,418.02	0	0		
1	11	47,799.75	0	0		11	47,799.75	0	0		
2	17	73,872.34	0	0		17	73,872.34	0	0		
3	22	95,599.50	0	0		22	95,599.50	0	0		
4	28	121,672.89	0	0		28	121,672.09	0	0		
5	33	143,399.25	0	0		33	143,399.25	0	0		
6	35	152,890.12	0	0		35	152,890.12	0	0		
7	38	163,126.41	0	0		38	163,126.41	0	0		
8	40	173,817.28	0	0		40	173,817.28	0	0		
9	44	191,599.00	0	0		44	191,599.00	0	0		
10	46	199,889.87	0	0		46	199,889.87	0	0		
11	48	208,580.73	0	0		48	208,580.73	0	0		
12	50	434,543.2	0	0		50	434,543.2	0	0		
13	52	434,543.2	0	0		52	434,543.2	0	0		
14	54	434,543.2	0	0		54	434,543.2	0	0		
15	54	434,543.2	0	0		54	434,543.2	0	0		
16	54	434,543.2	0	0		54	434,543.2	0	0		

Contents Damages
Floodplain and Stream Restoration @ 12F Norwich Rd, East Haddam, Connecticut, 06423

Contents Value in Dollars:	\$0	Use Default:Yes
Utilities Elevated:	No	
Expected Annual Losses due to Contents Damages before Mitigation:	\$1,338	
Expected Annual Losses due to Contents Damages after Mitigation:	\$460	
Expected Annual Benefits - Contents:	\$877	

Depth Damage Curve - Contents
Floodplain and Stream Restoration @ 12F Norwich Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION			AFTER MITIGATION		
	Percent (%)	Damage Value (\$)		Percent (%)	Damage Value (\$)	
-2	6	13,036.29		6	13,036.29	
-1	9	19,554.44		9	19,554.44	
0	11	23,899.87		11	23,899.87	
1	17	36,936.17		17	36,936.17	
2	22	47,799.75		22	47,799.75	
3	28	60,836.04		28	60,836.04	
4	33	71,699.62		33	71,699.62	
5	39	84,735.92		39	84,735.92	
6	44	95,599.50		44	95,599.50	
7	49	106,463.08		49	106,463.08	
8	55	119,499.38		55	119,499.38	
9	61	132,535.67		61	132,535.67	
10	64	139,053.82		64	139,053.82	
11	71	154,262.83		71	154,262.83	
12	76	163,126.41		76	163,126.41	
13	78	169,473.84		78	169,473.84	
14	79	171,644.56		79	171,644.56	
15	79	171,644.56		79	171,644.56	
16	87	189,026.29		87	189,026.29	

Displacement Costs Avoided
Floodplain and Stream Restoration @ 12F Norwich Rd, East Haddam, Connecticut, 06423

Lodging Per Diem:	\$110	Use Default:Yes
Meals Per Diem:	\$68	Use Default:Yes
Population Affected:	0	
Duration of Displacement (days):	365	Use Default:Yes
Total Residential Displacement Cost:	\$0	
Expected Annual Losses due to Displacement Damages before mitigation:	\$0	
Expected Annual Losses due to Displacement Damages after Mitigation:	\$0	
Expected Annual Losses - Displacement:	\$0	

Comments

- Number of Building Residents:
Building has two units.

Depth Damage Curve - Displacement
Floodplain and Stream Restoration @ 12F Norwich Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION			AFTER MITIGATION		
	Days	Damage Value (\$)		Days	Damage Value (\$)	
-2	0	0		0	0	
-1	0	0		0	0	
0	0	0		0	0	
1	45	0		45	0	
2	90	0		90	0	
3	135	0		135	0	
4	180	0		180	0	
5	225	0		225	0	
6	270	0		270	0	
7	315	0		315	0	
8	360	0		360	0	
9	405	0		405	0	
10	450	0		450	0	
11	495	0		495	0	
12	540	0		540	0	
13	585	0		585	0	
14	630	0		630	0	
15	675	0		675	0	
16	720	0		720	0	

Street Maintenance Costs Avoided
Floodplain and Stream Restoration @ 12F Norwich Rd, East Haddam, Connecticut, 06423

Total Annual Street Maintenance Budget:	\$0
Total Number of Street Miles Maintained:	0
Street Miles that will not require future maintenance:	0
Expected Annual Benefits - Street Maintenance:	\$0

Volunteer Costs Avoided
Floodplain and Stream Restoration @ 12F Norwich Rd, East Haddam, Connecticut, 06423

Number of Volunteers (volunteers/event):	0
Number of Days of Lodging:	0
Expected Annual Volunteer Benefits:	\$0

Ecosystem Services Losses Avoided
Floodplain and Stream Restoration @ 12F Norwich Rd, East Haddam, Connecticut, 06423

Total Project Area (acres):	0
Percentage of Urban Green Open Space:	0.00%
Percentage of Rural Green Open Space:	0.00%
Percentage of Riparian:	0.00%
Percentage of Coastal Wetlands:	0.00%
Percentage of Inland Wetlands:	0.00%
Percentage of Forests:	0.00%
Percentage of Coral Reefs:	0.00%
Percentage of Shellfish Reefs:	0.00%
Percentage of Beaches and Dunes:	0.00%
Expected Annual Ecosystem Services Benefits:	\$0

Benefits-Costs Summary
Floodplain and Stream Restoration @ 12F Norwich Rd, East Haddam, Connecticut, 06423

Discount Rate (%):	7.0%	Use Default:Yes
Total Project Benefits:	\$17,545	
Total Project Cost:	\$0	
Benefit-Cost Ratio:	0	

Property Configuration

Property Title:	Floodplain and Stream Restoration @ 12G Norwich Rd, East Haddam, Connecticut, 06423
Property Location:	06423, Middlesex, Connecticut
Property Coordinates:	41.45438196885874, -72.45918517190287
Hazard Type:	Riverine Flood
Mitigation Action Type:	Floodplain and Stream Restoration
Property Type:	Residential Building
Analysis Method Type:	Modeled Damages

Cost Estimation

Floodplain and Stream Restoration @ 12G Norwich Rd, East Haddam, Connecticut, 06423

Discount Rate (%):	7.0%	Use Default:Yes
Project Useful Life (years):	30	
Project Cost:	\$0	
Number of Maintenance Years:	30	Use Default:Yes
Annual Maintenance Cost:	\$0	

Hazard Probabilities Parameters - Flood

Floodplain and Stream Restoration @ 12G Norwich Rd, East Haddam, Connecticut, 06423

Lowest Floor Elevation of the Property (ft):	25
Streambed Elevation at the Property Location (ft):	13.7
Use Default Recurrence Intervals:	Use Default:Yes

Discharge

Floodplain and Stream Restoration @ 12G Norwich Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION		
Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)
10	22.84	533
50	23.34	971
100	23.5	1188
500	23.81	1884

AFTER MITIGATION		
Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)
10	16.4	533
50	21.13	971
100	21.28	1188
500	23.28	1884

Estimated Annual Damages by Category
Floodplain and Stream Restoration @ 12G Norwich Rd, East Haddam, Connecticut, 06423

Before Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-3.5	111	\$ 0	\$ 0	\$ 0	\$ 0
-2.83	2	\$ 0	\$ 0	\$ 0	\$ 0
-2.36	5	\$ 0	\$ 0	\$ 0	\$ 0
-2.21	8	\$ 0	\$ 0	\$ 0	\$ 0
-2.11	1006	\$ 0	\$ 0	\$ 0	\$ 0
-2	16.64	\$ 119	\$ 119	\$ 0	\$ 0
-1.91	20	\$ 151	\$ 148	\$ 0	\$ 0
-1.8	30	\$ 80	\$ 77	\$ 0	\$ 0
-1.74	40	\$ 49	\$ 47	\$ 0	\$ 0
-1.67	48.85	\$ 35	\$ 33	\$ 0	\$ 0
-1.61	60	\$ 25	\$ 24	\$ 0	\$ 0
-1.6	70	\$ 19	\$ 18	\$ 0	\$ 0
-1.57	80	\$ 15	\$ 14	\$ 0	\$ 0
-1.54	90	\$ 8	\$ 7	\$ 0	\$ 0
-1.51	95.93	\$ 62	\$ 58	\$ 0	\$ 0
-1.36	200	\$ 20	\$ 19	\$ 0	\$ 0
-1.26	300	\$ 10	\$ 10	\$ 0	\$ 0
-1.2	400	\$ 8	\$ 8	\$ 0	\$ 0
-1.14	537.72	\$ 30	\$ 25	\$ 0	\$ 0
0	53730.48	\$ 1	\$ 0	\$ 0	\$ 0
Total (\$)		\$ 633	\$ 607	\$ 0	\$ 0

After Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-10.88	111	\$ 0	\$ 0	\$ 0	\$ 0
-10.15	2	\$ 0	\$ 0	\$ 0	\$ 0
-9.87	5	\$ 0	\$ 0	\$ 0	\$ 0
-8.44	8	\$ 0	\$ 0	\$ 0	\$ 0
-8.14	1006	\$ 0	\$ 0	\$ 0	\$ 0
-7.09	20	\$ 0	\$ 0	\$ 0	\$ 0
-6.43	30	\$ 0	\$ 0	\$ 0	\$ 0
-5.91	40	\$ 0	\$ 0	\$ 0	\$ 0
-5.52	48.85	\$ 0	\$ 0	\$ 0	\$ 0
-5.15	60	\$ 0	\$ 0	\$ 0	\$ 0
-4.86	70	\$ 0	\$ 0	\$ 0	\$ 0
-4.59	80	\$ 0	\$ 0	\$ 0	\$ 0
-4.35	90	\$ 0	\$ 0	\$ 0	\$ 0
-4.2	95.93	\$ 0	\$ 0	\$ 0	\$ 0
-2.57	200	\$ 0	\$ 0	\$ 0	\$ 0
-2	253.61	\$ 6	\$ 6	\$ 0	\$ 0
-1.56	300	\$ 11	\$ 10	\$ 0	\$ 0
-0.82	400	\$ 11	\$ 9	\$ 0	\$ 0
-0.81	537.72	\$ 0	\$ 0	\$ 0	\$ 0
0	543.5	\$ 113	\$ 107	\$ 0	\$ 0
Total (\$)		\$ 141	\$ 101	\$ 0	\$ 0

Building Information
Floodplain and Stream Restoration @ 12G Norwich Rd, East Haddam, Connecticut, 06423

Building Type:	Two or More Stories
Foundation Type:	
Building Has Basement:	Yes
NFIP:	No

Building Damages
Floodplain and Stream Restoration @ 12G Norwich Rd, East Haddam, Connecticut, 06423

Depth Damage Curve:

USACE - Chicago: two story, w/ basement

Use Default:Yes

Building Size (sq.ft):

1426

Building Replacement Value (BRV) (\$/sq.ft):

\$196

Use Default: No

Demolition Threshold (%):

50.00%

Use Default:Yes

Expected Annual Losses due to Building Damages before Mitigation:

\$633

Expected Annual Losses due to Building Damages after Mitigation:

\$541

Expected Annual Benefits - Building:

\$92

Depth Damage Curve - Building
Floodplain and Stream Restoration @ 12G Norwich Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION					AFTER MITIGATION				
Flood Depth (ft)	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)	
-2	3	8,369.05	0	0	3	8,369.05	0	0	
-1	5	13,948.41	0	0	5	13,948.41	0	0	
0	7	18,527.78	0	0	7	18,527.78	0	0	
1	11	30,686.52	0	0	11	30,686.52	0	0	
2	17	47,424.62	0	0	17	47,424.62	0	0	
3	22	61,373.04	0	0	22	61,373.04	0	0	
4	28	78,111.34	0	0	28	78,111.34	0	0	
5	33	90,059.56	0	0	33	90,059.56	0	0	
6	35	97,638.91	0	0	35	97,638.91	0	0	
7	38	106,007.88	0	0	38	106,007.88	0	0	
8	40	111,587.35	0	0	40	111,587.35	0	0	
9	44	122,746.08	0	0	44	122,746.08	0	0	
10	46	128,325.45	0	0	46	128,325.45	0	0	
11	48	133,904.82	0	0	48	133,904.82	0	0	
12	50	178,968.38	0	0	50	178,968.38	0	0	
13	52	278,968.38	0	0	52	278,968.38	0	0	
14	54	278,968.38	0	0	54	278,968.38	0	0	
15	54	278,968.38	0	0	54	278,968.38	0	0	
16	54	278,968.38	0	0	54	278,968.38	0	0	

Contents Damages
Floodplain and Stream Restoration @ 12G Norwich Rd, East Haddam, Connecticut, 06423

Contents Value in Dollars:

\$0

Use Default:Yes

Utilities Elevated:

No

Expected Annual Losses due to Contents Damages before Mitigation:

\$607

Expected Annual Losses due to Contents Damages after Mitigation:

\$281

Expected Annual Benefits - Contents:

\$326

Depth Damage Curve - Contents
Floodplain and Stream Restoration @ 12G Norwich Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION				AFTER MITIGATION			
Flood Depth (ft)	Percent (%)	Damage Value (\$)		Percent (%)	Damage Value (\$)		
-2	6	8,369.05		6	8,369.05		
-1	9	12,553.57		9	12,553.57		
0	11	15,343.26		11	15,343.26		
1	17	23,712.31		17	23,712.31		
2	22	35,686.52		22	35,686.52		
3	28	48,055.57		28	48,055.57		
4	33	46,029.78		33	46,029.78		
5	39	54,398.83		39	54,398.83		
6	44	61,373.04		44	61,373.04		
7	49	68,347.25		49	68,347.25		
8	55	76,716.30		55	76,716.30		
9	61	85,085.35		61	85,085.35		
10	64	89,269.88		64	89,269.88		
11	71	99,033.77		71	99,033.77		
12	76	106,007.88		76	106,007.88		
13	78	108,797.66		78	108,797.66		
14	79	110,192.51		79	110,192.51		
15	79	110,192.51		79	110,192.51		
16	87	121,351.24		87	121,351.24		

Displacement Costs Avoided
Floodplain and Stream Restoration @ 12G Norwich Rd, East Haddam, Connecticut, 06423

Lodging Per Diem:

\$110

Use Default:Yes

Meals Per Diem:

\$68

Use Default:Yes

Population Affected:

0

Duration of Displacement (days):

365

Use Default:Yes

Total Residential Displacement Cost:

\$0

Expected Annual Losses due to Displacement Damages before mitigation:

\$0

Expected Annual Losses due to Displacement Damages after Mitigation:

\$0

Expected Annual Losses - Displacement:

\$0

Comments

-

Number of Building Residents:
Building has two units.

Depth Damage Curve - Displacement Floodplain and Stream Restoration @ 12G Norwich Rd, East Haddam, Connecticut, 06423					
Flood Depth (ft)	BEFORE MITIGATION		AFTER MITIGATION		
	Days	Damage Value (\$)	Days	Damage Value (\$)	
-2	0	0	0	0	
-1	0	0	0	0	
0	0	0	0	0	
1	45	0	45	0	
2	90	0	90	0	
3	135	0	135	0	
4	180	0	180	0	
5	225	0	225	0	
6	270	0	270	0	
7	315	0	315	0	
8	360	0	360	0	
9	405	0	405	0	
10	450	0	450	0	
11	495	0	495	0	
12	540	0	540	0	
13	585	0	585	0	
14	630	0	630	0	
15	675	0	675	0	
16	720	0	720	0	

Street Maintenance Costs Avoided Floodplain and Stream Restoration @ 12G Norwich Rd, East Haddam, Connecticut, 06423	
Total Annual Street Maintenance Budget:	\$0
Total Number of Street Miles Maintained:	0
Street Miles that will not require future maintenance:	0
Expected Annual Benefits - Street Maintenance:	\$0

Volunteer Costs Avoided Floodplain and Stream Restoration @ 12G Norwich Rd, East Haddam, Connecticut, 06423	
Number of Volunteers (volunteers/event):	0
Number of Days of Lodging:	0
Expected Annual Volunteer Benefits:	\$0

Ecosystem Services Losses Avoided Floodplain and Stream Restoration @ 12G Norwich Rd, East Haddam, Connecticut, 06423	
Total Project Area (acres):	0
Percentage of Urban Green Open Space:	0.00%
Percentage of Rural Green Open Space:	0.00%
Percentage of Riparian:	0.00%
Percentage of Coastal Wetlands:	0.00%
Percentage of Inland Wetlands:	0.00%
Percentage of Forests:	0.00%
Percentage of Coral Reefs:	0.00%
Percentage of Shellfish Reefs:	0.00%
Percentage of Beaches and Dunes:	0.00%
Expected Annual Ecosystem Services Benefits:	\$0

Benefits-Costs Summary Floodplain and Stream Restoration @ 12G Norwich Rd, East Haddam, Connecticut, 06423	
Discount Rate (%):	7.0% Use Default:Yes
Total Project Benefits:	\$5,185
Total Project Cost:	\$0
Benefit-Cost Ratio:	0

Property Configuration	
Property Title:	Floodplain and Stream Restoration @ 12H Norwich Rd, East Haddam, Connecticut, 06423
Property Location:	06423, Middlesex, Connecticut
Property Coordinates:	41.45438196885874, -72.45918517190287
Hazard Type:	Riverine Flood
Mitigation Action Type:	Floodplain and Stream Restoration
Property Type:	Residential Building
Analysis Method Type:	Modeled Damages

Cost Estimation Floodplain and Stream Restoration @ 12H Norwich Rd, East Haddam, Connecticut, 06423	
Discount Rate (%):	7.0% Use Default:Yes
Project Useful Life (years):	30
Project Cost:	\$0
Number of Maintenance Years:	30 Use Default:Yes
Annual Maintenance Cost:	\$0

Hazard Probabilities Parameters - Flood Floodplain and Stream Restoration @ 12H Norwich Rd, East Haddam, Connecticut, 06423	
Lowest Floor Elevation of the Property (ft):	23.6
Streambed Elevation at the Property Location (ft):	13.5
Use Default Recurrence Intervals:	Use Default:Yes

Discharge Floodplain and Stream Restoration @ 12H Norwich Rd, East Haddam, Connecticut, 06423		
BEFORE MITIGATION		
Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)
10	21.94	533
50	22.31	971
100	22.44	1188
500	22.53	1884
AFTER MITIGATION		
Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)
10	16.14	533
50	21.34	971
100	21.63	1188
500	22.25	1884

Estimated Annual Damages by Category
Floodplain and Stream Restoration @ 12H Norwich Rd, East Haddam, Connecticut, 06423

Before Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-2.5	1/1	\$ 0	\$ 0	\$ 0	\$ 0
-2.07	2	\$ 0	\$ 0	\$ 0	\$ 0
-2	2.38	\$ 2,884	\$ 2,837	\$ 0	\$ 0
-1.76	5	\$ 1,093	\$ 1,051	\$ 0	\$ 0
-1.65	8	\$ 389	\$ 371	\$ 0	\$ 0
-1.61	10.06	\$ 790	\$ 744	\$ 0	\$ 0
-1.48	20	\$ 280	\$ 261	\$ 0	\$ 0
-1.41	30	\$ 144	\$ 134	\$ 0	\$ 0
-1.36	40	\$ 87	\$ 81	\$ 0	\$ 0
-1.31	48.85	\$ 61	\$ 56	\$ 0	\$ 0
-1.13	60	\$ 43	\$ 40	\$ 0	\$ 0
-1.05	70	\$ 33	\$ 30	\$ 0	\$ 0
-1.04	80	\$ 26	\$ 23	\$ 0	\$ 0
-1.04	90	\$ 13	\$ 12	\$ 0	\$ 0
-1.23	95.93	\$ 103	\$ 94	\$ 0	\$ 0
-1.13	200	\$ 33	\$ 30	\$ 0	\$ 0
-1.06	300	\$ 17	\$ 15	\$ 0	\$ 0
-1.04	400	\$ 13	\$ 12	\$ 0	\$ 0
-1	537.72	\$ 45	\$ 38	\$ 0	\$ 0
0	20994615.02	\$ 0	\$ 0	\$ 0	\$ 0
Total (\$)		\$ 6,054	\$ 5,827	\$ 0	\$ 0

After Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-9.63	1/1	\$ 0	\$ 0	\$ 0	\$ 0
-8.85	2	\$ 0	\$ 0	\$ 0	\$ 0
-7.76	5	\$ 0	\$ 0	\$ 0	\$ 0
-7.16	8	\$ 0	\$ 0	\$ 0	\$ 0
-5.83	10.06	\$ 0	\$ 0	\$ 0	\$ 0
-5.83	20	\$ 0	\$ 0	\$ 0	\$ 0
-5.17	30	\$ 0	\$ 0	\$ 0	\$ 0
-4.68	40	\$ 0	\$ 0	\$ 0	\$ 0
-4.27	48.85	\$ 0	\$ 0	\$ 0	\$ 0
-3.93	60	\$ 0	\$ 0	\$ 0	\$ 0
-3.64	70	\$ 0	\$ 0	\$ 0	\$ 0
-3.38	80	\$ 0	\$ 0	\$ 0	\$ 0
-3.15	90	\$ 0	\$ 0	\$ 0	\$ 0
-3.02	95.93	\$ 0	\$ 0	\$ 0	\$ 0
-2	197.54	\$ 19	\$ 19	\$ 0	\$ 0
-1.47	200	\$ 34	\$ 30	\$ 0	\$ 0
-0.51	300	\$ 17	\$ 14	\$ 0	\$ 0
0	372.78	\$ 5	\$ 4	\$ 0	\$ 0
0.18	400	\$ 24	\$ 19	\$ 0	\$ 0
0.83	537.72	\$ 762	\$ 381	\$ 0	\$ 0
Total (\$)		\$ 881	\$ 486	\$ 0	\$ 0

Building Information
Floodplain and Stream Restoration @ 12H Norwich Rd, East Haddam, Connecticut, 06423

Building Type:	Two or More Stories
Foundation Type:	
Building Has Basement:	Yes
NFIP:	No

Building Damages
Floodplain and Stream Restoration @ 12H Norwich Rd, East Haddam, Connecticut, 06423

Depth Damage Curve:	USACE - Chicago: two story, w/ basement	Use Default:Yes
Building Size (sq.ft):	2,632	
Building Replacement Value (BRV) (\$/sq.ft):	\$156	Use Default: No
Demolition Threshold (%):	50.00%	Use Default:Yes
Expected Annual Losses due to Building Damages before Mitigation:	\$6,054	
Expected Annual Losses due to Building Damages after Mitigation:	\$861	
Expected Annual Benefits - Building:	\$5,193	

Depth Damage Curve - Building
Floodplain and Stream Restoration @ 12H Norwich Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION						AFTER MITIGATION					
Flood Depth (ft)	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)		Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)		
-2	3	12,286.96	0	0		3	12,286.96	0	0		
-4	5	20,478.27	0	0		5	20,478.27	0	0		
0	7	28,669.58	0	0		7	28,669.58	0	0		
1	11	45,052.20	0	0		11	45,052.20	0	0		
2	17	68,626.13	0	0		17	68,626.13	0	0		
3	22	90,104.41	0	0		22	90,104.41	0	0		
4	28	114,678.34	0	0		28	114,678.34	0	0		
5	33	135,156.62	0	0		33	135,156.62	0	0		
6	35	143,347.93	0	0		35	143,347.93	0	0		
7	38	155,634.89	0	0		38	155,634.89	0	0		
8	40	163,826.20	0	0		40	163,826.20	0	0		
9	44	180,208.82	0	0		44	180,208.82	0	0		
10	46	188,400.13	0	0		46	188,400.13	0	0		
11	48	196,591.44	0	0		48	196,591.44	0	0		
12	50	409,565.52	0	0		50	409,565.52	0	0		
13	52	409,565.52	0	0		52	409,565.52	0	0		
14	54	409,565.52	0	0		54	409,565.52	0	0		
15	54	409,565.52	0	0		54	409,565.52	0	0		
16	54	409,565.52	0	0		54	409,565.52	0	0		

Contents Damages
Floodplain and Stream Restoration @ 12H Norwich Rd, East Haddam, Connecticut, 06423

Contents Value in Dollars:	\$0	Use Default:Yes
Utilities Elevated:	No	
Expected Annual Losses due to Contents Damages before Mitigation:	\$5,827	
Expected Annual Losses due to Contents Damages after Mitigation:	\$466	
Expected Annual Benefits - Contents:	\$5,361	

Depth Damage Curve - Contents
Floodplain and Stream Restoration @ 12H Norwich Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION			AFTER MITIGATION		
	Percent (%)	Damage Value (\$)		Percent (%)	Damage Value (\$)	
-2	6	12,286.96		6	12,286.96	
-1	9	18,430.44		9	18,430.44	
0	11	22,526.10		11	22,526.10	
1	17	34,813.06		17	34,813.06	
2	22	45,052.20		22	45,052.20	
3	28	57,339.17		28	57,339.17	
4	33	67,578.31		33	67,578.31	
5	39	79,865.27		39	79,865.27	
6	44	90,104.41		44	90,104.41	
7	49	100,343.55		49	100,343.55	
8	55	110,630.51		55	110,630.51	
9	61	124,917.48		61	124,917.48	
10	64	131,060.96		64	131,060.96	
11	71	145,395.75		71	145,395.75	
12	76	155,634.89		76	155,634.89	
13	78	159,730.55		78	159,730.55	
14	79	161,778.38		79	161,778.38	
15	79	161,778.38		79	161,778.38	
16	87	178,161.00		87	178,161.00	

Displacement Costs Avoided
Floodplain and Stream Restoration @ 12H Norwich Rd, East Haddam, Connecticut, 06423

Lodging Per Diem:	\$110	Use Default:Yes
Meals Per Diem:	\$68	Use Default:Yes
Population Affected:	0	
Duration of Displacement (days):	365	Use Default:Yes
Total Residential Displacement Cost:	\$0	
Expected Annual Losses due to Displacement Damages before mitigation:	\$0	
Expected Annual Losses due to Displacement Damages after Mitigation:	\$0	
Expected Annual Losses - Displacement:	\$0	

Comments

- Number of Building Residents:
Building has two units.

Depth Damage Curve - Displacement
Floodplain and Stream Restoration @ 12H Norwich Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION			AFTER MITIGATION		
	Days	Damage Value (\$)		Days	Damage Value (\$)	
-2	0	0		0	0	
-1	0	0		0	0	
0	0	0		0	0	
1	45	0		45	0	
2	90	0		90	0	
3	135	0		135	0	
4	180	0		180	0	
5	225	0		225	0	
6	270	0		270	0	
7	315	0		315	0	
8	360	0		360	0	
9	405	0		405	0	
10	450	0		450	0	
11	495	0		495	0	
12	540	0		540	0	
13	585	0		585	0	
14	630	0		630	0	
15	675	0		675	0	
16	720	0		720	0	

Street Maintenance Costs Avoided
Floodplain and Stream Restoration @ 12H Norwich Rd, East Haddam, Connecticut, 06423

Total Annual Street Maintenance Budget:	\$0
Total Number of Street Miles Maintained:	0
Street Miles that will not require future maintenance:	0
Expected Annual Benefits - Street Maintenance:	\$0

Volunteer Costs Avoided
Floodplain and Stream Restoration @ 12H Norwich Rd, East Haddam, Connecticut, 06423

Number of Volunteers (volunteers/event):	0
Number of Days of Lodging:	0
Expected Annual Volunteer Benefits:	\$0

Ecosystem Services Losses Avoided
Floodplain and Stream Restoration @ 12H Norwich Rd, East Haddam, Connecticut, 06423

Total Project Area (acres):	0
Percentage of Urban Green Open Space:	0.00%
Percentage of Rural Green Open Space:	0.00%
Percentage of Riparian:	0.00%
Percentage of Coastal Wetlands:	0.00%
Percentage of Inland Wetlands:	0.00%
Percentage of Forests:	0.00%
Percentage of Coral Reefs:	0.00%
Percentage of Shellfish Reefs:	0.00%
Percentage of Beaches and Dunes:	0.00%
Expected Annual Ecosystem Services Benefits:	\$0

Benefits-Costs Summary
Floodplain and Stream Restoration @ 12H Norwich Rd, East Haddam, Connecticut, 06423

Discount Rate (%):	7.0%	Use Default:Yes
Total Project Benefits:	\$130,963	
Total Project Cost:	\$0	
Benefit-Cost Ratio:	0	

Property Configuration

Property Title:

Floodplain and Stream Restoration @ 121 Norwich Rd, East Haddam, Connecticut, 06423

Property Location:

06423, Middlesex, Connecticut

Property Coordinates:

41.45438196885874, -72.45918517190287

Hazard Type:

Riverine Flood

Mitigation Action Type:

Floodplain and Stream Restoration

Property Type:

Residential Building

Analysis Method Type:

Modeled Damages

Cost Estimation

Floodplain and Stream Restoration @ 121 Norwich Rd, East Haddam, Connecticut, 06423

Discount Rate (%):

7.0%

Use Default:Yes

Project Useful Life (years):

30

Project Cost:

\$0

Number of Maintenance Years:

30

Use Default:Yes

Annual Maintenance Cost:

\$0

Hazard Probabilities Parameters - Flood

Floodplain and Stream Restoration @ 121 Norwich Rd, East Haddam, Connecticut, 06423

Lowest Floor Elevation of the Property (ft):

25

Streambed Elevation at the Property Location (ft):

12.7

Use Default Recurrence Intervals:

Use Default:Yes

Discharge

Floodplain and Stream Restoration @ 121 Norwich Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION		
Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)
10	22.78	533
50	23.28	971
100	23.44	1188
500	23.75	1884

AFTER MITIGATION		
Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)
10	15.98	533
50	20.56	971
100	20.72	1188
500	23.25	1884

Estimated Annual Damages by Category
Floodplain and Stream Restoration @ 121 Norwich Rd, East Haddam, Connecticut, 06423

Before Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-3.55	111	\$ 0	\$ 0	\$ 0	\$ 0
-2.91	2	\$ 0	\$ 0	\$ 0	\$ 0
-2.45	5	\$ 0	\$ 0	\$ 0	\$ 0
-2.26	8	\$ 0	\$ 0	\$ 0	\$ 0
-2.18	1006	\$ 0	\$ 0	\$ 0	\$ 0
-2	1818	\$ 27	\$ 28	\$ 0	\$ 0
-1.97	20	\$ 214	\$ 212	\$ 0	\$ 0
-1.86	30	\$ 113	\$ 111	\$ 0	\$ 0
-1.8	40	\$ 70	\$ 68	\$ 0	\$ 0
-1.74	4885	\$ 49	\$ 47	\$ 0	\$ 0
-1.68	60	\$ 35	\$ 34	\$ 0	\$ 0
-1.65	70	\$ 27	\$ 26	\$ 0	\$ 0
-1.61	80	\$ 21	\$ 20	\$ 0	\$ 0
-1.6	90	\$ 11	\$ 10	\$ 0	\$ 0
-1.57	9593	\$ 89	\$ 83	\$ 0	\$ 0
-1.42	200	\$ 29	\$ 27	\$ 0	\$ 0
-1.32	300	\$ 15	\$ 14	\$ 0	\$ 0
-1.26	400	\$ 12	\$ 11	\$ 0	\$ 0
-1.2	537.72	\$ 43	\$ 36	\$ 0	\$ 0
0	87640.75	\$ 0	\$ 0	\$ 0	\$ 0
Total (\$)		\$ 756	\$ 725	\$ 0	\$ 0

After Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-11.72	111	\$ 0	\$ 0	\$ 0	\$ 0
-10.84	2	\$ 0	\$ 0	\$ 0	\$ 0
-9.6	5	\$ 0	\$ 0	\$ 0	\$ 0
-8.93	8	\$ 0	\$ 0	\$ 0	\$ 0
-8.59	1006	\$ 0	\$ 0	\$ 0	\$ 0
-7.51	20	\$ 0	\$ 0	\$ 0	\$ 0
-6.81	30	\$ 0	\$ 0	\$ 0	\$ 0
-6.27	40	\$ 0	\$ 0	\$ 0	\$ 0
-6.87	4885	\$ 0	\$ 0	\$ 0	\$ 0
-5.91	60	\$ 0	\$ 0	\$ 0	\$ 0
-5.2	70	\$ 0	\$ 0	\$ 0	\$ 0
-4.93	80	\$ 0	\$ 0	\$ 0	\$ 0
-4.67	90	\$ 0	\$ 0	\$ 0	\$ 0
-4.55	9593	\$ 0	\$ 0	\$ 0	\$ 0
-2.9	200	\$ 0	\$ 0	\$ 0	\$ 0
-2	282.91	\$ 1	\$ 1	\$ 0	\$ 0
-1.94	300	\$ 13	\$ 12	\$ 0	\$ 0
-1.21	400	\$ 14	\$ 12	\$ 0	\$ 0
-0.43	537.72	\$ 7	\$ 6	\$ 0	\$ 0
0	1480.95	\$ 649	\$ 525	\$ 0	\$ 0
Total (\$)		\$ 684	\$ 536	\$ 0	\$ 0

Building Information
Floodplain and Stream Restoration @ 121 Norwich Rd, East Haddam, Connecticut, 06423

Building Type:

Two or More Stories

Foundation Type:

Building Has Basement:

Yes

NFIP:

No

Building Damages
Floodplain and Stream Restoration @ 121 Norwich Rd, East Haddam, Connecticut, 06423

Depth Damage Curve:

USACE - Chicago: two story, w/ basement

Use Default:Yes

Building Size (sq.ft):

2,632

Building Replacement Value (BRV) (\$/sq.ft):

\$156

Use Default: No

Demolition Threshold (%):

50.00%

Use Default:Yes

Expected Annual Losses due to Building Damages before Mitigation:

\$756

Expected Annual Losses due to Building Damages after Mitigation:

\$684

Expected Annual Benefits - Building:

\$71

Depth Damage Curve - Building
Floodplain and Stream Restoration @ 121 Norwich Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION						AFTER MITIGATION					
Flood Depth (ft)	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)		Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)		
-2	3	12,286.96	0	0		3	12,286.96	0	0		
-1	5	20,478.27	0	0	5	20,478.27	0	0			
0	7	28,669.58	0	0	7	28,669.58	0	0			
1	11	45,052.20	0	0	11	45,052.20	0	0			
2	17	68,626.13	0	0	17	68,626.13	0	0			
3	22	90,104.41	0	0	22	90,104.41	0	0			
4	28	114,678.34	0	0	28	114,678.34	0	0			
5	33	135,786.62	0	0	33	135,786.62	0	0			
6	35	143,347.93	0	0	35	143,347.93	0	0			
7	38	153,634.89	0	0	38	153,634.89	0	0			
8	40	163,826.20	0	0	40	163,826.20	0	0			
9	44	180,208.82	0	0	44	180,208.82	0	0			
10	46	188,400.13	0	0	46	188,400.13	0	0			
11	48	196,591.44	0	0	48	196,591.44	0	0			
12	50	409,565.52	0	0	50	409,565.52	0	0			
13	52	409,565.52	0	0	52	409,565.52	0	0			
14	54	409,565.52	0	0	54	409,565.52	0	0			
15	54	409,565.52	0	0	54	409,565.52	0	0			
16	54	409,565.52	0	0	54	409,565.52	0	0			

Contents Damages
Floodplain and Stream Restoration @ 121 Norwich Rd, East Haddam, Connecticut, 06423

Contents Value in Dollars:

\$0

Use Default:Yes

Utilities Elevated:

No

Expected Annual Losses due to Contents Damages before Mitigation:

\$725

Expected Annual Losses due to Contents Damages after Mitigation:

\$356

Expected Annual Benefits - Contents:

\$369

Depth Damage Curve - Contents
Floodplain and Stream Restoration @ 121 Norwich Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION				AFTER MITIGATION			
Flood Depth (ft)	Percent (%)	Damage Value (\$)		Percent (%)	Damage Value (\$)		
-2	6	12,286.96		6	12,286.96		
-1	9	18,430.44		9	18,430.44		
0	11	22,526.10		11	22,526.10		
1	17	34,813.06		17	34,813.06		
2	22	45,052.20		22	45,052.20		
3	28	57,239.17		28	57,239.17		
4	33	67,578.31		33	67,578.31		
5	39	79,865.27		39	79,865.27		
6	44	90,104.41		44	90,104.41		
7	49	100,343.55		49	100,343.55		
8	55	110,600.51		55	110,600.51		
9	61	124,917.48		61	124,917.48		
10	64	131,060.96		64	131,060.96		
11	71	145,395.75		71	145,395.75		
12	76	155,634.89		76	155,634.89		
13	78	159,730.55		78	159,730.55		
14	79	161,778.38		79	161,778.38		
15	79	161,778.38		79	161,778.38		
16	87	178,161.00		87	178,161.00		

Displacement Costs Avoided
Floodplain and Stream Restoration @ 121 Norwich Rd, East Haddam, Connecticut, 06423

Lodging Per Diem:

\$110

Use Default:Yes

Meals Per Diem:

\$68

Use Default:Yes

Population Affected:

0

Duration of Displacement (days):

365

Use Default:Yes

Total Residential Displacement Cost:

\$0

Expected Annual Losses due to Displacement Damages before mitigation:

\$0

Expected Annual Losses due to Displacement Damages after Mitigation:

\$0

Expected Annual Losses - Displacement:

\$0

Comments

-

Number of Building Residents:
Building has two units.

Depth Damage Curve - Displacement Floodplain and Stream Restoration @ 121 Norwich Rd, East Haddam, Connecticut, 06423					
Flood Depth (ft)	BEFORE MITIGATION		AFTER MITIGATION		
	Days	Damage Value (\$)	Days	Damage Value (\$)	
-2	0	0	0	0	
-1	0	0	0	0	
0	0	0	0	0	
1	45	0	45	0	
2	90	0	90	0	
3	135	0	135	0	
4	180	0	180	0	
5	225	0	225	0	
6	270	0	270	0	
7	315	0	315	0	
8	360	0	360	0	
9	405	0	405	0	
10	450	0	450	0	
11	495	0	495	0	
12	540	0	540	0	
13	585	0	585	0	
14	630	0	630	0	
15	675	0	675	0	
16	720	0	720	0	

Street Maintenance Costs Avoided Floodplain and Stream Restoration @ 121 Norwich Rd, East Haddam, Connecticut, 06423	
Total Annual Street Maintenance Budget:	\$0
Total Number of Street Miles Maintained:	0
Street Miles that will not require future maintenance:	0
Expected Annual Benefits - Street Maintenance:	\$0

Volunteer Costs Avoided Floodplain and Stream Restoration @ 121 Norwich Rd, East Haddam, Connecticut, 06423	
Number of Volunteers (volunteers/event):	0
Number of Days of Lodging:	0
Expected Annual Volunteer Benefits:	\$0

Ecosystem Services Losses Avoided Floodplain and Stream Restoration @ 121 Norwich Rd, East Haddam, Connecticut, 06423	
Total Project Area (acres):	0
Percentage of Urban Green Open Space:	0.00%
Percentage of Rural Green Open Space:	0.00%
Percentage of Riparian:	0.00%
Percentage of Coastal Wetlands:	0.00%
Percentage of Inland Wetlands:	0.00%
Percentage of Forests:	0.00%
Percentage of Coral Reefs:	0.00%
Percentage of Shellfish Reefs:	0.00%
Percentage of Beaches and Dunes:	0.00%
Expected Annual Ecosystem Services Benefits:	\$0

Benefits-Costs Summary Floodplain and Stream Restoration @ 121 Norwich Rd, East Haddam, Connecticut, 06423	
Discount Rate (%):	7.0% Use Default:Yes
Total Project Benefits:	\$5,470
Total Project Cost:	\$0
Benefit-Cost Ratio:	0

Property Configuration	
Property Title:	Floodplain and Stream Restoration @ 59 Creamery Rd, East Haddam, Connecticut, 06423
Property Location:	06423, Middlesex, Connecticut
Property Coordinates:	41.45229504511332, -72.45890946707638
Hazard Type:	Riverine Flood
Mitigation Action Type:	Floodplain and Stream Restoration
Property Type:	Residential Building
Analysis Method Type:	Modeled Damages

Cost Estimation Floodplain and Stream Restoration @ 59 Creamery Rd, East Haddam, Connecticut, 06423	
Discount Rate (%):	7.0% Use Default:Yes
Project Useful Life (years):	\$0
Project Cost:	\$1,550,000
Number of Maintenance Years:	50 Use Default:Yes
Annual Maintenance Cost:	\$0

Comments
Project Useful Life: The improvement at this building is the result of bridge replacement, therefore the standard PUL for bridge projects (50 years) was used.
Mitigation Project Cost: Includes cost of replacing existing Creamery Road bridge with new, wider structure and widening Succor Brook upstream of the bridge. This component has a PUL of 50 years.
Annual Maintenance Cost: This analysis assumes funding already allocated by the Town for maintenance of the existing bridge would be used for the replacement bridge (i.e. no "new" maintenance costs would be required).

Hazard Probabilities Parameters - Flood Floodplain and Stream Restoration @ 59 Creamery Rd, East Haddam, Connecticut, 06423	
Lowest Floor Elevation of the Property (ft):	13.6
Streambed Elevation at the Property Location (ft):	5.2
Use Default Recurrence Intervals:	Use Default:Yes

Discharge Floodplain and Stream Restoration @ 59 Creamery Rd, East Haddam, Connecticut, 06423		
BEFORE MITIGATION		
Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)
10	12.28	533
50	13.09	971
100	13.25	1188
500	13.84	1884
AFTER MITIGATION		
Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)
10	10.06	533
50	12.31	971
100	12.38	1188
500	12.97	1884

Estimated Annual Damages by Category
Floodplain and Stream Restoration @ 59 Creamery Rd, East Haddam, Connecticut, 06423

Before Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-3.19	111	\$ 0	\$ 0	\$ 0	\$ 0
-2.32	2	\$ 0	\$ 0	\$ 0	\$ 0
-2	238	\$ 1,627	\$ 1,589	\$ 0	\$ 0
-1.65	5	\$ 1,064	\$ 1,002	\$ 0	\$ 0
-1.4	8	\$ 988	\$ 968	\$ 0	\$ 0
-1.27	10.06	\$ 847	\$ 788	\$ 0	\$ 0
-0.95	20	\$ 316	\$ 278	\$ 0	\$ 0
-0.79	30	\$ 167	\$ 144	\$ 0	\$ 0
-0.67	40	\$ 103	\$ 87	\$ 0	\$ 0
-0.57	49.85	\$ 72	\$ 61	\$ 0	\$ 0
-0.51	60	\$ 52	\$ 43	\$ 0	\$ 0
-0.45	70	\$ 40	\$ 33	\$ 0	\$ 0
-0.4	80	\$ 31	\$ 26	\$ 0	\$ 0
-0.34	90	\$ 16	\$ 13	\$ 0	\$ 0
-0.32	95.93	\$ 129	\$ 104	\$ 0	\$ 0
-0.05	200	\$ 22	\$ 18	\$ 0	\$ 0
0	243.35	\$ 20	\$ 16	\$ 0	\$ 0
0.07	300	\$ 23	\$ 18	\$ 0	\$ 0
0.17	400	\$ 18	\$ 14	\$ 0	\$ 0
0.27	537.72	\$ 673	\$ 336	\$ 0	\$ 0
Total (\$)		\$ 5,616	\$ 4,916	\$ 0	\$ 0

After Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-5.36	131	\$ 0	\$ 0	\$ 0	\$ 0
-4.85	2	\$ 0	\$ 0	\$ 0	\$ 0
-3.86	5	\$ 0	\$ 0	\$ 0	\$ 0
-3.43	8	\$ 0	\$ 0	\$ 0	\$ 0
-3.22	10.06	\$ 0	\$ 0	\$ 0	\$ 0
-2.66	20	\$ 0	\$ 0	\$ 0	\$ 0
-2.32	30	\$ 0	\$ 0	\$ 0	\$ 0
-2.09	40	\$ 0	\$ 0	\$ 0	\$ 0
-2	45.93	\$ 19	\$ 19	\$ 0	\$ 0
-1.92	49.85	\$ 40	\$ 39	\$ 0	\$ 0
-1.79	60	\$ 30	\$ 29	\$ 0	\$ 0
-1.67	70	\$ 24	\$ 23	\$ 0	\$ 0
-1.55	80	\$ 20	\$ 19	\$ 0	\$ 0
-1.46	90	\$ 10	\$ 9	\$ 0	\$ 0
-1.41	95.93	\$ 82	\$ 63	\$ 0	\$ 0
-0.85	200	\$ 34	\$ 29	\$ 0	\$ 0
-0.54	300	\$ 18	\$ 15	\$ 0	\$ 0
-0.34	400	\$ 15	\$ 12	\$ 0	\$ 0
-0.1	537.72	\$ 7	\$ 5	\$ 0	\$ 0
0	626.86	\$ 577	\$ 289	\$ 0	\$ 0
Total (\$)		\$ 886	\$ 572	\$ 0	\$ 0

Building Information
Floodplain and Stream Restoration @ 59 Creamery Rd, East Haddam, Connecticut, 06423

Building Type:	Two or More Stories
Foundation Type:	
Building Has Basement:	Yes
NFIP:	No

Building Damages
Floodplain and Stream Restoration @ 59 Creamery Rd, East Haddam, Connecticut, 06423

Depth Damage Curve:	USACE - Chicago: two story, w/ basement	Use Default:Yes
Building Size (sq.ft):	2,179	
Building Replacement Value (BRV) (\$/sq.ft):	\$166	Use Default: No
Demolition Threshold (%):	50.00%	Use Default:Yes
Expected Annual Losses due to Building Damages before Mitigation:	\$5,616	
Expected Annual Losses due to Building Damages after Mitigation:	\$886	
Expected Annual Benefits - Building:	\$4,730	

Depth Damage Curve - Building
Floodplain and Stream Restoration @ 59 Creamery Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION						AFTER MITIGATION					
Flood Depth (ft)	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)		Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)		
-2	3	10,851.42	0	0		3	10,851.42	0	0		
-4	5	16,085.7	0	0		5	16,085.7	0	0		
0	7	25,319.98	0	0		7	25,319.98	0	0		
1	11	38,788.54	0	0		11	38,788.54	0	0		
2	17	61,491.38	0	0		17	61,491.38	0	0		
3	22	79,577.08	0	0		22	79,577.08	0	0		
4	28	101,279.92	0	0		28	101,279.92	0	0		
5	33	119,365.62	0	0		33	119,365.62	0	0		
6	35	126,599.9	0	0		35	126,599.9	0	0		
7	38	137,431.32	0	0		38	137,431.32	0	0		
8	40	144,685.6	0	0		40	144,685.6	0	0		
9	44	159,54.16	0	0		44	159,54.16	0	0		
10	46	166,388.44	0	0		46	166,388.44	0	0		
11	48	173,622.72	0	0		48	173,622.72	0	0		
12	50	181,714	0	0		50	181,714	0	0		
13	52	181,714	0	0		52	181,714	0	0		
14	54	181,714	0	0		54	181,714	0	0		
15	54	181,714	0	0		54	181,714	0	0		
16	54	181,714	0	0		54	181,714	0	0		

Contents Damages
Floodplain and Stream Restoration @ 59 Creamery Rd, East Haddam, Connecticut, 06423

Contents Value in Dollars:	\$0	Use Default:Yes
Utilities Elevated:	No	
Expected Annual Losses due to Contents Damages before Mitigation:	\$4,916	
Expected Annual Losses due to Contents Damages after Mitigation:	\$572	
Expected Annual Benefits - Contents:	\$4,345	

Depth Damage Curve - Contents
Floodplain and Stream Restoration @ 59 Creamery Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION			AFTER MITIGATION		
	Percent (%)	Damage Value (\$)		Percent (%)	Damage Value (\$)	
-2	6	16,851.42		6	16,851.42	
-1	9	16,277.13		9	16,277.13	
0	11	16,894.27		11	16,894.27	
1	17	30,743.69		17	30,743.69	
2	22	39,788.54		22	39,788.54	
3	28	58,639.96		28	58,639.96	
4	33	59,682.81		33	59,682.81	
5	39	70,534.23		39	70,534.23	
6	44	79,577.08		44	79,577.08	
7	49	88,619.93		49	88,619.93	
8	55	99,471.35		55	99,471.35	
9	61	160,322.77		61	160,322.77	
10	64	115,748.48		64	115,748.48	
11	71	128,408.47		71	128,408.47	
12	76	137,451.32		76	137,451.32	
13	78	141,068.46		78	141,068.46	
14	79	142,877.03		79	142,877.03	
15	79	142,877.03		79	142,877.03	
16	87	157,345.59		87	157,345.59	

Displacement Costs Avoided
Floodplain and Stream Restoration @ 59 Creamery Rd, East Haddam, Connecticut, 06423

Lodging Per Diem:	\$110	Use Default:Yes
Meals Per Diem:	\$68	Use Default:Yes
Population Affected:	0	
Duration of Displacement (days):	365	Use Default:Yes
Total Residential Displacement Cost:	\$0	
Expected Annual Losses due to Displacement Damages before mitigation:	\$0	
Expected Annual Losses due to Displacement Damages after Mitigation:	\$0	
Expected Annual Losses - Displacement:	\$0	

Comments

- Number of Building Residents:
Building has two units.

Depth Damage Curve - Displacement
Floodplain and Stream Restoration @ 59 Creamery Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION			AFTER MITIGATION		
	Days	Damage Value (\$)		Days	Damage Value (\$)	
-2	0	0		0	0	
-1	0	0		0	0	
0	0	0		0	0	
1	45	0		45	0	
2	90	0		90	0	
3	135	0		135	0	
4	180	0		180	0	
5	225	0		225	0	
6	270	0		270	0	
7	315	0		315	0	
8	360	0		360	0	
9	405	0		405	0	
10	450	0		450	0	
11	495	0		495	0	
12	540	0		540	0	
13	585	0		585	0	
14	630	0		630	0	
15	675	0		675	0	
16	720	0		720	0	

Street Maintenance Costs Avoided
Floodplain and Stream Restoration @ 59 Creamery Rd, East Haddam, Connecticut, 06423

Total Annual Street Maintenance Budget:	\$0
Total Number of Street Miles Maintained:	0
Street Miles that will not require future maintenance:	0
Expected Annual Benefits - Street Maintenance:	\$0

Volunteer Costs Avoided
Floodplain and Stream Restoration @ 59 Creamery Rd, East Haddam, Connecticut, 06423

Number of Volunteers (volunteers/event):	0
Number of Days of Lodging:	0
Expected Annual Volunteer Benefits:	\$0

Ecosystem Services Losses Avoided
Floodplain and Stream Restoration @ 59 Creamery Rd, East Haddam, Connecticut, 06423

Total Project Area (acres):	0
Percentage of Urban Green Open Space:	0.00%
Percentage of Rural Green Open Space:	0.00%
Percentage of Riparian:	0.00%
Percentage of Coastal Wetlands:	0.00%
Percentage of Inland Wetlands:	0.00%
Percentage of Forests:	0.00%
Percentage of Coral Reefs:	0.00%
Percentage of Shellfish Reefs:	0.00%
Percentage of Beaches and Dunes:	0.00%
Expected Annual Ecosystem Services Benefits:	\$0

Benefits-Costs Summary
Floodplain and Stream Restoration @ 59 Creamery Rd, East Haddam, Connecticut, 06423

Discount Rate (%):	7.0%	Use Default:Yes
Total Project Benefits:	\$125,243	
Total Project Cost:	\$1,550,000	
Benefit-Cost Ratio:	0.08	

Property Configuration

Property Title:

Floodplain and Stream Restoration @ 20 Norwich Rd, East Haddam, Connecticut, 06423

Property Location:

06423, Middlesex, Connecticut

Property Coordinates:

41.45476900574508, -72.45860302469629

Hazard Type:

Riverine Flood

Mitigation Action Type:

Floodplain and Stream Restoration

Property Type:

Non-Residential Building

Analysis Method Type:

Modeled Damages

Cost Estimation

Floodplain and Stream Restoration @ 20 Norwich Rd, East Haddam, Connecticut, 06423

Discount Rate (%):

7.0%

Use Default:Yes

Project Useful Life (years):

30

Project Cost:

\$0

Number of Maintenance Years:

30

Use Default:Yes

Annual Maintenance Cost:

\$0

Hazard Probabilities Parameters - Flood

Floodplain and Stream Restoration @ 20 Norwich Rd, East Haddam, Connecticut, 06423

Lowest Floor Elevation of the Property (ft):

35.95

Streambed Elevation at the Property Location (ft):

29.5

Use Default Recurrence Intervals:

Use Default:Yes

Discharge

Floodplain and Stream Restoration @ 20 Norwich Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION		
Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)
10	37.78	533
50	38.22	971
100	38.59	1188
500	42.75	1884

AFTER MITIGATION		
Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)
10	32.29	533
50	34.75	971
100	34.78	1188
500	37.88	1884

Estimated Annual Damages by Category
Floodplain and Stream Restoration @ 20 Norwich Rd, East Haddam, Connecticut, 06423

Before Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-2.68	111	\$ 0	\$ 0	\$ 0	\$ 0
-2	133	\$ 0	\$ 0	\$ 0	\$ 0
-1.87	2	\$ 0	\$ 0	\$ 0	\$ 0
0	398	\$ 0	\$ 0	\$ 0	\$ 0
0.31	5	\$ 4,135	\$ 403	\$ 0	\$ 0
0.91	8	\$ 2,880	\$ 265	\$ 0	\$ 0
1.19	1006	\$ 6,969	\$ 628	\$ 0	\$ 0
1.88	20	\$ 2,997	\$ 254	\$ 0	\$ 0
2.43	30	\$ 1,634	\$ 141	\$ 0	\$ 0
2.75	40	\$ 1,026	\$ 89	\$ 0	\$ 0
2.88	4985	\$ 727	\$ 64	\$ 0	\$ 0
3.18	60	\$ 538	\$ 46	\$ 0	\$ 0
3.35	70	\$ 416	\$ 36	\$ 0	\$ 0
3.49	80	\$ 333	\$ 28	\$ 0	\$ 0
3.61	90	\$ 188	\$ 14	\$ 0	\$ 0
3.68	9533	\$ 1,406	\$ 126	\$ 0	\$ 0
4.45	200	\$ 466	\$ 38	\$ 0	\$ 0
4.87	300	\$ 241	\$ 19	\$ 0	\$ 0
5.16	400	\$ 181	\$ 15	\$ 0	\$ 0
5.47	537.72	\$ 1,485	\$ 89	\$ 0	\$ 0
Total (\$)		\$ 25,422	\$ 2,263	\$ 0	\$ 0

After Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-5.93	131	\$ 0	\$ 0	\$ 0	\$ 0
-5.23	2	\$ 0	\$ 0	\$ 0	\$ 0
-4.32	5	\$ 0	\$ 0	\$ 0	\$ 0
-3.83	8	\$ 0	\$ 0	\$ 0	\$ 0
-3.57	1006	\$ 0	\$ 0	\$ 0	\$ 0
-2.81	20	\$ 0	\$ 0	\$ 0	\$ 0
-2.31	30	\$ 0	\$ 0	\$ 0	\$ 0
-2	38.95	\$ 0	\$ 0	\$ 0	\$ 0
-1.85	40	\$ 0	\$ 0	\$ 0	\$ 0
-1.68	4985	\$ 0	\$ 0	\$ 0	\$ 0
-1.42	60	\$ 0	\$ 0	\$ 0	\$ 0
-1.21	70	\$ 0	\$ 0	\$ 0	\$ 0
-1.04	80	\$ 0	\$ 0	\$ 0	\$ 0
-0.86	90	\$ 0	\$ 0	\$ 0	\$ 0
-0.77	9533	\$ 0	\$ 0	\$ 0	\$ 0
0	163.84	\$ 0	\$ 0	\$ 0	\$ 0
0.31	200	\$ 94	\$ 9	\$ 0	\$ 0
0.95	300	\$ 96	\$ 9	\$ 0	\$ 0
1.43	400	\$ 96	\$ 8	\$ 0	\$ 0
1.84	537.72	\$ 1,485	\$ 89	\$ 0	\$ 0
Total (\$)		\$ 1,770	\$ 116	\$ 0	\$ 0

Building Information

Floodplain and Stream Restoration @ 20 Norwich Rd, East Haddam, Connecticut, 06423

Non-Residential Occupancy Type:

EDUT: Education - Schools/Libraries

Building is outside hundred-year flood area:

No

Building Type:

Schools

Building Is Engineered:

Yes

NFIP:

No

Building Damages
Floodplain and Stream Restoration @ 20 Norwich Rd, East Haddam, Connecticut, 06423

Depth Damage Curve:

Schools (Default)

Use Default:Yes

Building Size (sq.ft):

13,156

Building Replacement Value (BRV) (\$/sq.ft):

\$96

Use Default: No

Demolition Threshold (%):

50.00%

Use Default:Yes

Expected Annual Losses due to Building Damages before Mitigation:

\$25,422

Expected Annual Losses due to Building Damages after Mitigation:

\$1,770

Expected Annual Benefits - Building:

\$23,652

Depth Damage Curve - Building
Floodplain and Stream Restoration @ 20 Norwich Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION				AFTER MITIGATION			
	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)
-2	0	0	0	0	0	0	0	0
-1	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
1	13	103,895.77	0	0	13	103,895.77	0	0
2	21.5	171,695.32	0	0	21.5	171,695.32	0	0
3	26.7	213,221.63	0	0	26.7	213,221.63	0	0
4	32.7	261,136.61	0	0	32.7	261,136.61	0	0
5	36.2	289,087.01	0	0	36.2	289,087.01	0	0
6	39.7	317,037.41	0	0	39.7	317,037.41	0	0
7	41.6	332,210.49	0	0	41.6	332,210.49	0	0
8	44.5	355,369.39	0	0	44.5	355,369.39	0	0
9	46.4	370,542.47	0	0	46.4	370,542.47	0	0
10	48.5	387,312.71	0	0	48.5	387,312.71	0	0
11	48.5	387,312.71	0	0	48.5	387,312.71	0	0
12	48.5	387,312.71	0	0	48.5	387,312.71	0	0
13	48.5	387,312.71	0	0	48.5	387,312.71	0	0
14	48.5	387,312.71	0	0	48.5	387,312.71	0	0
15	48.5	387,312.71	0	0	48.5	387,312.71	0	0
16	48.5	387,312.71	0	0	48.5	387,312.71	0	0

Contents Damages
Floodplain and Stream Restoration @ 20 Norwich Rd, East Haddam, Connecticut, 06423

Contents Value in Dollars:

\$0

Use Default:Yes

Expected Annual Losses due to Contents Damages before Mitigation:

\$2,263

Expected Annual Losses due to Contents Damages after Mitigation:

\$116

Expected Annual Benefits - Contents:

\$2,146

Depth Damage Curve - Contents
Floodplain and Stream Restoration @ 20 Norwich Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION			AFTER MITIGATION		
	Percent (%)	Damage Value (\$)		Percent (%)	Damage Value (\$)	
-2	0	0		0	0	
-1	0	0		0	0	
0	0	0		0	0	
1	22	10,541.29		22	10,541.29	
2	30	14,374.49		30	14,374.49	
3	39	18,686.84		39	18,686.84	
4	45	21,561.73		45	21,561.73	
5	48	22,999.18		48	22,999.18	
6	52	24,915.78		52	24,915.78	
7	56	26,832.38		56	26,832.38	
8	59	28,269.83		59	28,269.83	
9	61	29,228.13		61	29,228.13	
10	63	30,186.43		63	30,186.43	
11	63	30,186.43		63	30,186.43	
12	63	30,186.43		63	30,186.43	
13	63	30,186.43		63	30,186.43	
14	63	30,186.43		63	30,186.43	
15	63	30,186.43		63	30,186.43	
16	63	30,186.43		63	30,186.43	

Displacement Costs Avoided
Floodplain and Stream Restoration @ 20 Norwich Rd, East Haddam, Connecticut, 06423

Monthly Displacement Cost (\$/sq.ft/month):

0

Use Default: No

One-Time Displacement Cost (\$/sq.ft):

0

Use Default: No

Expected Annual Losses due to Displacement Damages before mitigation:

\$0

Expected Annual Losses due to Displacement Damages after Mitigation:

\$0

Expected Annual Losses - Displacement:

\$0

- Comments
-
- Monthly Displacement Cost:**
No displacement costs were assumed for this building.
-
- One-time Displacement Cost:**
No displacement costs were assumed for this building.

Depth Damage Curve - Displacement Floodplain and Stream Restoration @ 20 Norwich Rd, East Haddam, Connecticut, 06423					
Flood Depth (ft)	BEFORE MITIGATION		AFTER MITIGATION		
	Days	Damage Value (\$)	Days	Damage Value (\$)	
-2	0	0	0	0	
-1	0	0	0	0	
0	0	0	0	0	
1	45	0	45	0	
2	90	0	90	0	
3	135	0	135	0	
4	180	0	180	0	
5	225	0	225	0	
6	270	0	270	0	
7	315	0	315	0	
8	360	0	360	0	
9	405	0	405	0	
10	450	0	450	0	
11	450	0	450	0	
12	450	0	450	0	
13	450	0	450	0	
14	450	0	450	0	
15	450	0	450	0	
16	450	0	450	0	

Loss of Function/Loss of Income Avoided Floodplain and Stream Restoration @ 20 Norwich Rd, East Haddam, Connecticut, 06423	
Annual Operating Budget:	\$0
Loss of Function/Loss of Income Per Day:	\$0
Expected Annual Losses due to Loss of Function/Loss of Income before mitigation:	\$0
Expected Annual Losses due to Loss of Function/Loss of Income after mitigation:	\$0
Expected Annual Benefits - Loss of Function/Loss of Income Avoided:	\$0

Depth Damage Curve - Loss of Function/Loss of Income Floodplain and Stream Restoration @ 20 Norwich Rd, East Haddam, Connecticut, 06423					
Flood Depth (ft)	BEFORE MITIGATION		AFTER MITIGATION		
	Days	Damage Value (\$)	Days	Damage Value (\$)	
-2	0	0	0	0	
-1	0	0	0	0	
0	0	0	0	0	
1	45	0	45	0	
2	90	0	90	0	
3	135	0	135	0	
4	180	0	180	0	
5	225	0	225	0	
6	270	0	270	0	
7	315	0	315	0	
8	360	0	360	0	
9	405	0	405	0	
10	450	0	450	0	
11	450	0	450	0	
12	450	0	450	0	
13	450	0	450	0	
14	450	0	450	0	
15	450	0	450	0	
16	450	0	450	0	

Volunteer Costs Avoided Floodplain and Stream Restoration @ 20 Norwich Rd, East Haddam, Connecticut, 06423	
Number of Volunteers (volunteers/event):	0
Number of Days of Lodging:	0
Expected Annual Volunteer Benefits:	\$0

Ecosystem Services Losses Avoided Floodplain and Stream Restoration @ 20 Norwich Rd, East Haddam, Connecticut, 06423	
Total Project Area (acres):	0
Percentage of Urban Green Open Space:	0.00%
Percentage of Rural Green Open Space:	0.00%
Percentage of Riparian:	0.00%
Percentage of Coastal Wetlands:	0.00%
Percentage of Inland Wetlands:	0.00%
Percentage of Forests:	0.00%
Percentage of Coral Reefs:	0.00%
Percentage of Shellfish Reefs:	0.00%
Percentage of Beaches and Dunes:	0.00%
Expected Annual Ecosystem Services Benefits:	\$0

Benefits-Costs Summary Floodplain and Stream Restoration @ 20 Norwich Rd, East Haddam, Connecticut, 06423	
Discount Rate (%):	7.0% Use Default:Yes
Total Project Benefits:	\$320,134
Total Project Cost:	\$0
Benefit-Cost Ratio:	0

Property Configuration

Property Title:	Floodplain and Stream Restoration @ 12D Norwich Rd, East Haddam, Connecticut, 06423
Property Location:	06423, Middlesex, Connecticut
Property Coordinates:	41.45438196885874, -72.45918517190287
Hazard Type:	Riverine Flood
Mitigation Action Type:	Floodplain and Stream Restoration
Property Type:	Residential Building
Analysis Method Type:	Modeled Damages

Cost Estimation

Floodplain and Stream Restoration @ 12D Norwich Rd, East Haddam, Connecticut, 06423

Discount Rate (%):	7.0%	Use Default:Yes
Project Useful Life (years):	30	
Project Cost:	\$0	
Number of Maintenance Years:	30	Use Default:Yes
Annual Maintenance Cost:	\$0	

Comments

•

Project Useful Life:
Default PUL for Floodplain and Stream Restoration.

•

Mitigation Project Cost:
Costs not included in this entry.

•

Annual Maintenance Cost:
Costs not included in this entry.

Hazard Probabilities Parameters - Flood

Floodplain and Stream Restoration @ 12D Norwich Rd, East Haddam, Connecticut, 06423

Lowest Floor Elevation of the Property (ft):	28.5
Streambed Elevation at the Property Location (ft):	16.4
Use Default Recurrence Intervals:	Use Default:Yes

Comments

•

Lowest Floor Elevation:
Per 2024 MCA survey.

•

Streambed Elevation:
Based on CT ECO 2016 Lidar DEM.

Discharge

Floodplain and Stream Restoration @ 12D Norwich Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION		
Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)
10	25.84	533
50	26.59	971
100	26.78	1188
500	27.03	1884

AFTER MITIGATION		
Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)
10	21.27	533
50	23.8	971
100	25.06	1188
500	26.56	1884

Estimated Annual Damages by Category

Floodplain and Stream Restoration @ 12D Norwich Rd, East Haddam, Connecticut, 06423

Before Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-4.22	1	\$ 0	\$ 0	\$ 0	\$ 0
-3.43	2	\$ 0	\$ 0	\$ 0	\$ 0
-2.87	5	\$ 0	\$ 0	\$ 0	\$ 0
-2.67	8	\$ 0	\$ 0	\$ 0	\$ 0
-2.56	10,06	\$ 0	\$ 0	\$ 0	\$ 0
-2.3	20	\$ 0	\$ 0	\$ 0	\$ 0
-2.16	30	\$ 0	\$ 0	\$ 0	\$ 0
-2.08	40	\$ 0	\$ 0	\$ 0	\$ 0
-2.01	49,85	\$ 0	\$ 0	\$ 0	\$ 0
-2	52,15	\$ 21	\$ 21	\$ 0	\$ 0
-1.94	60	\$ 21	\$ 21	\$ 0	\$ 0
-1.9	70	\$ 16	\$ 16	\$ 0	\$ 0
-1.87	80	\$ 13	\$ 13	\$ 0	\$ 0
-1.82	90	\$ 6	\$ 6	\$ 0	\$ 0
-1.8	95,93	\$ 54	\$ 52	\$ 0	\$ 0
-1.81	200	\$ 18	\$ 17	\$ 0	\$ 0
-1.5	300	\$ 18	\$ 9	\$ 0	\$ 0
-1.41	400	\$ 8	\$ 0	\$ 0	\$ 0
-1.35	537,72	\$ 29	\$ 24	\$ 0	\$ 0
0	279880,96	\$ 1	\$ 1	\$ 0	\$ 0
Total (\$)		\$ 187	\$ 187	\$ 0	\$ 0

After Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-10.55	1	\$ 0	\$ 0	\$ 0	\$ 0
-9.32	2	\$ 0	\$ 0	\$ 0	\$ 0
-7.97	5	\$ 0	\$ 0	\$ 0	\$ 0
-7.34	8	\$ 0	\$ 0	\$ 0	\$ 0
-7.05	10,06	\$ 0	\$ 0	\$ 0	\$ 0
-6.19	30	\$ 0	\$ 0	\$ 0	\$ 0
-5.58	30	\$ 0	\$ 0	\$ 0	\$ 0
-5.17	40	\$ 0	\$ 0	\$ 0	\$ 0
-4.87	49,85	\$ 0	\$ 0	\$ 0	\$ 0
-4.61	60	\$ 0	\$ 0	\$ 0	\$ 0
-4.41	70	\$ 0	\$ 0	\$ 0	\$ 0
-4.22	80	\$ 0	\$ 0	\$ 0	\$ 0
-4.04	90	\$ 0	\$ 0	\$ 0	\$ 0
-3.95	95,93	\$ 0	\$ 0	\$ 0	\$ 0
-2.88	200	\$ 0	\$ 0	\$ 0	\$ 0
-2.29	300	\$ 0	\$ 0	\$ 0	\$ 0
-2	364,18	\$ 2	\$ 2	\$ 0	\$ 0
-1.84	400	\$ 7	\$ 6	\$ 0	\$ 0
-1.38	537,72	\$ 17	\$ 14	\$ 0	\$ 0
0	1291,95	\$ 217	\$ 109	\$ 0	\$ 0
Total (\$)		\$ 243	\$ 131	\$ 0	\$ 0

Building Information
Floodplain and Stream Restoration @ 12D Norwich Rd, East Haddam, Connecticut, 06423

Building Type:	Two or More Stories
Foundation Type:	
Building Has Basement:	Yes
NFIP:	No

Comments

-

Building Type:

Per field observations.

-

Buiding has basement:

Per Town of East Haddam Assessor's Database.

-

Has NFIP:

The default value for this input is "No".

Building Damages
Floodplain and Stream Restoration @ 12D Norwich Rd, East Haddam, Connecticut, 06423

Depth Damage Curve:	USACE - Chicago: two story, w/ basement	Use Default:Yes
Building Size (sq.ft):	1,426	
Building Replacement Value (BRV) (\$/sq.ft):	\$197	Use Default: No
Demolition Threshold (%):	50.00%	Use Default:Yes
Expected Annual Losses due to Building Damages before Mitigation:	\$197	
Expected Annual Losses due to Building Damages after Mitigation:	\$243	
Expected Annual Benefits - Building:	\$-46	

Comments

-

Damage Curve:

For residential buildings with two stories and an unfinished basement/enclosed space below the lowest finished floor, three available depth-damage curves were available: USACE Generic, USACE Chicago, and FEMA FIA. USACE Generic was considered inappropriate as it assumed a contents value equal to 100% of the BRV by default. Comparing USACE Chicago to FEMA FIA, the estimated benefits using USACE Chicago were more conservative, therefore USACE Chicago curves were selected.

-

Building Size:

Per Town of East Haddam Assessor's Database.

-

Building Replacement Value:

Calculated based on the building size and the "replacement cost" for the building listed on the Town of East Haddam Assessor's Database.

Depth Damage Curve - Building
Floodplain and Stream Restoration @ 12D Norwich Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION				AFTER MITIGATION			
	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)
-2	3	8,424.23	0	0	3	8,424.23	0	0
-1	5	14,040.39	0	0	5	14,040.39	0	0
0	7	19,656.55	0	0	7	19,656.55	0	0
1	11	30,888.87	0	0	11	30,888.87	0	0
2	17	47,737.34	0	0	17	47,737.34	0	0
3	22	61,777.74	0	0	22	61,777.74	0	0
4	28	78,626.21	0	0	28	78,626.21	0	0
5	33	92,666.61	0	0	33	92,666.61	0	0
6	35	98,282.77	0	0	35	98,282.77	0	0
7	38	106,707.00	0	0	38	106,707.00	0	0
8	40	112,323.16	0	0	40	112,323.16	0	0
9	44	123,555.48	0	0	44	123,555.48	0	0
10	46	129,171.64	0	0	46	129,171.64	0	0
11	48	134,787.80	0	0	48	134,787.80	0	0
12	50	280,807.92	0	0	50	280,807.92	0	0
13	52	280,807.92	0	0	52	280,807.92	0	0
14	54	280,807.92	0	0	54	280,807.92	0	0
15	54	280,807.92	0	0	54	280,807.92	0	0
16	54	280,807.92	0	0	54	280,807.92	0	0

Contents Damages
Floodplain and Stream Restoration @ 12D Norwich Rd, East Haddam, Connecticut, 06423

Contents Value in Dollars:	\$0	Use Default:Yes
Utilities Elevated:	No	
Expected Annual Losses due to Contents Damages before Mitigation:	\$187	
Expected Annual Losses due to Contents Damages after Mitigation:	\$131	
Expected Annual Benefits - Contents:	\$56	

Comments

-

Utilities Elevated:

The default value for this input is "No".

Depth Damage Curve - Contents
Floodplain and Stream Restoration @ 12D Norwich Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION			AFTER MITIGATION	
	Percent (%)	Damage Value (\$)		Percent (%)	Damage Value (\$)
-2	6	8,424.23		6	8,424.23
-1	9	12,636.35		9	12,636.35
0	11	15,444.43		11	15,444.43
1	17	21,868.67		17	23,868.67
2	22	30,888.87		22	30,888.87
3	28	39,913.10		28	39,913.10
4	33	46,333.30		33	46,333.30
5	39	54,757.54		39	54,757.54
6	44	61,777.74		44	61,777.74
7	49	68,797.94		49	68,797.94
8	55	77,222.17		55	77,222.17
9	61	85,646.41		61	85,646.41
10	64	89,858.53		64	89,858.53
11	71	99,686.81		71	99,686.81
12	76	106,707.00		76	106,707.00
13	78	109,515.08		78	109,515.08
14	79	110,919.12		79	110,919.12
15	79	110,919.12		79	110,919.12
16	87	122,151.44		87	122,151.44

Displacement Costs Avoided
Floodplain and Stream Restoration @ 12D Norwich Rd, East Haddam, Connecticut, 06423

Lodging Per Diem:	\$110	Use Default:Yes
Meals Per Diem:	\$68	Use Default:Yes
Population Affected:	0	
Duration of Displacement (days):	365	Use Default:Yes
Total Residential Displacement Cost:	\$0	
Expected Annual Losses due to Displacement Damages before mitigation:	\$0	
Expected Annual Losses due to Displacement Damages after Mitigation:	\$0	
Expected Annual Losses - Displacement:	\$0	

Depth Damage Curve - Displacement
Floodplain and Stream Restoration @ 12D Norwich Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION		AFTER MITIGATION	
	Days	Damage Value (\$)	Days	Damage Value (\$)
-2	0	0	0	0
-1	0	0	0	0
0	0	0	0	0
1	45	0	45	0
2	90	0	90	0
3	135	0	135	0
4	180	0	180	0
5	225	0	225	0
6	270	0	270	0
7	315	0	315	0
8	360	0	360	0
9	405	0	405	0
10	450	0	450	0
11	495	0	495	0
12	540	0	540	0
13	585	0	585	0
14	630	0	630	0
15	675	0	675	0
16	720	0	720	0

Street Maintenance Costs Avoided
Floodplain and Stream Restoration @ 12D Norwich Rd, East Haddam, Connecticut, 06423

Total Annual Street Maintenance Budget:	\$0
Total Number of Street Miles Maintained:	0
Street Miles that will not require future maintenance:	0
Expected Annual Benefits - Street Maintenance:	\$0

Volunteer Costs Avoided
Floodplain and Stream Restoration @ 12D Norwich Rd, East Haddam, Connecticut, 06423

Number of Volunteers (volunteers/event):	0
Number of Days of Lodging:	0
Expected Annual Volunteer Benefits:	\$0

Ecosystem Services Losses Avoided
Floodplain and Stream Restoration @ 12D Norwich Rd, East Haddam, Connecticut, 06423

Total Project Area (acres):	0
Percentage of Urban Green Open Space:	0.00%
Percentage of Rural Green Open Space:	0.00%
Percentage of Riparian:	0.00%
Percentage of Coastal Wetlands:	0.00%
Percentage of Inland Wetlands:	0.00%
Percentage of Forests:	0.00%
Percentage of Coral Reefs:	0.00%
Percentage of Shellfish Reefs:	0.00%
Percentage of Beaches and Dunes:	0.00%
Expected Annual Ecosystem Services Benefits:	\$0

Benefits-Costs Summary
Floodplain and Stream Restoration @ 12D Norwich Rd, East Haddam, Connecticut, 06423

Discount Rate (%):	7.0%	Use Default:Yes
Total Project Benefits:	\$122	
Total Project Cost:	\$0	
Benefit-Cost Ratio:	0	



Benefit-Cost Calculator
V.6.0 (Build 20250604.2146) | Release Notes

Benefit-Cost Analysis

Project Name: Alternative 3: Remove Rehearsal Studio, Build Floodwall, Widen Creamery Road Bridge, & Build Culvert



Map Marker 	Mitigation Title	Property Type	Hazard	Discount Rate (%)	Benefits (B)	Costs (C)	BCR (B/C)
1	Acquisition @ 21 Norwich Rd, East Haddam, Connecticut, 06423		Riverine Flood	7.0	\$ 1,940,358	\$ 1,934,212	1.00
2	Floodplain and Stream Restoration @ 128 Norwich Rd, East Haddam, Connecticut, 06423		Riverine Flood	7.0	\$ 61,146	\$ 3,794,959	0.02
3	Floodplain and Stream Restoration @ 12E Norwich Rd, East Haddam, Connecticut, 06423		Riverine Flood	7.0	\$ 12,587	\$ 0	0.00
4	Floodplain and Stream Restoration @ 12K Norwich Rd, East Haddam, Connecticut, 06423		Riverine Flood	7.0	\$ 1,752	\$ 0	0.00
5	Floodplain and Stream Restoration @ 12F Norwich Rd, East Haddam, Connecticut, 06423		Riverine Flood	7.0	\$ 30,324	\$ 0	0.00
6	Floodplain and Stream Restoration @ 12G Norwich Rd, East Haddam, Connecticut, 06423		Riverine Flood	7.0	\$ 12,357	\$ 0	0.00
7	Floodplain and Stream Restoration @ 12H Norwich Rd, East Haddam, Connecticut, 06423		Riverine Flood	7.0	\$ 148,378	\$ 0	0.00
8	Floodplain and Stream Restoration @ 12I Norwich Rd, East Haddam, Connecticut, 06423		Riverine Flood	7.0	\$ 10,125	\$ 0	0.00
9	Floodplain and Stream Restoration @ 62 Creamery Rd, East Haddam, Connecticut, 06423		Riverine Flood	7.0	\$ 16,801	\$ 0	0.00
10	Floodplain and Stream Restoration @ 59 Creamery Rd, East Haddam, Connecticut, 06423		Riverine Flood	7.0	\$ 136,832	\$ 1,550,000	0.09
11	Floodplain and Stream Restoration @ 20 Norwich Rd, East Haddam, Connecticut, 06423		Riverine Flood	7.0	\$ 315,405	\$ 0	0.00
12	Floodplain and Stream Restoration @ 12D Norwich Rd, East Haddam, Connecticut, 06423		Riverine Flood	7.0	\$ 1,562	\$ 0	0.00
TOTAL (SELECTED)					\$ 2,687,627	\$ 7,279,171	0.37
TOTAL					\$ 2,687,627	\$ 7,279,171	0.37

Property Configuration

Property Title:

Acquisition @ 21 Norwich Rd, East Haddam, Connecticut, 06423

Property Location:

06423, Middlesex, Connecticut

Property Coordinates:

41.4551689663638, -72.45005179170229

Hazard Type:

Riverine Flood

Mitigation Action Type:

Acquisition

Property Type:

Non-Residential Building

Analysis Method Type:

Modeled Damages

Cost Estimation

Acquisition @ 21 Norwich Rd, East Haddam, Connecticut, 06423

Discount Rate (%):

7.0% Use Default:Yes

Project Useful Life (years):

100

Project Cost:

\$1,870,000

Number of Maintenance Years:

100 Use Default:Yes

Annual Maintenance Cost:

\$4,500

Comments

-

Mitigation Project Cost:

Includes existing rehearsal studio removal, channel widening/restoration, and construction of new studio on alternate property owned by Goodspeed.

Hazard Probabilities Parameters - Flood

Acquisition @ 21 Norwich Rd, East Haddam, Connecticut, 06423

Lowest Floor Elevation of the Property (ft):

40.7

Streambed Elevation at the Property Location (ft):

33.8

Use Default Recurrence Intervals:

Use Default:Yes

Comments

-

Lowest Floor Elevation:

Based on 2024 survey by Martinez Couch & Associates, LLC (MCA).

Streambed Elevation:

Based on 2024 survey by Martinez Couch & Associates, LLC (MCA).

Discharge

Acquisition @ 21 Norwich Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION		
Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)
10	43.39	533
50	44.69	971
100	45.28	1188
500	46.44	1884

AFTER MITIGATION		
Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)
10	43.39	533
50	44.69	971
100	45.28	1188
500	46.44	1884

Estimated Annual Damages by Category
Acquisition @ 21 Norwich Rd, East Haddam, Connecticut, 06423

Before Mitigation						
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)	
-2	0.33	\$ 0	\$ 0	\$ 0	\$ 0	
-1.02	1.11	\$ 0	\$ 0	\$ 0	\$ 0	
0	1.52	\$ 0	\$ 0	\$ 0	\$ 0	
0.53	2	\$ 34,327	\$ 10,726	\$ 0	\$ 0	
1.78	5	\$ 15,966	\$ 6,866	\$ 0	\$ 0	
2.29	8	\$ 6,014	\$ 3,304	\$ 0	\$ 0	
2.53	1006	\$ 13,154	\$ 7,748	\$ 0	\$ 0	
3.18	20	\$ 4,978	\$ 2,938	\$ 0	\$ 0	
3.53	30	\$ 2,656	\$ 1,536	\$ 0	\$ 0	
3.78	40	\$ 1,645	\$ 939	\$ 0	\$ 0	
3.87	49.85	\$ 1,564	\$ 658	\$ 0	\$ 0	
4.12	60	\$ 834	\$ 469	\$ 0	\$ 0	
4.24	70	\$ 635	\$ 355	\$ 0	\$ 0	
4.35	80	\$ 501	\$ 279	\$ 0	\$ 0	
4.45	90	\$ 250	\$ 139	\$ 0	\$ 0	
4.5	115.11	\$ 2,056	\$ 1,126	\$ 0	\$ 0	
5.06	200	\$ 665	\$ 357	\$ 0	\$ 0	
5.38	300	\$ 342	\$ 181	\$ 0	\$ 0	
5.59	400	\$ 268	\$ 141	\$ 0	\$ 0	
5.81	537.72	\$ 1,971	\$ 493	\$ 0	\$ 0	
Total (\$)		\$ 87,527	\$ 48,455	\$ 0	\$ 0	

After Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
Total (\$)		\$ 0	\$ 0	\$ 0	\$ 0

Building Information
Acquisition @ 21 Norwich Rd, East Haddam, Connecticut, 06423

Non-Residential Occupancy Type:

COM8: Commercial - Entertainment and Recreation

Building is outside hundred-year flood area:

No

Building Type:

Recreation

Building Is Engineered:

Yes

NFIP:

No

Comments

•

Structure Type:

Per the BCA Toolkit documentation, Recreational building types can include structures such as fitness studios. The rehearsal studio has a large room used for rehearsals of choreography for stage performances, with smaller rooms used for music and line rehearsals, which is similar to a fitness studio.

•

Outside Hundred-Year Flood Zone:

The building is within the 100-year floodplain based on the 2024 Kleinfelder H&H Model.

•

Is Engineered:

The building was formerly a manufacturing facility purpose-built to use water power from Succor Brook. Historic use of the building is documented in the National Register of Historic Places entry for the East Haddam Historic District.

•

:

The building does not have a

Building Damages
Acquisition @ 21 Norwich Rd, East Haddam, Connecticut, 06423

Depth Damage Curve:

Recreation (Default)

Use Default:Yes

Building Size (sq.ft):

3,245

Building Replacement Value (BRV) (\$/sq.ft):

\$327

Use Default: No

Demolition Threshold (%):

50.00%

Use Default:Yes

Expected Annual Losses due to Building Damages before Mitigation:

\$87,527

Expected Annual Losses due to Building Damages after Mitigation:

\$0

Expected Annual Benefits - Building:

\$87,527

Comments

•

First Floor Area:

Based on 2024 survey by Martinez Couch & Associates, LLC (MCA).

•

Building Replacement Value:

Based on RSMeans estimate for building replacement with a one-story brick office building. Office building was chosen as the closest category in RSMeans' database to the rehearsal studio that allowed entry of a 3,245 SF building.

Depth Damage Curve - Building
Acquisition @ 21 Norwich Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION					AFTER MITIGATION				
	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)		
-2	0	0	0	0	0	0	0	0		
-1	0	0	0	0	0	0	0	0		
0	0	0	0	0	0	0	0	0		
1	11.6	126,187.53	0	0	0	0	0	0		
2	20.2	214,715.80	0	0	0	0	0	0		
3	26	275,594.60	0	0	0	0	0	0		
4	32.2	341,313.31	0	0	0	0	0	0		
5	36.8	390,072.36	0	0	0	0	0	0		
6	40.7	431,491.55	0	0	0	0	0	0		
7	43.4	460,030.99	0	0	0	0	0	0		
8	47.4	502,430.16	0	0	0	0	0	0		
9	49.4	523,629.74	0	0	0	0	0	0		
10	51.6	1,059,979.25	0	0	0	0	0	0		
11	51.6	1,059,979.25	0	0	0	0	0	0		
12	51.6	1,059,979.25	0	0	0	0	0	0		
13	51.6	1,059,979.25	0	0	0	0	0	0		
14	51.6	1,059,979.25	0	0	0	0	0	0		
15	51.6	1,059,979.25	0	0	0	0	0	0		
16	51.6	1,059,979.25	0	0	0	0	0	0		

Contents Damages
Acquisition @ 21 Norwich Rd, East Haddam, Connecticut, 06423

Contents Value in Dollars:

\$0

Use Default:Yes

Expected Annual Losses due to Contents Damages before Mitigation:

\$48,455

Expected Annual Losses due to Contents Damages after Mitigation:

\$0

Expected Annual Benefits - Contents:

\$48,455

Depth Damage Curve - Contents
Acquisition @ 21 Norwich Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION			AFTER MITIGATION		
	Percent (%)	Damage Value (\$)		Percent (%)	Damage Value (\$)	
-2	0	0		0	0	
-1	0	0		0	0	
0	0	0		0	0	
1	26	68,898.65		0	0	
2	44	136,597.71		0	0	
3	60	186,946.73		0	0	
4	73	193,446.21		0	0	
5	80	211,995.85		0	0	
6	84	222,595.64		0	0	
7	91	241,145.27		0	0	
8	95	251,745.07		0	0	
9	95	251,745.07		0	0	
10	95	251,745.07		0	0	
11	95	251,745.07		0	0	
12	95	251,745.07		0	0	
13	95	251,745.07		0	0	
14	95	251,745.07		0	0	
15	95	251,745.07		0	0	
16	95	251,745.07		0	0	

Displacement Costs Avoided
Acquisition @ 21 Norwich Rd, East Haddam, Connecticut, 06423

Monthly Displacement Cost (\$/sq.ft/month):	☒ Use Default: No
One-Time Displacement Cost (\$/sq.ft):	☐ Use Default: Yes
Expected Annual Losses due to Displacement Damages before mitigation:	\$0
Expected Annual Losses due to Displacement Damages after Mitigation:	\$0
Expected Annual Losses - Displacement:	\$0

Depth Damage Curve - Displacement
Acquisition @ 21 Norwich Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION			AFTER MITIGATION		
	Days	Damage Value (\$)		Days	Damage Value (\$)	
-2	0	0		0	0	
-1	0	0		0	0	
0	0	0		0	0	
1	45	0		0	0	
2	90	0		0	0	
3	135	0		0	0	
4	180	0		0	0	
5	225	0		0	0	
6	270	0		0	0	
7	315	0		0	0	
8	360	0		0	0	
9	405	0		0	0	
10	450	0		0	0	
11	450	0		0	0	
12	450	0		0	0	
13	450	0		0	0	
14	450	0		0	0	
15	450	0		0	0	
16	450	0		0	0	

Loss of Function/Loss of Income Avoided
Acquisition @ 21 Norwich Rd, East Haddam, Connecticut, 06423

Annual Operating Budget:	\$0
Loss of Function/Loss of Income Per Day:	\$0
Expected Annual Losses due to Loss of Function/Loss of Income before mitigation:	\$0
Expected Annual Losses due to Loss of Function/Loss of Income after mitigation:	\$0
Expected Annual Benefits - Loss of Function/Loss of Income Avoided:	\$0

Depth Damage Curve - Loss of Function/Loss of Income
Acquisition @ 21 Norwich Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION			AFTER MITIGATION		
	Days	Damage Value (\$)		Days	Damage Value (\$)	
-2	0	0		0	0	
-1	0	0		0	0	
0	0	0		0	0	
1	45	0		0	0	
2	90	0		0	0	
3	135	0		0	0	
4	180	0		0	0	
5	225	0		0	0	
6	270	0		0	0	
7	315	0		0	0	
8	360	0		0	0	
9	405	0		0	0	
10	450	0		0	0	
11	450	0		0	0	
12	450	0		0	0	
13	450	0		0	0	
14	450	0		0	0	
15	450	0		0	0	
16	450	0		0	0	

Volunteer Costs Avoided
Acquisition @ 21 Norwich Rd, East Haddam, Connecticut, 06423

Number of Volunteers (volunteers/event):	0
Number of Days of Lodging:	0
Expected Annual Volunteer Benefits:	\$0

Ecosystem Services Losses Avoided
Acquisition @ 21 Norwich Rd, East Haddam, Connecticut, 06423

Total Project Area (acres):	0
Percentage of Urban Green Open Space:	0.00%
Percentage of Rural Green Open Space:	0.00%
Percentage of Riparian:	0.00%
Percentage of Coastal Wetlands:	0.00%
Percentage of Inland Wetlands:	0.00%
Percentage of Forests:	0.00%
Percentage of Coral Reefs:	0.00%
Percentage of Shellfish Reefs:	0.00%
Percentage of Beaches and Dunes:	0.00%
Expected Annual Ecosystem Services Benefits:	\$0

Comments

Percent Riparian:

Not applicable.

Percent Forests:

Not applicable.

Percent Urban Green Open Space:

Not applicable.

Percent Rural Green Open Space:

Not applicable.

Percent Coastal Wetlands:

Not applicable.

Percent Inland Wetlands:

Not applicable.

Coral Reefs:

Not applicable.

Shellfish Reefs:

Not applicable.

Beaches and Dunes:

Not applicable.

Total Project Area:

Not applicable.

Benefits-Costs Summary

Acquisition @ 21 Norwich Rd, East Haddam, Connecticut, 06423

Discount Rate (%):

7.0%

Use Default:Yes

Total Project Benefits:

\$1,940,358

Total Project Cost:

\$1,934,212

Benefit-Cost Ratio:

1.00

Property Configuration

Property Title:

Floodplain and Stream Restoration @ 128 Norwich Rd, East Haddam, Connecticut, 06423

Property Location:

06423, Middlesex, Connecticut

Property Coordinates:

41.45438196885874, -72.45918517190287

Hazard Type:

Riverine Flood

Mitigation Action Type:

Floodplain and Stream Restoration

Property Type:

Residential Building

Analysis Method Type:

Modeled Damages

Cost Estimation

Floodplain and Stream Restoration @ 128 Norwich Rd, East Haddam, Connecticut, 06423

Discount Rate (%):

7.0%

Use Default:Yes

Project Useful Life (years):

35

Project Cost:

\$3,290,000

Number of Maintenance Years:

35

Use Default:Yes

Annual Maintenance Cost:

\$39,000

Comments

Project Useful Life:

Flood protection at this building is due to a combination of a floodwall/berm and a culvert with end treatments. However, the effectiveness of this alternative is expected to diminish as a result of projected future storms. Therefore, the minimum PUL for concrete infrastructure (35 years) was selected.

Mitigation Project Cost:

Includes construction of the berm/floodwall, raised driveway, and relief culvert under Norwich Road. These components have a PUL of 35 years.

Annual Maintenance Cost:

Annual cost for inspection and maintenance of the floodwall, assumed to be equal to 5% of the construction cost of the floodwall.

Hazard Probabilities Parameters - Flood

Floodplain and Stream Restoration @ 128 Norwich Rd, East Haddam, Connecticut, 06423

Lowest Floor Elevation of the Property (ft):

34.3

Streambed Elevation at the Property Location (ft):

25.5

Use Default Recurrence Intervals:

Use Default:Yes

Discharge

Floodplain and Stream Restoration @ 128 Norwich Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION

Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)
10	32.53	533
50	32.47	971
100	32.56	1188
500	33.06	1884

AFTER MITIGATION

Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)
10	28.95	533
50	29.25	971
100	31.91	1188
500	32.66	1884

Estimated Annual Damages by Category
Floodplain and Stream Restoration @ 12B Norwich Rd, East Haddam, Connecticut, 06423

Before Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-2.61	1	\$ 0	\$ 0	\$ 0	\$ 0
-2.24	2	\$ 0	\$ 0	\$ 0	\$ 0
-2.03	5	\$ 0	\$ 0	\$ 0	\$ 0
-2	5.82	\$ 693	\$ 690	\$ 0	\$ 0
-1.84	8	\$ 989	\$ 984	\$ 0	\$ 0
-1.9	10.06	\$ 787	\$ 789	\$ 0	\$ 0
-1.78	20	\$ 278	\$ 269	\$ 0	\$ 0
-1.72	30	\$ 143	\$ 137	\$ 0	\$ 0
-1.7	40	\$ 86	\$ 83	\$ 0	\$ 0
-1.67	49.85	\$ 60	\$ 57	\$ 0	\$ 0
-1.65	60	\$ 43	\$ 41	\$ 0	\$ 0
-1.62	70	\$ 32	\$ 31	\$ 0	\$ 0
-1.6	80	\$ 25	\$ 24	\$ 0	\$ 0
-1.6	90	\$ 13	\$ 12	\$ 0	\$ 0
-1.58	95.93	\$ 102	\$ 96	\$ 0	\$ 0
-1.51	200	\$ 32	\$ 30	\$ 0	\$ 0
-1.47	300	\$ 16	\$ 15	\$ 0	\$ 0
-1.44	400	\$ 13	\$ 12	\$ 0	\$ 0
-1.41	537.72	\$ 48	\$ 41	\$ 0	\$ 0
0	10670727221194	\$ 0	\$ 0	\$ 0	\$ 0
Total (\$)		\$ 2,762	\$ 2,692	\$ 0	\$ 0

After Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-7.65	1	\$ 0	\$ 0	\$ 0	\$ 0
-6.75	2	\$ 0	\$ 0	\$ 0	\$ 0
-5.76	5	\$ 0	\$ 0	\$ 0	\$ 0
-5.3	8	\$ 0	\$ 0	\$ 0	\$ 0
-5.09	10.06	\$ 0	\$ 0	\$ 0	\$ 0
-4.42	20	\$ 0	\$ 0	\$ 0	\$ 0
-4.02	30	\$ 0	\$ 0	\$ 0	\$ 0
-3.72	40	\$ 0	\$ 0	\$ 0	\$ 0
-3.49	49.85	\$ 0	\$ 0	\$ 0	\$ 0
-3.33	60	\$ 0	\$ 0	\$ 0	\$ 0
-3.17	70	\$ 0	\$ 0	\$ 0	\$ 0
-3.02	80	\$ 0	\$ 0	\$ 0	\$ 0
-2.9	90	\$ 0	\$ 0	\$ 0	\$ 0
-2.83	95.93	\$ 0	\$ 0	\$ 0	\$ 0
-2.07	200	\$ 0	\$ 0	\$ 0	\$ 0
-2	214.37	\$ 21	\$ 21	\$ 0	\$ 0
-1.62	300	\$ 16	\$ 15	\$ 0	\$ 0
-1.3	400	\$ 14	\$ 13	\$ 0	\$ 0
-0.87	537.72	\$ 31	\$ 28	\$ 0	\$ 0
0	1260.74	\$ 383	\$ 391	\$ 0	\$ 0
Total (\$)		\$ 465	\$ 386	\$ 0	\$ 0

Building Information
Floodplain and Stream Restoration @ 12B Norwich Rd, East Haddam, Connecticut, 06423

Building Type:	Two or More Stories
Foundation Type:	
Building Has Basement:	Yes
NFIP:	No

Building Damages
Floodplain and Stream Restoration @ 12B Norwich Rd, East Haddam, Connecticut, 06423

Depth Damage Curve:	USACE - Chicago: two story, w/ basement	Use Default:Yes
Building Size (sq.ft):	3,030	
Building Replacement Value (BRV) (\$/sq.ft):	\$159	Use Default: No
Demolition Threshold (%):	50.00%	Use Default:Yes
Expected Annual Losses due to Building Damages before Mitigation:	\$2,762	
Expected Annual Losses due to Building Damages after Mitigation:	\$465	
Expected Annual Benefits - Building:	\$2,297	

Depth Damage Curve - Building
Floodplain and Stream Restoration @ 12B Norwich Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION						AFTER MITIGATION					
Flood Depth (ft)	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)		Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)		
-2	3	14,473.09	0	0		3	14,473.09	0	0		
-4	5	24,021.83	0	0		5	24,021.83	0	0		
0	7	33,770.56	0	0		7	33,770.56	0	0		
1	11	53,068.02	0	0		11	53,068.02	0	0		
2	17	82,014.22	0	0		17	82,014.22	0	0		
3	22	106,136.05	0	0		22	106,136.05	0	0		
4	28	135,982.24	0	0		28	135,982.24	0	0		
5	33	159,204.07	0	0		33	159,204.07	0	0		
6	35	168,852.81	0	0		35	168,852.81	0	0		
7	38	183,325.90	0	0		38	183,325.90	0	0		
8	40	192,974.64	0	0		40	192,974.64	0	0		
9	44	212,272.10	0	0		44	212,272.10	0	0		
10	46	221,920.83	0	0		46	221,920.83	0	0		
11	48	231,569.56	0	0		48	231,569.56	0	0		
12	50	482,436.6	0	0		50	482,436.6	0	0		
13	52	482,436.6	0	0		52	482,436.6	0	0		
14	54	482,436.6	0	0		54	482,436.6	0	0		
15	54	482,436.6	0	0		54	482,436.6	0	0		
16	54	482,436.6	0	0		54	482,436.6	0	0		

Contents Damages
Floodplain and Stream Restoration @ 12B Norwich Rd, East Haddam, Connecticut, 06423

Contents Value in Dollars:	\$0	Use Default:Yes
Utilities Elevated:	No	
Expected Annual Losses due to Contents Damages before Mitigation:	\$2,692	
Expected Annual Losses due to Contents Damages after Mitigation:	\$266	
Expected Annual Benefits - Contents:	\$2,426	

Depth Damage Curve - Contents
Floodplain and Stream Restoration @ 12B Norwich Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION			AFTER MITIGATION		
	Percent (%)	Damage Value (\$)		Percent (%)	Damage Value (\$)	
-2	6	14,473.09		6	14,473.09	
-1	9	21,709.64		9	21,709.64	
0	11	26,534.01		11	26,534.01	
1	17	41,007.11		17	41,007.11	
2	22	53,068.02		22	53,068.02	
3	28	67,541.12		28	67,541.12	
4	33	79,602.03		33	79,602.03	
5	39	94,075.13		39	94,075.13	
6	44	106,136.05		44	106,136.05	
7	49	118,196.96		49	118,196.96	
8	55	132,670.06		55	132,670.06	
9	61	147,143.16		61	147,143.16	
10	64	154,379.71		64	154,379.71	
11	71	171,264.99		71	171,264.99	
12	76	183,325.90		76	183,325.90	
13	78	188,150.27		78	188,150.27	
14	79	190,562.45		79	190,562.45	
15	79	190,562.45		79	190,562.45	
16	87	209,859.92		87	209,859.92	

Displacement Costs Avoided
Floodplain and Stream Restoration @ 12B Norwich Rd, East Haddam, Connecticut, 06423

Lodging Per Diem:	\$110	Use Default:Yes
Meals Per Diem:	\$68	Use Default:Yes
Population Affected:	0	
Duration of Displacement (days):	365	Use Default:Yes
Total Residential Displacement Cost:	\$0	
Expected Annual Losses due to Displacement Damages before mitigation:	\$0	
Expected Annual Losses due to Displacement Damages after Mitigation:	\$0	
Expected Annual Losses - Displacement:	\$0	

Depth Damage Curve - Displacement
Floodplain and Stream Restoration @ 12B Norwich Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION			AFTER MITIGATION		
	Days	Damage Value (\$)		Days	Damage Value (\$)	
-2	0	0		0	0	
-1	0	0		0	0	
0	0	0		0	0	
1	45	0		45	0	
2	90	0		90	0	
3	135	0		135	0	
4	180	0		180	0	
5	225	0		225	0	
6	270	0		270	0	
7	315	0		315	0	
8	360	0		360	0	
9	405	0		405	0	
10	450	0		450	0	
11	495	0		495	0	
12	540	0		540	0	
13	585	0		585	0	
14	630	0		630	0	
15	675	0		675	0	
16	720	0		720	0	

Street Maintenance Costs Avoided
Floodplain and Stream Restoration @ 12B Norwich Rd, East Haddam, Connecticut, 06423

Total Annual Street Maintenance Budget:	\$0
Total Number of Street Miles Maintained:	0
Street Miles that will not require future maintenance:	0
Expected Annual Benefits - Street Maintenance:	\$0

Volunteer Costs Avoided
Floodplain and Stream Restoration @ 12B Norwich Rd, East Haddam, Connecticut, 06423

Number of Volunteers (volunteers/event):	0
Number of Days of Lodging:	0
Expected Annual Volunteer Benefits:	\$0

Ecosystem Services Losses Avoided
Floodplain and Stream Restoration @ 12B Norwich Rd, East Haddam, Connecticut, 06423

Total Project Area (acres):	0
Percentage of Urban Green Open Space:	0.00%
Percentage of Rural Green Open Space:	0.00%
Percentage of Riparian:	0.00%
Percentage of Coastal Wetlands:	0.00%
Percentage of Inland Wetlands:	0.00%
Percentage of Forests:	0.00%
Percentage of Shellfish Reefs:	0.00%
Percentage of Beaches and Dunes:	0.00%
Expected Annual Ecosystem Services Benefits:	\$0

Benefits-Costs Summary
Floodplain and Stream Restoration @ 12B Norwich Rd, East Haddam, Connecticut, 06423

Discount Rate (%):	7.0%	Use Default:Yes
Total Project Benefits:	\$61,146	
Total Project Cost:	\$3,794,959	
Benefit-Cost Ratio:	0.02	

Property Configuration

Property Title:	Floodplain and Stream Restoration @ 12E Norwich Rd, East Haddam, Connecticut, 06423
Property Location:	06423, Middlesex, Connecticut
Property Coordinates:	41.45438196885874, -72.45918517190287
Hazard Type:	Riverine Flood
Mitigation Action Type:	Floodplain and Stream Restoration
Property Type:	Residential Building
Analysis Method Type:	Modeled Damages

Cost Estimation

Floodplain and Stream Restoration @ 12E Norwich Rd, East Haddam, Connecticut, 06423

Discount Rate (%):	7.0%	Use Default:Yes
Project Useful Life (years):	35	
Project Cost:	\$0	
Number of Maintenance Years:	35	Use Default:Yes
Annual Maintenance Cost:	\$0	

Comments

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Project Useful Life:
Flood protection at this building is due to a combination of a floodwall/berm and a culvert with end treatments. However, the effectiveness of this alternative is expected to diminish as a result of projected future storms. Therefore, the minimum PUL for concrete infrastructure (35 years) was selected.

Hazard Probabilities Parameters - Flood

Floodplain and Stream Restoration @ 12E Norwich Rd, East Haddam, Connecticut, 06423

Lowest Floor Elevation of the Property (ft):	27.1
Streambed Elevation at the Property Location (ft):	15.1
Use Default Recurrence Intervals:	Use Default:Yes

Discharge

Floodplain and Stream Restoration @ 12E Norwich Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION		
Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)
10	24.97	533
50	25.34	971
100	25.5	1188
500	25.88	1884

AFTER MITIGATION		
Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)
10	19.82	533
50	21.76	971
100	22.42	1188
500	25.06	1884

Estimated Annual Damages by Category

Floodplain and Stream Restoration @ 12E Norwich Rd, East Haddam, Connecticut, 06423

Before Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-3.43	111	\$ 0	\$ 0	\$ 0	\$ 0
-2.8	2	\$ 0	\$ 0	\$ 0	\$ 0
-2.38	5	\$ 0	\$ 0	\$ 0	\$ 0
-2.22	8	\$ 0	\$ 0	\$ 0	\$ 0
-2.15	1006	\$ 0	\$ 0	\$ 0	\$ 0
-2	1636	\$ 80	\$ 80	\$ 0	\$ 0
-1.94	20	\$ 156	\$ 153	\$ 0	\$ 0
-1.85	30	\$ 82	\$ 80	\$ 0	\$ 0
-1.78	40	\$ 59	\$ 49	\$ 0	\$ 0
-1.73	4985	\$ 36	\$ 34	\$ 0	\$ 0
-1.67	60	\$ 25	\$ 24	\$ 0	\$ 0
-1.65	70	\$ 19	\$ 18	\$ 0	\$ 0
-1.62	80	\$ 15	\$ 15	\$ 0	\$ 0
-1.58	90	\$ 8	\$ 7	\$ 0	\$ 0
-1.58	9593	\$ 63	\$ 59	\$ 0	\$ 0
-1.63	200	\$ 21	\$ 19	\$ 0	\$ 0
-1.55	300	\$ 11	\$ 10	\$ 0	\$ 0
-1.28	400	\$ 8	\$ 8	\$ 0	\$ 0
-1.24	537.72	\$ 31	\$ 26	\$ 0	\$ 0
0	2240453.13	\$ 0	\$ 0	\$ 0	\$ 0
Total (\$)		\$ 605	\$ 582	\$ 0	\$ 0

After Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-10.34	111	\$ 0	\$ 0	\$ 0	\$ 0
-9.4	2	\$ 0	\$ 0	\$ 0	\$ 0
-8.36	5	\$ 0	\$ 0	\$ 0	\$ 0
-7.58	8	\$ 0	\$ 0	\$ 0	\$ 0
-7.3	1006	\$ 0	\$ 0	\$ 0	\$ 0
-6.46	20	\$ 0	\$ 0	\$ 0	\$ 0
-5.96	30	\$ 0	\$ 0	\$ 0	\$ 0
-5.82	40	\$ 0	\$ 0	\$ 0	\$ 0
-5.34	4985	\$ 0	\$ 0	\$ 0	\$ 0
-5.11	60	\$ 0	\$ 0	\$ 0	\$ 0
-4.91	70	\$ 0	\$ 0	\$ 0	\$ 0
-4.74	80	\$ 0	\$ 0	\$ 0	\$ 0
-4.59	90	\$ 0	\$ 0	\$ 0	\$ 0
-4.49	9593	\$ 0	\$ 0	\$ 0	\$ 0
-3.54	200	\$ 0	\$ 0	\$ 0	\$ 0
-2.99	300	\$ 0	\$ 0	\$ 0	\$ 0
-2.58	400	\$ 0	\$ 0	\$ 0	\$ 0
-2.18	537.72	\$ 0	\$ 0	\$ 0	\$ 0
-2	615.66	\$ 16	\$ 14	\$ 0	\$ 0
0	2379.78	\$ 123	\$ 61	\$ 0	\$ 0
Total (\$)		\$ 139	\$ 75	\$ 0	\$ 0

Building Information

Floodplain and Stream Restoration @ 12E Norwich Rd, East Haddam, Connecticut, 06423

Building Type:	Two or More Stories
Foundation Type:	
Building Has Basement:	Yes
NFIP:	No

Building Damages
Floodplain and Stream Restoration @ 12E Norwich Rd, East Haddam, Connecticut, 06423

Depth Damage Curve:

USACE - Chicago: two story, w/ basement

Use Default:Yes

Building Size (sq.ft):

1426

Building Replacement Value (BRV) (\$/sq.ft):

\$205

Use Default: No

Demolition Threshold (%):

50.00%

Use Default:Yes

Expected Annual Losses due to Building Damages before Mitigation:

\$605

Expected Annual Losses due to Building Damages after Mitigation:

\$139

Expected Annual Benefits - Building:

\$466

Depth Damage Curve - Building
Floodplain and Stream Restoration @ 12E Norwich Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION					AFTER MITIGATION				
Flood Depth (ft)	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)	
-2	3	8,774.60	0	0	3	8,774.60	0	0	
-1	5	14,624.34	0	0	5	14,624.34	0	0	
0	7	20,474.08	0	0	7	20,474.08	0	0	
1	11	32,173.55	0	0	11	32,173.55	0	0	
2	17	49,722.76	0	0	17	49,722.76	0	0	
3	22	64,347.10	0	0	22	64,347.10	0	0	
4	28	81,896.32	0	0	28	81,896.32	0	0	
5	33	96,520.66	0	0	33	96,520.66	0	0	
6	35	102,370.40	0	0	35	102,370.40	0	0	
7	38	111,145.00	0	0	38	111,145.00	0	0	
8	40	116,994.74	0	0	40	116,994.74	0	0	
9	44	128,694.21	0	0	44	128,694.21	0	0	
10	46	134,543.95	0	0	46	134,543.95	0	0	
11	48	140,393.69	0	0	48	140,393.69	0	0	
12	50	292,486.86	0	0	50	292,486.86	0	0	
13	52	292,486.86	0	0	52	292,486.86	0	0	
14	54	292,486.86	0	0	54	292,486.86	0	0	
15	54	292,486.86	0	0	54	292,486.86	0	0	
16	54	292,486.86	0	0	54	292,486.86	0	0	

Contents Damages
Floodplain and Stream Restoration @ 12E Norwich Rd, East Haddam, Connecticut, 06423

Contents Value in Dollars:

\$0

Use Default:Yes

Utilities Elevated:

No

Expected Annual Losses due to Contents Damages before Mitigation:

\$582

Expected Annual Losses due to Contents Damages after Mitigation:

\$76

Expected Annual Benefits - Contents:

\$506

Depth Damage Curve - Contents
Floodplain and Stream Restoration @ 12E Norwich Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION			AFTER MITIGATION		
	Percent (%)	Damage Value (\$)		Percent (%)	Damage Value (\$)	
-2	6	8,774.60		6	8,774.60	
-1	9	13,915.90		9	13,915.90	
0	11	16,086.77		11	16,086.77	
1	17	24,803.38		17	24,803.38	
2	22	32,173.55		22	32,173.55	
3	28	40,948.16		28	40,948.16	
4	33	48,260.33		33	48,260.33	
5	39	57,034.93		39	57,034.93	
6	44	64,347.10		44	64,347.10	
7	49	71,659.28		49	71,659.28	
8	55	80,433.88		55	80,433.88	
9	61	89,208.49		61	89,208.49	
10	64	93,595.79		64	93,595.79	
11	71	103,882.83		71	103,882.83	
12	76	111,145.00		76	111,145.00	
13	78	114,068.87		78	114,068.87	
14	79	116,532.30		79	116,532.30	
15	79	116,532.30		79	116,532.30	
16	87	127,231.78		87	127,231.78	

Displacement Costs Avoided
Floodplain and Stream Restoration @ 12E Norwich Rd, East Haddam, Connecticut, 06423

Lodging Per Diem:

\$110

Use Default:Yes

Meals Per Diem:

\$68

Use Default:Yes

Population Affected:

0

Duration of Displacement (days):

365

Use Default:Yes

Total Residential Displacement Cost:

\$0

Expected Annual Losses due to Displacement Damages before mitigation:

\$0

Expected Annual Losses due to Displacement Damages after Mitigation:

\$0

Expected Annual Losses - Displacement:

\$0

Comments

-

Number of Building Residents:
Building has two units.

Depth Damage Curve - Displacement
Floodplain and Stream Restoration @ 12E Norwich Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION		AFTER MITIGATION	
	Days	Damage Value (\$)	Days	Damage Value (\$)
-2	0	0	0	0
-1	0	0	0	0
0	0	0	0	0
1	45	0	45	0
2	90	0	90	0
3	135	0	135	0
4	180	0	180	0
5	225	0	225	0
6	270	0	270	0
7	315	0	315	0
8	360	0	360	0
9	405	0	405	0
10	450	0	450	0
11	495	0	495	0
12	540	0	540	0
13	585	0	585	0
14	630	0	630	0
15	675	0	675	0
16	720	0	720	0

Street Maintenance Costs Avoided
Floodplain and Stream Restoration @ 12E Norwich Rd, East Haddam, Connecticut, 06423

Total Annual Street Maintenance Budget:	\$0
Total Number of Street Miles Maintained:	0
Street Miles that will not require future maintenance:	0
Expected Annual Benefits - Street Maintenance:	\$0

Volunteer Costs Avoided
Floodplain and Stream Restoration @ 12E Norwich Rd, East Haddam, Connecticut, 06423

Number of Volunteers (volunteers/event):	0
Number of Days of Lodging:	0
Expected Annual Volunteer Benefits:	\$0

Ecosystem Services Losses Avoided
Floodplain and Stream Restoration @ 12E Norwich Rd, East Haddam, Connecticut, 06423

Total Project Area (acres):	0
Percentage of Urban Green Open Space:	0.00%
Percentage of Rural Green Open Space:	0.00%
Percentage of Riparian:	0.00%
Percentage of Coastal Wetlands:	0.00%
Percentage of Inland Wetlands:	0.00%
Percentage of Forests:	0.00%
Percentage of Coral Reefs:	0.00%
Percentage of Shellfish Reefs:	0.00%
Percentage of Beaches and Dunes:	0.00%
Expected Annual Ecosystem Services Benefits:	\$0

Benefits-Costs Summary
Floodplain and Stream Restoration @ 12E Norwich Rd, East Haddam, Connecticut, 06423

Discount Rate (%):	7.0% Use Default:Yes
Total Project Benefits:	\$12,587
Total Project Cost:	\$0
Benefit-Cost Ratio:	0

Property Configuration

Property Title:	Floodplain and Stream Restoration @ 12K Norwich Rd, East Haddam, Connecticut, 06423
Property Location:	06423, Middlesex, Connecticut
Property Coordinates:	41.45438196885874, -72.45918517190287
Hazard Type:	Riverine Flood
Mitigation Action Type:	Floodplain and Stream Restoration
Property Type:	Non-Residential Building
Analysis Method Type:	Modeled Damages

Cost Estimation
Floodplain and Stream Restoration @ 12K Norwich Rd, East Haddam, Connecticut, 06423

Discount Rate (%):	7.0% Use Default:Yes
Project Useful Life (years):	35
Project Cost:	\$0
Number of Maintenance Years:	35 Use Default:Yes
Annual Maintenance Cost:	\$0

Comments

-

Project Useful Life:

Flood protection at this building is due to a combination of a floodwall/berm and a culvert with end treatments. However, the effectiveness of this alternative is expected to diminish as a result of projected future storms. Therefore, the minimum PUL for concrete infrastructure (35 years) was selected.

Hazard Probabilities Parameters - Flood
Floodplain and Stream Restoration @ 12K Norwich Rd, East Haddam, Connecticut, 06423

Lowest Floor Elevation of the Property (ft):	21.6
Streambed Elevation at the Property Location (ft):	12.3
Use Default Recurrence Intervals:	Use Default:Yes

Discharge
Floodplain and Stream Restoration @ 12K Norwich Rd, East Haddam, Connecticut, 06423

Recurrence Interval (years)	BEFORE MITIGATION	
	Surface Elevation (ft)	Discharge (cfs)
10	21.99	533
50	21.72	971
100	21.70	1188
500	21.81	1884
Recurrence Interval (years)	AFTER MITIGATION	
	Surface Elevation (ft)	Discharge (cfs)
10	15.76	533
50	17.62	971
100	18.49	1188
500	21.47	1884

Estimated Annual Damages by Category
Floodplain and Stream Restoration @ 12K Norwich Rd, East Haddam, Connecticut, 06423

Before Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-2	0.33	\$0	\$0	\$0	\$0
-1.23	1.11	\$0	\$0	\$0	\$0
-0.79	2	\$0	\$0	\$0	\$0
-0.40	5	\$0	\$0	\$0	\$0
-0.36	8	\$0	\$0	\$0	\$0
-0.31	10.06	\$0	\$0	\$0	\$0
-0.17	20	\$0	\$0	\$0	\$0
-0.08	30	\$0	\$0	\$0	\$0
-0.03	40	\$0	\$0	\$0	\$0
-0.01	49.85	\$0	\$0	\$0	\$0
0	53.74	\$0	\$0	\$0	\$0
0.02	60	\$1	\$1	\$5	\$0
0.04	70	\$1	\$1	\$4	\$0
0.06	80	\$1	\$1	\$3	\$0
0.08	90	\$1	\$1	\$2	\$0
0.09	95.93	\$10	\$0	\$12	\$0
0.2	200	\$5	\$4	\$4	\$0
0.25	300	\$3	\$2	\$2	\$0
0.29	400	\$3	\$2	\$1	\$0
0.33	537.72	\$291	\$93	\$7	\$0
Total (\$)		\$277	\$112	\$40	\$0

After Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-8.57	1.11	\$0	\$0	\$0	\$0
-7.72	2	\$0	\$0	\$0	\$0
-6.67	5	\$0	\$0	\$0	\$0
-6.14	8	\$0	\$0	\$0	\$0
-5.89	10.06	\$0	\$0	\$0	\$0
-5.05	20	\$0	\$0	\$0	\$0
-4.56	30	\$0	\$0	\$0	\$0
-4.17	40	\$0	\$0	\$0	\$0
-3.88	49.85	\$0	\$0	\$0	\$0
-3.63	60	\$0	\$0	\$0	\$0
-3.43	70	\$0	\$0	\$0	\$0
-3.23	80	\$0	\$0	\$0	\$0
-3.08	90	\$0	\$0	\$0	\$0
-2.99	95.93	\$0	\$0	\$0	\$0
-2	197.62	\$0	\$0	\$0	\$0
-1.9	200	\$0	\$0	\$0	\$0
-1.25	300	\$0	\$0	\$0	\$0
-0.8	400	\$0	\$0	\$0	\$0
-0.29	537.72	\$0	\$0	\$0	\$0
0	143.83	\$270	\$78	\$6	\$0
Total (\$)		\$270	\$78	\$6	\$0

Building Information
Floodplain and Stream Restoration @ 12K Norwich Rd, East Haddam, Connecticut, 06423

Non-Residential Occupancy Type:	IND2: Industrial - Light
Building Type:	Warehouse-Non-Refrig
Building Is Engineered:	Yes
NFIP:	No

Building Damages
Floodplain and Stream Restoration @ 12K Norwich Rd, East Haddam, Connecticut, 06423

Depth Damage Curve:	Warehouse, Non-Refrig (Default)	Use Default:Yes
Building Size (sq.ft):	1680	
Building Replacement Value (BRV) (\$/sq.ft):	\$188	Use Default: No
Demolition Threshold (%):	50.00%	Use Default:Yes
Expected Annual Losses due to Building Damages before Mitigation:	\$277	
Expected Annual Losses due to Building Damages after Mitigation:	\$210	
Expected Annual Benefits - Building:	\$67	

Depth Damage Curve - Building
Floodplain and Stream Restoration @ 12K Norwich Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION						AFTER MITIGATION					
Flood Depth (ft)	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)			
-2	0	0	0	0	0	0	0	0	0	0	0
-1	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
1	10.2	13,778.07	0	0	10.2	13,778.07	0	0	0	0	0
2	16.7	22,558.22	0	0	16.7	22,558.22	0	0	0	0	0
3	20.4	27,556.15	0	0	20.4	27,556.15	0	0	0	0	0
4	25.5	34,445.19	0	0	25.5	34,445.19	0	0	0	0	0
5	28.7	40,788.52	0	0	28.7	40,788.52	0	0	0	0	0
6	32.8	44,305.97	0	0	32.8	44,305.97	0	0	0	0	0
7	35.5	47,953.11	0	0	35.5	47,953.11	0	0	0	0	0
8	39.6	53,491.36	0	0	39.6	53,491.36	0	0	0	0	0
9	42.5	57,408.66	0	0	42.5	57,408.66	0	0	0	0	0
10	44.5	60,710.24	0	0	44.5	60,710.24	0	0	0	0	0
11	44.5	60,710.24	0	0	44.5	60,710.24	0	0	0	0	0
12	44.5	60,710.24	0	0	44.5	60,710.24	0	0	0	0	0
13	44.5	60,710.24	0	0	44.5	60,710.24	0	0	0	0	0
14	44.5	60,710.24	0	0	44.5	60,710.24	0	0	0	0	0
15	44.5	60,710.24	0	0	44.5	60,710.24	0	0	0	0	0
16	44.5	60,710.24	0	0	44.5	60,710.24	0	0	0	0	0

Contents Damages
Floodplain and Stream Restoration @ 12K Norwich Rd, East Haddam, Connecticut, 06423

Contents Value in Dollars:	\$0	Use Default:Yes
Expected Annual Losses due to Contents Damages before Mitigation:	\$112	
Expected Annual Losses due to Contents Damages after Mitigation:	\$78	
Expected Annual Benefits - Contents:	\$35	

Depth Damage Curve - Contents
Floodplain and Stream Restoration @ 12K Norwich Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION			AFTER MITIGATION		
	Percent (%)	Damage Value (\$)		Percent (%)	Damage Value (\$)	
-2	0	0		0	0	
-1	0	0		0	0	
0	0	0		0	0	
1	21	10,495.65		21	10,495.65	
2	34	16,992.96		34	16,992.96	
3	47	23,490.27		47	23,490.27	
4	57	28,488.20		57	28,488.20	
5	66	32,896.34		66	32,896.34	
6	74	36,884.68		74	36,884.68	
7	81	40,483.23		81	40,483.23	
8	88	43,981.78		88	43,981.78	
9	92	45,980.95		92	45,980.95	
10	94	46,980.54		94	46,980.54	
11	94	46,980.54		94	46,980.54	
12	94	46,980.54		94	46,980.54	
13	94	46,980.54		94	46,980.54	
14	94	46,980.54		94	46,980.54	
15	94	46,980.54		94	46,980.54	
16	94	46,980.54		94	46,980.54	

Displacement Costs Avoided
Floodplain and Stream Restoration @ 12K Norwich Rd, East Haddam, Connecticut, 06423

Monthly Displacement Cost (\$/sq.ft/month):	0.37	Use Default:Yes
One-Time Displacement Cost (\$/sq.ft):	1.28	Use Default:Yes
Expected Annual Losses due to Displacement Damages before mitigation:	\$40	
Expected Annual Losses due to Displacement Damages after Mitigation:	\$6	
Expected Annual Losses - Displacement:	\$34	

Depth Damage Curve - Displacement
Floodplain and Stream Restoration @ 12K Norwich Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION			AFTER MITIGATION		
	Days	Damage Value (\$)		Days	Damage Value (\$)	
-2	0	0		0	0	
-1	0	0		0	0	
0	0	0		0	0	
1	45	383.17		45	383.17	
2	90	766.35		90	766.35	
3	135	1,149.53		135	1,149.53	
4	180	1,532.71		180	1,532.71	
5	225	1,915.89		225	1,915.89	
6	270	2,299.06		270	2,299.06	
7	315	2,682.24		315	2,682.24	
8	360	3,065.42		360	3,065.42	
9	405	3,448.60		405	3,448.60	
10	450	3,831.78		450	3,831.78	
11	450	3,831.78		450	3,831.78	
12	450	3,831.78		450	3,831.78	
13	450	3,831.78		450	3,831.78	
14	450	3,831.78		450	3,831.78	
15	450	3,831.78		450	3,831.78	
16	450	3,831.78		450	3,831.78	

Loss of Function/Loss of Income Avoided
Floodplain and Stream Restoration @ 12K Norwich Rd, East Haddam, Connecticut, 06423

Annual Operating Budget:	\$0
Loss of Function/Loss of Income Per Day:	\$0
Expected Annual Losses due to Loss of Function/Loss of Income before mitigation:	\$0
Expected Annual Losses due to Loss of Function/Loss of Income after mitigation:	\$0
Expected Annual Benefits - Loss of Function/Loss of Income Avoided:	\$0

Depth Damage Curve - Loss of Function/Loss of Income
Floodplain and Stream Restoration @ 12K Norwich Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION			AFTER MITIGATION		
	Days	Damage Value (\$)		Days	Damage Value (\$)	
-2	0	0		0	0	
-1	0	0		0	0	
0	0	0		0	0	
1	45	0		45	0	
2	90	0		90	0	
3	135	0		135	0	
4	180	0		180	0	
5	225	0		225	0	
6	270	0		270	0	
7	315	0		315	0	
8	360	0		360	0	
9	405	0		405	0	
10	450	0		450	0	
11	450	0		450	0	
12	450	0		450	0	
13	450	0		450	0	
14	450	0		450	0	
15	450	0		450	0	
16	450	0		450	0	

Volunteer Costs Avoided
Floodplain and Stream Restoration @ 12K Norwich Rd, East Haddam, Connecticut, 06423

Number of Volunteers (volunteers/event):	0
Number of Days of Lodging:	0
Expected Annual Volunteer Benefits:	\$0

Ecosystem Services Losses Avoided
Floodplain and Stream Restoration @ 12K Norwich Rd, East Haddam, Connecticut, 06423

Total Project Area (acres):	0
Percentage of Urban Green Open Space:	0.00%
Percentage of Rural Green Open Space:	0.00%
Percentage of Riparian:	0.00%
Percentage of Coastal Wetlands:	0.00%
Percentage of Inland Wetlands:	0.00%
Percentage of Forests:	0.00%
Percentage of Coral Reefs:	0.00%
Percentage of Shellfish Reefs:	0.00%
Percentage of Beaches and Dunes:	0.00%
Expected Annual Ecosystem Services Benefits:	\$0

Benefits-Costs Summary
Floodplain and Stream Restoration @ 12K Norwich Rd, East Haddam, Connecticut, 06423

Discount Rate (%):	7.0%	Use Default:Yes
Total Project Benefits:	\$1,752	
Total Project Cost:	\$0	
Benefit-Cost Ratio:	0	

Property Configuration

Property Title:	Floodplain and Stream Restoration @ 12F Norwich Rd, East Haddam, Connecticut, 06423
Property Location:	06423, Middlesex, Connecticut
Property Coordinates:	41.45438196885874, -72.45918517190287
Hazard Type:	Riverine Flood
Mitigation Action Type:	Floodplain and Stream Restoration
Property Type:	Residential Building
Analysis Method Type:	Modeled Damages

Cost Estimation

Floodplain and Stream Restoration @ 12F Norwich Rd, East Haddam, Connecticut, 06423

Discount Rate (%):	7.0%	Use Default:Yes
Project Useful Life (years):	35	
Project Cost:	\$0	
Number of Maintenance Years:	35	Use Default:Yes
Annual Maintenance Cost:	\$0	

Comments

-

Project Useful Life:

Flood protection at this building is due to a combination of a floodwall/berm and a culvert with end treatments. However, the effectiveness of this alternative is expected to diminish as a result of projected future storms. Therefore, the minimum PUL for concrete infrastructure (35 years) was selected.

Hazard Probabilities Parameters - Flood

Floodplain and Stream Restoration @ 12F Norwich Rd, East Haddam, Connecticut, 06423

Lowest Floor Elevation of the Property (ft):	26
Streambed Elevation at the Property Location (ft):	13.9
Use Default Recurrence Intervals:	Use Default:Yes

Discharge

Floodplain and Stream Restoration @ 12F Norwich Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION		
Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)
10	23.94	533
50	24.5	971
100	24.69	1188
500	25.89	1884

AFTER MITIGATION		
Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)
10	17.81	533
50	19.4	971
100	20.68	1188
500	24.13	1884

Estimated Annual Damages by Category

Floodplain and Stream Restoration @ 12F Norwich Rd, East Haddam, Connecticut, 06423

Before Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-3.64	111	\$ 0	\$ 0	\$ 0	\$ 0
-2.88	2	\$ 0	\$ 0	\$ 0	\$ 0
-2.34	5	\$ 0	\$ 0	\$ 0	\$ 0
-2.11	8	\$ 0	\$ 0	\$ 0	\$ 0
-2.03	1006	\$ 0	\$ 0	\$ 0	\$ 0
-2	11.88	\$ 525	\$ 518	\$ 0	\$ 0
-1.8	20	\$ 256	\$ 246	\$ 0	\$ 0
-1.64	30	\$ 136	\$ 129	\$ 0	\$ 0
-1.56	40	\$ 84	\$ 79	\$ 0	\$ 0
-1.51	48.85	\$ 59	\$ 56	\$ 0	\$ 0
-1.44	60	\$ 43	\$ 40	\$ 0	\$ 0
-1.4	70	\$ 33	\$ 30	\$ 0	\$ 0
-1.36	80	\$ 26	\$ 24	\$ 0	\$ 0
-1.33	90	\$ 13	\$ 12	\$ 0	\$ 0
-1.31	95.93	\$ 107	\$ 98	\$ 0	\$ 0
-1.13	200	\$ 35	\$ 32	\$ 0	\$ 0
-1.03	300	\$ 18	\$ 16	\$ 0	\$ 0
-0.96	400	\$ 14	\$ 13	\$ 0	\$ 0
-0.89	537.72	\$ 48	\$ 40	\$ 0	\$ 0
0	36997.4	\$ 12	\$ 6	\$ 0	\$ 0
Total (\$)		\$ 1,408	\$ 1,338	\$ 0	\$ 0

After Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-11.27	111	\$ 0	\$ 0	\$ 0	\$ 0
-10.34	2	\$ 0	\$ 0	\$ 0	\$ 0
-9.22	5	\$ 0	\$ 0	\$ 0	\$ 0
-8.64	8	\$ 0	\$ 0	\$ 0	\$ 0
-8.34	1006	\$ 0	\$ 0	\$ 0	\$ 0
-7.46	20	\$ 0	\$ 0	\$ 0	\$ 0
-6.91	30	\$ 0	\$ 0	\$ 0	\$ 0
-6.49	40	\$ 0	\$ 0	\$ 0	\$ 0
-6.19	48.85	\$ 0	\$ 0	\$ 0	\$ 0
-5.9	60	\$ 0	\$ 0	\$ 0	\$ 0
-5.67	70	\$ 0	\$ 0	\$ 0	\$ 0
-5.47	80	\$ 0	\$ 0	\$ 0	\$ 0
-5.29	90	\$ 0	\$ 0	\$ 0	\$ 0
-5.21	95.93	\$ 0	\$ 0	\$ 0	\$ 0
-4.63	200	\$ 0	\$ 0	\$ 0	\$ 0
-3.33	300	\$ 0	\$ 0	\$ 0	\$ 0
-2.83	400	\$ 0	\$ 0	\$ 0	\$ 0
-2.31	537.72	\$ 0	\$ 0	\$ 0	\$ 0
-2	637.62	\$ 20	\$ 18	\$ 0	\$ 0
0	1781.74	\$ 244	\$ 122	\$ 0	\$ 0
Total (\$)		\$ 264	\$ 140	\$ 0	\$ 0

Building Information

Floodplain and Stream Restoration @ 12F Norwich Rd, East Haddam, Connecticut, 06423

Building Type:	Two or More Stories
Foundation Type:	
Building Has Basement:	Yes
NFIP:	No

Building Damages
Floodplain and Stream Restoration @ 12F Norwich Rd, East Haddam, Connecticut, 06423

Depth Damage Curve:

USACE - Chicago: two story, w/ basement

Use Default:Yes

Building Size (sq.ft):

2,632

Building Replacement Value (BRV) (\$/sq.ft):

\$165

Use Default: No

Demolition Threshold (%):

50.00%

Use Default:Yes

Expected Annual Losses due to Building Damages before Mitigation:

\$1,408

Expected Annual Losses due to Building Damages after Mitigation:

\$264

Expected Annual Benefits - Building:

\$1,144

Depth Damage Curve - Building
Floodplain and Stream Restoration @ 12F Norwich Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION						AFTER MITIGATION					
Flood Depth (ft)	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)		Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)		
-2	3	13,036.29	0	0		3	13,036.29	0	0		
-1	5	21,727.16	0	0	5	21,727.16	0	0	0		
0	7	30,418.02	0	0	7	30,418.02	0	0	0		
1	11	47,799.75	0	0	11	47,799.75	0	0	0		
2	17	73,872.34	0	0	17	73,872.34	0	0	0		
3	22	95,599.50	0	0	22	95,599.50	0	0	0		
4	28	121,672.89	0	0	28	121,672.09	0	0	0		
5	33	143,399.25	0	0	33	143,399.25	0	0	0		
6	35	152,890.12	0	0	35	152,890.12	0	0	0		
7	38	165,126.41	0	0	38	165,126.41	0	0	0		
8	40	173,817.28	0	0	40	173,817.28	0	0	0		
9	44	191,599.00	0	0	44	191,599.00	0	0	0		
10	46	199,889.87	0	0	46	199,889.87	0	0	0		
11	48	208,580.73	0	0	48	208,580.73	0	0	0		
12	50	434,543.2	0	0	50	434,543.2	0	0	0		
13	52	434,543.2	0	0	52	434,543.2	0	0	0		
14	54	434,543.2	0	0	54	434,543.2	0	0	0		
15	54	434,543.2	0	0	54	434,543.2	0	0	0		
16	54	434,543.2	0	0	54	434,543.2	0	0	0		

Contents Damages
Floodplain and Stream Restoration @ 12F Norwich Rd, East Haddam, Connecticut, 06423

Contents Value in Dollars:

\$0

Use Default:Yes

Utilities Elevated:

No

Expected Annual Losses due to Contents Damages before Mitigation:

\$1,338

Expected Annual Losses due to Contents Damages after Mitigation:

\$140

Expected Annual Benefits - Contents:

\$1,198

Depth Damage Curve - Contents
Floodplain and Stream Restoration @ 12F Norwich Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION				AFTER MITIGATION			
Flood Depth (ft)	Percent (%)	Damage Value (\$)		Percent (%)	Damage Value (\$)		
-2	6	13,036.29		6	13,036.29		
-1	9	19,554.44		9	19,554.44		
0	11	23,899.87		11	23,899.87		
1	17	36,936.17		17	36,936.17		
2	22	47,799.75		22	47,799.75		
3	28	60,836.04		28	60,836.04		
4	33	71,699.62		33	71,699.62		
5	39	84,735.92		39	84,735.92		
6	44	95,599.50		44	95,599.50		
7	49	106,463.08		49	106,463.08		
8	55	116,498.38		55	116,498.38		
9	61	132,535.67		61	132,535.67		
10	64	139,053.82		64	139,053.82		
11	71	154,262.83		71	154,262.83		
12	76	165,126.41		76	165,126.41		
13	78	169,471.84		78	169,471.84		
14	79	171,644.56		79	171,644.56		
15	79	171,644.56		79	171,644.56		
16	87	189,026.29		87	189,026.29		

Displacement Costs Avoided
Floodplain and Stream Restoration @ 12F Norwich Rd, East Haddam, Connecticut, 06423

Lodging Per Diem:

\$110

Use Default:Yes

Meals Per Diem:

\$68

Use Default:Yes

Population Affected:

0

Duration of Displacement (days):

365

Use Default:Yes

Total Residential Displacement Cost:

\$0

Expected Annual Losses due to Displacement Damages before mitigation:

\$0

Expected Annual Losses due to Displacement Damages after Mitigation:

\$0

Expected Annual Losses - Displacement:

\$0

Comments

-

Number of Building Residents:
Building has two units.

Depth Damage Curve - Displacement Floodplain and Stream Restoration @ 12F Norwich Rd, East Haddam, Connecticut, 06423					
Flood Depth (ft)	BEFORE MITIGATION		AFTER MITIGATION		
	Days	Damage Value (\$)	Days	Damage Value (\$)	
-2	0	0	0	0	
-1	0	0	0	0	
0	0	0	0	0	
1	45	0	45	0	
2	90	0	90	0	
3	135	0	135	0	
4	180	0	180	0	
5	225	0	225	0	
6	270	0	270	0	
7	315	0	315	0	
8	360	0	360	0	
9	405	0	405	0	
10	450	0	450	0	
11	495	0	495	0	
12	540	0	540	0	
13	585	0	585	0	
14	630	0	630	0	
15	675	0	675	0	
16	720	0	720	0	

Street Maintenance Costs Avoided Floodplain and Stream Restoration @ 12F Norwich Rd, East Haddam, Connecticut, 06423	
Total Annual Street Maintenance Budget:	\$0
Total Number of Street Miles Maintained:	0
Street Miles that will not require future maintenance:	0
Expected Annual Benefits - Street Maintenance:	\$0

Volunteer Costs Avoided Floodplain and Stream Restoration @ 12F Norwich Rd, East Haddam, Connecticut, 06423	
Number of Volunteers (volunteers/event):	0
Number of Days of Lodging:	0
Expected Annual Volunteer Benefits:	\$0

Ecosystem Services Losses Avoided Floodplain and Stream Restoration @ 12F Norwich Rd, East Haddam, Connecticut, 06423	
Total Project Area (acres):	0
Percentage of Urban Green Open Space:	0.00%
Percentage of Rural Green Open Space:	0.00%
Percentage of Riparian:	0.00%
Percentage of Coastal Wetlands:	0.00%
Percentage of Inland Wetlands:	0.00%
Percentage of Forests:	0.00%
Percentage of Coral Reefs:	0.00%
Percentage of Shellfish Reefs:	0.00%
Percentage of Beaches and Dunes:	0.00%
Expected Annual Ecosystem Services Benefits:	\$0

Benefits-Costs Summary Floodplain and Stream Restoration @ 12F Norwich Rd, East Haddam, Connecticut, 06423	
Discount Rate (%):	7.0% Use Default:Yes
Total Project Benefits:	\$30,324
Total Project Cost:	\$0
Benefit-Cost Ratio:	0

Property Configuration	
Property Title:	Floodplain and Stream Restoration @ 12G Norwich Rd, East Haddam, Connecticut, 06423
Property Location:	06423, Middlesex, Connecticut
Property Coordinates:	41.45438196885874, -72.45918517190287
Hazard Type:	Riverine Flood
Mitigation Action Type:	Floodplain and Stream Restoration
Property Type:	Residential Building
Analysis Method Type:	Modeled Damages

Cost Estimation Floodplain and Stream Restoration @ 12G Norwich Rd, East Haddam, Connecticut, 06423	
Discount Rate (%):	7.0% Use Default:Yes
Project Useful Life (years):	35
Project Cost:	\$0
Number of Maintenance Years:	35 Use Default:Yes
Annual Maintenance Cost:	\$0

Comments	
•	
Project Useful Life: Flood protection at this building is due to a combination of a floodwall/berm and a culvert with end treatments. However, the effectiveness of this alternative is expected to diminish as a result of projected future storms. Therefore, the minimum PUL for concrete infrastructure (35 years) was selected.	

Hazard Probabilities Parameters - Flood Floodplain and Stream Restoration @ 12G Norwich Rd, East Haddam, Connecticut, 06423	
Lowest Floor Elevation of the Property (ft):	25
Streambed Elevation at the Property Location (ft):	13.7
Use Default Recurrence Intervals:	Use Default:Yes

Discharge Floodplain and Stream Restoration @ 12G Norwich Rd, East Haddam, Connecticut, 06423		
BEFORE MITIGATION		
Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)
10	22.84	533
50	23.34	971
100	23.5	1188
500	23.81	1884
AFTER MITIGATION		
Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)
10	16.42	533
50	18.17	971
100	19.01	1188
500	23.09	1884

Estimated Annual Damages by Category
Floodplain and Stream Restoration @ 12G Norwich Rd, East Haddam, Connecticut, 06423

Before Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-3.5	1	\$ 0	\$ 0	\$ 0	\$ 0
-2.83	2	\$ 0	\$ 0	\$ 0	\$ 0
-2.36	5	\$ 0	\$ 0	\$ 0	\$ 0
-2.21	8	\$ 0	\$ 0	\$ 0	\$ 0
-2.11	1006	\$ 0	\$ 0	\$ 0	\$ 0
-2	16.64	\$ 119	\$ 119	\$ 0	\$ 0
-1.91	20	\$ 151	\$ 148	\$ 0	\$ 0
-1.8	30	\$ 80	\$ 77	\$ 0	\$ 0
-1.74	40	\$ 49	\$ 47	\$ 0	\$ 0
-1.67	49.85	\$ 35	\$ 33	\$ 0	\$ 0
-1.61	60	\$ 25	\$ 24	\$ 0	\$ 0
-1.6	70	\$ 19	\$ 18	\$ 0	\$ 0
-1.57	80	\$ 15	\$ 14	\$ 0	\$ 0
-1.54	90	\$ 8	\$ 7	\$ 0	\$ 0
-1.51	95.93	\$ 62	\$ 58	\$ 0	\$ 0
-1.36	200	\$ 20	\$ 19	\$ 0	\$ 0
-1.26	300	\$ 10	\$ 10	\$ 0	\$ 0
-1.2	400	\$ 8	\$ 8	\$ 0	\$ 0
-1.14	537.72	\$ 30	\$ 25	\$ 0	\$ 0
0	537730.48	\$ 1	\$ 0	\$ 0	\$ 0
Total (\$)		\$ 633	\$ 607	\$ 0	\$ 0

After Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-10.91	1	\$ 0	\$ 0	\$ 0	\$ 0
-10.3	2	\$ 0	\$ 0	\$ 0	\$ 0
-9.42	5	\$ 0	\$ 0	\$ 0	\$ 0
-8.93	8	\$ 0	\$ 0	\$ 0	\$ 0
-8.68	1006	\$ 0	\$ 0	\$ 0	\$ 0
-7.88	20	\$ 0	\$ 0	\$ 0	\$ 0
-7.34	30	\$ 0	\$ 0	\$ 0	\$ 0
-6.96	40	\$ 0	\$ 0	\$ 0	\$ 0
-6.62	49.85	\$ 0	\$ 0	\$ 0	\$ 0
-6.37	60	\$ 0	\$ 0	\$ 0	\$ 0
-6.12	70	\$ 0	\$ 0	\$ 0	\$ 0
-5.93	80	\$ 0	\$ 0	\$ 0	\$ 0
-5.74	90	\$ 0	\$ 0	\$ 0	\$ 0
-5.64	95.93	\$ 0	\$ 0	\$ 0	\$ 0
-4.38	200	\$ 0	\$ 0	\$ 0	\$ 0
-3.61	300	\$ 0	\$ 0	\$ 0	\$ 0
-3.06	400	\$ 0	\$ 0	\$ 0	\$ 0
-2.45	537.72	\$ 0	\$ 0	\$ 0	\$ 0
-2	664.8	\$ 11	\$ 10	\$ 0	\$ 0
0	1182.8	\$ 115	\$ 88	\$ 0	\$ 0
Total (\$)		\$ 187	\$ 98	\$ 0	\$ 0

Building Information
Floodplain and Stream Restoration @ 12G Norwich Rd, East Haddam, Connecticut, 06423

Building Type:	Two or More Stories
Foundation Type:	
Building Has Basement:	Yes
NFIP:	No

Building Damages
Floodplain and Stream Restoration @ 12G Norwich Rd, East Haddam, Connecticut, 06423

Depth Damage Curve:	USACE - Chicago: two story, w/ basement	Use Default:Yes
Building Size (sq.ft):	1426	
Building Replacement Value (BRV) (\$/sq.ft):	\$196	Use Default: No
Demolition Threshold (%):	50.00%	Use Default:Yes
Expected Annual Losses due to Building Damages before Mitigation:	\$633	
Expected Annual Losses due to Building Damages after Mitigation:	\$187	
Expected Annual Benefits - Building:	\$445	

Depth Damage Curve - Building
Floodplain and Stream Restoration @ 12G Norwich Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION						AFTER MITIGATION					
Flood Depth (ft)	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)	Percent (%)	Damage Value (\$)	ICC Fees (\$)
-2	3	8,369.05	0	0	3	8,369.05	0	0			
-4	5	13,946.41	0	0	5	13,946.41	0	0			
0	7	18,527.78	0	0	7	18,527.78	0	0			
1	11	30,686.52	0	0	11	30,686.52	0	0			
2	17	47,424.62	0	0	17	47,424.62	0	0			
3	22	61,373.04	0	0	22	61,373.04	0	0			
4	28	78,111.34	0	0	28	78,111.34	0	0			
5	33	92,089.56	0	0	33	92,089.56	0	0			
6	35	97,638.91	0	0	35	97,638.91	0	0			
7	38	106,007.88	0	0	38	106,007.88	0	0			
8	40	111,587.35	0	0	40	111,587.35	0	0			
9	44	122,746.08	0	0	44	122,746.08	0	0			
10	46	128,325.45	0	0	46	128,325.45	0	0			
11	48	133,904.82	0	0	48	133,904.82	0	0			
12	50	139,504.38	0	0	50	139,504.38	0	0			
13	52	145,124.00	0	0	52	145,124.00	0	0			
14	54	150,763.68	0	0	54	150,763.68	0	0			
15	54	156,423.40	0	0	54	156,423.40	0	0			
16	54	162,103.08	0	0	54	162,103.08	0	0			

Contents Damages
Floodplain and Stream Restoration @ 12G Norwich Rd, East Haddam, Connecticut, 06423

Contents Value in Dollars:	\$0	Use Default:Yes
Utilities Elevated:	No	
Expected Annual Losses due to Contents Damages before Mitigation:	\$607	
Expected Annual Losses due to Contents Damages after Mitigation:	\$98	
Expected Annual Benefits - Contents:	\$509	

Depth Damage Curve - Contents
Floodplain and Stream Restoration @ 12G Norwich Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION			AFTER MITIGATION		
	Percent (%)	Damage Value (\$)		Percent (%)	Damage Value (\$)	
-2	6	8,369.05		6	8,369.05	
-1	9	12,553.57		9	12,553.57	
0	11	15,343.26		11	15,343.26	
1	17	23,712.31		17	23,712.31	
2	22	30,686.52		22	30,686.52	
3	28	38,055.57		28	38,055.57	
4	33	46,029.78		33	46,029.78	
5	39	54,398.83		39	54,398.83	
6	44	61,373.04		44	61,373.04	
7	49	68,347.25		49	68,347.25	
8	55	76,716.30		55	76,716.30	
9	61	85,085.35		61	85,085.35	
10	64	89,269.88		64	89,269.88	
11	71	98,033.77		71	98,033.77	
12	76	106,007.98		76	106,007.98	
13	78	108,797.66		78	108,797.66	
14	79	110,192.51		79	110,192.51	
15	79	110,192.51		79	110,192.51	
16	87	121,351.24		87	121,351.24	

Displacement Costs Avoided
Floodplain and Stream Restoration @ 12G Norwich Rd, East Haddam, Connecticut, 06423

Lodging Per Diem:	\$110	Use Default:Yes
Meals Per Diem:	\$68	Use Default:Yes
Population Affected:	0	
Duration of Displacement (days):	365	Use Default:Yes
Total Residential Displacement Cost:	\$0	
Expected Annual Losses due to Displacement Damages before mitigation:	\$0	
Expected Annual Losses due to Displacement Damages after Mitigation:	\$0	
Expected Annual Losses - Displacement:	\$0	

Comments

- Number of Building Residents:
Building has two units.

Depth Damage Curve - Displacement
Floodplain and Stream Restoration @ 12G Norwich Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION			AFTER MITIGATION		
	Days	Damage Value (\$)		Days	Damage Value (\$)	
-2	0	0		0	0	
-1	0	0		0	0	
0	0	0		0	0	
1	45	0		45	0	
2	90	0		90	0	
3	135	0		135	0	
4	180	0		180	0	
5	225	0		225	0	
6	270	0		270	0	
7	315	0		315	0	
8	360	0		360	0	
9	405	0		405	0	
10	450	0		450	0	
11	495	0		495	0	
12	540	0		540	0	
13	585	0		585	0	
14	630	0		630	0	
15	675	0		675	0	
16	720	0		720	0	

Street Maintenance Costs Avoided
Floodplain and Stream Restoration @ 12G Norwich Rd, East Haddam, Connecticut, 06423

Total Annual Street Maintenance Budget:	\$0
Total Number of Street Miles Maintained:	0
Street Miles that will not require future maintenance:	0
Expected Annual Benefits - Street Maintenance:	\$0

Volunteer Costs Avoided
Floodplain and Stream Restoration @ 12G Norwich Rd, East Haddam, Connecticut, 06423

Number of Volunteers (volunteers/event):	0
Number of Days of Lodging:	0
Expected Annual Volunteer Benefits:	\$0

Ecosystem Services Losses Avoided
Floodplain and Stream Restoration @ 12G Norwich Rd, East Haddam, Connecticut, 06423

Total Project Area (acres):	0
Percentage of Urban Green Open Space:	0.00%
Percentage of Rural Green Open Space:	0.00%
Percentage of Riparian:	0.00%
Percentage of Coastal Wetlands:	0.00%
Percentage of Inland Wetlands:	0.00%
Percentage of Forests:	0.00%
Percentage of Coral Reefs:	0.00%
Percentage of Shellfish Reefs:	0.00%
Percentage of Beaches and Dunes:	0.00%
Expected Annual Ecosystem Services Benefits:	\$0

Benefits-Costs Summary
Floodplain and Stream Restoration @ 12G Norwich Rd, East Haddam, Connecticut, 06423

Discount Rate (%):	7.0%	Use Default:Yes
Total Project Benefits:	\$12,357	
Total Project Cost:	\$0	
Benefit-Cost Ratio:	0	

Property Configuration

Property Title:	Floodplain and Stream Restoration @ 12H Norwich Rd, East Haddam, Connecticut, 06423
Property Location:	06423, Middlesex, Connecticut
Property Coordinates:	41.45438196885874, -72.45918517190287
Hazard Type:	Riverine Flood
Mitigation Action Type:	Floodplain and Stream Restoration
Property Type:	Residential Building
Analysis Method Type:	Modeled Damages

Cost Estimation

Floodplain and Stream Restoration @ 12H Norwich Rd, East Haddam, Connecticut, 06423

Discount Rate (%):	7.0%	Use Default:Yes
Project Useful Life (years):	35	
Project Cost:	\$0	
Number of Maintenance Years:	35	Use Default:Yes
Annual Maintenance Cost:	\$0	

Comments

-

Project Useful Life:

Flood protection at this building is due to a combination of a floodwall/berm and a culvert with end treatments. However, the effectiveness of this alternative is expected to diminish as a result of projected future storms. Therefore, the minimum PUL for concrete infrastructure (35 years) was selected.

Hazard Probabilities Parameters - Flood

Floodplain and Stream Restoration @ 12H Norwich Rd, East Haddam, Connecticut, 06423

Lowest Floor Elevation of the Property (ft):	23.6
Streambed Elevation at the Property Location (ft):	13.5
Use Default Recurrence Intervals:	Use Default:Yes

Discharge

Floodplain and Stream Restoration @ 12H Norwich Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION		
Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)
10	21.94	533
50	22.31	971
100	22.44	1188
500	22.53	1884

AFTER MITIGATION		
Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)
10	16.16	533
50	17.97	971
100	18.84	1188
500	21.59	1884

Estimated Annual Damages by Category
Floodplain and Stream Restoration @ 12H Norwich Rd, East Haddam, Connecticut, 06423

Before Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-2.5	111	\$ 0	\$ 0	\$ 0	\$ 0
-2.07	2	\$ 0	\$ 0	\$ 0	\$ 0
-2	238	\$ 2,884	\$ 2,837	\$ 0	\$ 0
-1.76	5	\$ 1,093	\$ 1,051	\$ 0	\$ 0
-1.65	8	\$ 389	\$ 371	\$ 0	\$ 0
-1.61	10,06	\$ 790	\$ 744	\$ 0	\$ 0
-1.48	20	\$ 280	\$ 261	\$ 0	\$ 0
-1.41	30	\$ 144	\$ 134	\$ 0	\$ 0
-1.36	40	\$ 87	\$ 81	\$ 0	\$ 0
-1.31	49,85	\$ 61	\$ 56	\$ 0	\$ 0
-1.3	60	\$ 43	\$ 40	\$ 0	\$ 0
-1.26	70	\$ 33	\$ 30	\$ 0	\$ 0
-1.24	80	\$ 26	\$ 23	\$ 0	\$ 0
-1.24	90	\$ 13	\$ 12	\$ 0	\$ 0
-1.23	95,93	\$ 103	\$ 94	\$ 0	\$ 0
-1.13	200	\$ 33	\$ 30	\$ 0	\$ 0
-1.06	300	\$ 17	\$ 15	\$ 0	\$ 0
-1.04	400	\$ 13	\$ 12	\$ 0	\$ 0
-1	537,72	\$ 45	\$ 38	\$ 0	\$ 0
0	20934615.02	\$ 0	\$ 0	\$ 0	\$ 0
Total (\$)		\$ 6,054	\$ 5,827	\$ 0	\$ 0

After Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-9.63	131	\$ 0	\$ 0	\$ 0	\$ 0
-9	2	\$ 0	\$ 0	\$ 0	\$ 0
-8.13	5	\$ 0	\$ 0	\$ 0	\$ 0
-7.68	8	\$ 0	\$ 0	\$ 0	\$ 0
-7.45	10,06	\$ 0	\$ 0	\$ 0	\$ 0
-6.69	20	\$ 0	\$ 0	\$ 0	\$ 0
-6.22	30	\$ 0	\$ 0	\$ 0	\$ 0
-5.87	40	\$ 0	\$ 0	\$ 0	\$ 0
-5.59	49,85	\$ 0	\$ 0	\$ 0	\$ 0
-5.35	60	\$ 0	\$ 0	\$ 0	\$ 0
-5.15	70	\$ 0	\$ 0	\$ 0	\$ 0
-4.97	80	\$ 0	\$ 0	\$ 0	\$ 0
-4.82	90	\$ 0	\$ 0	\$ 0	\$ 0
-4.72	95,93	\$ 0	\$ 0	\$ 0	\$ 0
-3.66	200	\$ 0	\$ 0	\$ 0	\$ 0
-3.01	300	\$ 0	\$ 0	\$ 0	\$ 0
-2.55	400	\$ 0	\$ 0	\$ 0	\$ 0
-2.05	537,72	\$ 0	\$ 0	\$ 0	\$ 0
-2	553,74	\$ 22	\$ 20	\$ 0	\$ 0
0	1822.16	\$ 252	\$ 126	\$ 0	\$ 0
Total (\$)		\$ 275	\$ 146	\$ 0	\$ 0

Building Information
Floodplain and Stream Restoration @ 12H Norwich Rd, East Haddam, Connecticut, 06423

Building Type:	Two or More Stories
Foundation Type:	
Building Has Basement:	Yes
NFIP:	No

Building Damages
Floodplain and Stream Restoration @ 12H Norwich Rd, East Haddam, Connecticut, 06423

Depth Damage Curve:	USACE - Chicago: two story, w/ basement	Use Default:Yes
Building Size (sq.ft):	2,632	
Building Replacement Value (BRV) (\$/sq.ft):	\$156	Use Default: No
Demolition Threshold (%):	50.00%	Use Default:Yes
Expected Annual Losses due to Building Damages before Mitigation:	\$6,054	
Expected Annual Losses due to Building Damages after Mitigation:	\$275	
Expected Annual Benefits - Building:	\$5,779	

Depth Damage Curve - Building
Floodplain and Stream Restoration @ 12H Norwich Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION					AFTER MITIGATION				
Flood Depth (ft)	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)	
-2	3	12,286.96	0	0	3	12,286.96	0	0	
-1	5	20,478.27	0	0	5	20,478.27	0	0	
0	7	28,669.58	0	0	7	28,669.58	0	0	
1	11	45,052.20	0	0	11	45,052.20	0	0	
2	17	68,626.13	0	0	17	68,626.13	0	0	
3	22	90,104.41	0	0	22	90,104.41	0	0	
4	28	114,678.34	0	0	28	114,678.34	0	0	
5	33	135,786.62	0	0	33	135,786.62	0	0	
6	35	143,347.93	0	0	35	143,347.93	0	0	
7	38	153,634.89	0	0	38	153,634.89	0	0	
8	40	163,826.20	0	0	40	163,826.20	0	0	
9	44	180,208.82	0	0	44	180,208.82	0	0	
10	46	188,400.13	0	0	46	188,400.13	0	0	
11	48	196,591.44	0	0	48	196,591.44	0	0	
12	50	409,565.52	0	0	50	409,565.52	0	0	
13	52	409,565.52	0	0	52	409,565.52	0	0	
14	54	409,565.52	0	0	54	409,565.52	0	0	
15	54	409,565.52	0	0	54	409,565.52	0	0	
16	54	409,565.52	0	0	54	409,565.52	0	0	

Contents Damages
Floodplain and Stream Restoration @ 12H Norwich Rd, East Haddam, Connecticut, 06423

Contents Value in Dollars:	\$0	Use Default:Yes
Utilities Elevated:	No	
Expected Annual Losses due to Contents Damages before Mitigation:	\$5,827	
Expected Annual Losses due to Contents Damages after Mitigation:	\$146	
Expected Annual Benefits - Contents:	\$5,681	

Depth Damage Curve - Contents
Floodplain and Stream Restoration @ 12H Norwich Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION				AFTER MITIGATION			
Flood Depth (ft)	Percent (%)	Damage Value (\$)		Percent (%)	Damage Value (\$)		
-2	6	12,286.96		6	12,286.96		
-1	9	18,430.44		9	18,430.44		
0	11	22,526.10		11	22,526.10		
1	17	34,813.06		17	34,813.06		
2	22	45,052.20		22	45,052.20		
3	28	57,239.17		28	57,239.17		
4	33	67,578.31		33	67,578.31		
5	39	79,865.27		39	79,865.27		
6	44	90,104.41		44	90,104.41		
7	49	100,343.55		49	100,343.55		
8	55	110,680.51		55	110,680.51		
9	61	124,917.48		61	124,917.48		
10	64	131,060.96		64	131,060.96		
11	71	145,395.75		71	145,395.75		
12	76	153,634.89		76	153,634.89		
13	78	159,730.55		78	159,730.55		
14	79	161,778.38		79	161,778.38		
15	79	161,778.38		79	161,778.38		
16	87	178,161.00		87	178,161.00		

Displacement Costs Avoided
Floodplain and Stream Restoration @ 12H Norwich Rd, East Haddam, Connecticut, 06423

Lodging Per Diem:	\$110	Use Default:Yes
Meals Per Diem:	\$68	Use Default:Yes
Population Affected:	0	
Duration of Displacement (days):	365	Use Default:Yes
Total Residential Displacement Cost:	\$0	
Expected Annual Losses due to Displacement Damages before mitigation:	\$0	
Expected Annual Losses due to Displacement Damages after Mitigation:	\$0	
Expected Annual Losses - Displacement:	\$0	

Comments

-

Number of Building Residents:

Building has two units.

Depth Damage Curve - Displacement
Floodplain and Stream Restoration @ 12H Norwich Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION		AFTER MITIGATION	
	Days	Damage Value (\$)	Days	Damage Value (\$)
-2	0	0	0	0
-1	0	0	0	0
0	0	0	0	0
1	45	0	45	0
2	90	0	90	0
3	135	0	135	0
4	180	0	180	0
5	225	0	225	0
6	270	0	270	0
7	315	0	315	0
8	360	0	360	0
9	405	0	405	0
10	450	0	450	0
11	495	0	495	0
12	540	0	540	0
13	585	0	585	0
14	630	0	630	0
15	675	0	675	0
16	720	0	720	0

Street Maintenance Costs Avoided
Floodplain and Stream Restoration @ 12H Norwich Rd, East Haddam, Connecticut, 06423

Total Annual Street Maintenance Budget:	\$0
Total Number of Street Miles Maintained:	0
Street Miles that will not require future maintenance:	0
Expected Annual Benefits - Street Maintenance:	\$0

Volunteer Costs Avoided
Floodplain and Stream Restoration @ 12H Norwich Rd, East Haddam, Connecticut, 06423

Number of Volunteers (volunteers/event):	0
Number of Days of Lodging:	0
Expected Annual Volunteer Benefits:	\$0

Ecosystem Services Losses Avoided
Floodplain and Stream Restoration @ 12H Norwich Rd, East Haddam, Connecticut, 06423

Total Project Area (acres):	0
Percentage of Urban Green Open Space:	0.00%
Percentage of Rural Green Open Space:	0.00%
Percentage of Riparian:	0.00%
Percentage of Coastal Wetlands:	0.00%
Percentage of Inland Wetlands:	0.00%
Percentage of Forests:	0.00%
Percentage of Coral Reefs:	0.00%
Percentage of Shellfish Reefs:	0.00%
Percentage of Beaches and Dunes:	0.00%
Expected Annual Ecosystem Services Benefits:	\$0

Benefits-Costs Summary
Floodplain and Stream Restoration @ 12H Norwich Rd, East Haddam, Connecticut, 06423

Discount Rate (%):	7.0% Use Default:Yes
Total Project Benefits:	\$148,378
Total Project Cost:	\$0
Benefit-Cost Ratio:	0

Property Configuration

Property Title:	Floodplain and Stream Restoration @ 12I Norwich Rd, East Haddam, Connecticut, 06423
Property Location:	06423, Middlesex, Connecticut
Property Coordinates:	41.45438196885874, -72.45918517190287
Hazard Type:	Riverine Flood
Mitigation Action Type:	Floodplain and Stream Restoration
Property Type:	Residential Building
Analysis Method Type:	Modeled Damages

Cost Estimation
Floodplain and Stream Restoration @ 12I Norwich Rd, East Haddam, Connecticut, 06423

Discount Rate (%):	7.0% Use Default:Yes
Project Useful Life (years):	35
Project Cost:	\$0
Number of Maintenance Years:	35 Use Default:Yes
Annual Maintenance Cost:	\$0

Comments

-

Project Useful Life:

Flood protection at this building is due to a combination of a floodwall/berm and a culvert with end treatments. However, the effectiveness of this alternative is expected to diminish as a result of projected future storms. Therefore, the minimum PUL for concrete infrastructure (35 years) was selected.

Hazard Probabilities Parameters - Flood
Floodplain and Stream Restoration @ 12I Norwich Rd, East Haddam, Connecticut, 06423

Lowest Floor Elevation of the Property (ft):	25
Streambed Elevation at the Property Location (ft):	12.7
Use Default Recurrence Intervals:	Use Default:Yes

Discharge
Floodplain and Stream Restoration @ 12I Norwich Rd, East Haddam, Connecticut, 06423

Recurrence Interval (years)	BEFORE MITIGATION	
	Surface Elevation (ft)	Discharge (cfs)
10	22.78	533
50	23.28	971
100	23.44	1188
500	23.75	1884

Recurrence Interval (years)	AFTER MITIGATION	
	Surface Elevation (ft)	Discharge (cfs)
10	16	533
50	17.83	971
100	20.85	1188
500	23.06	1884

Estimated Annual Damages by Category
Floodplain and Stream Restoration @ 121 Norwich Rd, East Haddam, Connecticut, 06423

Before Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-3.55	1	\$ 0	\$ 0	\$ 0	\$ 0
-2.91	2	\$ 0	\$ 0	\$ 0	\$ 0
-2.45	5	\$ 0	\$ 0	\$ 0	\$ 0
-2.26	8	\$ 0	\$ 0	\$ 0	\$ 0
-2.18	10	\$ 0	\$ 0	\$ 0	\$ 0
-2	15	\$ 27	\$ 26	\$ 0	\$ 0
-1.97	20	\$ 214	\$ 212	\$ 0	\$ 0
-1.86	30	\$ 113	\$ 111	\$ 0	\$ 0
-1.8	40	\$ 70	\$ 68	\$ 0	\$ 0
-1.74	49.85	\$ 49	\$ 47	\$ 0	\$ 0
-1.68	60	\$ 35	\$ 34	\$ 0	\$ 0
-1.65	70	\$ 27	\$ 26	\$ 0	\$ 0
-1.61	80	\$ 21	\$ 20	\$ 0	\$ 0
-1.6	90	\$ 11	\$ 10	\$ 0	\$ 0
-1.57	95.93	\$ 89	\$ 83	\$ 0	\$ 0
-1.42	200	\$ 29	\$ 27	\$ 0	\$ 0
-1.32	300	\$ 15	\$ 14	\$ 0	\$ 0
-1.26	400	\$ 12	\$ 11	\$ 0	\$ 0
-1.2	537.72	\$ 43	\$ 36	\$ 0	\$ 0
0	876460.75	\$ 0	\$ 0	\$ 0	\$ 0
Total (\$)		\$ 756	\$ 725	\$ 0	\$ 0

After Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-11.79	1	\$ 0	\$ 0	\$ 0	\$ 0
-10.01	2	\$ 0	\$ 0	\$ 0	\$ 0
-9.93	5	\$ 0	\$ 0	\$ 0	\$ 0
-9.32	8	\$ 0	\$ 0	\$ 0	\$ 0
-9.01	10	\$ 0	\$ 0	\$ 0	\$ 0
-8.01	20	\$ 0	\$ 0	\$ 0	\$ 0
-7.37	30	\$ 0	\$ 0	\$ 0	\$ 0
-6.87	40	\$ 0	\$ 0	\$ 0	\$ 0
-6.49	49.85	\$ 0	\$ 0	\$ 0	\$ 0
-6.17	60	\$ 0	\$ 0	\$ 0	\$ 0
-5.89	70	\$ 0	\$ 0	\$ 0	\$ 0
-5.62	80	\$ 0	\$ 0	\$ 0	\$ 0
-5.41	90	\$ 0	\$ 0	\$ 0	\$ 0
-5.27	95.93	\$ 0	\$ 0	\$ 0	\$ 0
-3.77	200	\$ 0	\$ 0	\$ 0	\$ 0
-2.86	300	\$ 0	\$ 0	\$ 0	\$ 0
-2.16	400	\$ 0	\$ 0	\$ 0	\$ 0
-2	431.68	\$ 7	\$ 6	\$ 0	\$ 0
-1.44	537.72	\$ 17	\$ 15	\$ 0	\$ 0
0	939.74	\$ 436	\$ 218	\$ 0	\$ 0
Total (\$)		\$ 460	\$ 239	\$ 0	\$ 0

Building Information
Floodplain and Stream Restoration @ 121 Norwich Rd, East Haddam, Connecticut, 06423

Building Type:	Two or More Stories
Foundation Type:	
Building Has Basement:	Yes
NFIP:	No

Building Damages
Floodplain and Stream Restoration @ 121 Norwich Rd, East Haddam, Connecticut, 06423

Depth Damage Curve:	USACE - Chicago: two story, w/ basement	Use Default:Yes
Building Size (sq.ft):	2,632	
Building Replacement Value (BRV) (\$/sq.ft):	\$156	Use Default: No
Demolition Threshold (%):	50.00%	Use Default:Yes
Expected Annual Losses due to Building Damages before Mitigation:	\$756	
Expected Annual Losses due to Building Damages after Mitigation:	\$460	
Expected Annual Benefits - Building:	\$296	

Depth Damage Curve - Building
Floodplain and Stream Restoration @ 121 Norwich Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION						AFTER MITIGATION					
Flood Depth (ft)	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)		Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)		
-2	3	12,286.96	0	0		3	12,286.96	0	0		
-4	5	20,478.27	0	0		5	20,478.27	0	0		
0	7	28,669.58	0	0		7	28,669.58	0	0		
1	11	45,052.20	0	0		11	45,052.20	0	0		
2	17	68,626.13	0	0		17	68,626.13	0	0		
3	22	90,104.41	0	0		22	90,104.41	0	0		
4	28	114,678.34	0	0		28	114,678.34	0	0		
5	33	135,156.62	0	0		33	135,156.62	0	0		
6	35	143,347.93	0	0		35	143,347.93	0	0		
7	38	155,634.89	0	0		38	155,634.89	0	0		
8	40	163,826.20	0	0		40	163,826.20	0	0		
9	44	180,208.82	0	0		44	180,208.82	0	0		
10	46	188,400.13	0	0		46	188,400.13	0	0		
11	48	196,591.44	0	0		48	196,591.44	0	0		
12	50	409,565.52	0	0		50	409,565.52	0	0		
13	52	409,565.52	0	0		52	409,565.52	0	0		
14	54	409,565.52	0	0		54	409,565.52	0	0		
15	54	409,565.52	0	0		54	409,565.52	0	0		
16	54	409,565.52	0	0		54	409,565.52	0	0		

Contents Damages
Floodplain and Stream Restoration @ 121 Norwich Rd, East Haddam, Connecticut, 06423

Contents Value in Dollars:	\$0	Use Default:Yes
Utilities Elevated:	No	
Expected Annual Losses due to Contents Damages before Mitigation:	\$725	
Expected Annual Losses due to Contents Damages after Mitigation:	\$239	
Expected Annual Benefits - Contents:	\$486	

Depth Damage Curve - Contents
Floodplain and Stream Restoration @ 121 Norwich Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION			AFTER MITIGATION		
	Percent (%)	Damage Value (\$)		Percent (%)	Damage Value (\$)	
-2	6	12,286.96		6	12,286.96	
-1	9	18,430.44		9	18,430.44	
0	11	22,526.10		11	22,526.10	
1	17	34,813.06		17	34,813.06	
2	22	45,052.20		22	45,052.20	
3	28	57,339.17		28	57,339.17	
4	33	67,578.31		33	67,578.31	
5	39	79,865.27		39	79,865.27	
6	44	90,104.41		44	90,104.41	
7	49	100,343.55		49	100,343.55	
8	55	110,630.51		55	110,630.51	
9	61	124,917.48		61	124,917.48	
10	64	131,060.96		64	131,060.96	
11	71	145,395.75		71	145,395.75	
12	76	155,634.89		76	155,634.89	
13	78	159,730.55		78	159,730.55	
14	79	161,778.38		79	161,778.38	
15	79	161,778.38		79	161,778.38	
16	87	178,161.00		87	178,161.00	

Displacement Costs Avoided
Floodplain and Stream Restoration @ 121 Norwich Rd, East Haddam, Connecticut, 06423

Lodging Per Diem:	\$110	Use Default:Yes
Meals Per Diem:	\$68	Use Default:Yes
Population Affected:	0	
Duration of Displacement (days):	365	Use Default:Yes
Total Residential Displacement Cost:	\$0	
Expected Annual Losses due to Displacement Damages before mitigation:	\$0	
Expected Annual Losses due to Displacement Damages after Mitigation:	\$0	
Expected Annual Losses - Displacement:	\$0	

Comments

- Number of Building Residents:
Building has two units.

Depth Damage Curve - Displacement
Floodplain and Stream Restoration @ 121 Norwich Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION			AFTER MITIGATION		
	Days	Damage Value (\$)		Days	Damage Value (\$)	
-2	0	0		0	0	
-1	0	0		0	0	
0	0	0		0	0	
1	45	0		45	0	
2	90	0		90	0	
3	135	0		135	0	
4	180	0		180	0	
5	225	0		225	0	
6	270	0		270	0	
7	315	0		315	0	
8	360	0		360	0	
9	405	0		405	0	
10	450	0		450	0	
11	495	0		495	0	
12	540	0		540	0	
13	585	0		585	0	
14	630	0		630	0	
15	675	0		675	0	
16	720	0		720	0	

Street Maintenance Costs Avoided
Floodplain and Stream Restoration @ 121 Norwich Rd, East Haddam, Connecticut, 06423

Total Annual Street Maintenance Budget:	\$0
Total Number of Street Miles Maintained:	0
Street Miles that will not require future maintenance:	0
Expected Annual Benefits - Street Maintenance:	\$0

Volunteer Costs Avoided
Floodplain and Stream Restoration @ 121 Norwich Rd, East Haddam, Connecticut, 06423

Number of Volunteers (volunteers/event):	0
Number of Days of Lodging:	0
Expected Annual Volunteer Benefits:	\$0

Ecosystem Services Losses Avoided
Floodplain and Stream Restoration @ 121 Norwich Rd, East Haddam, Connecticut, 06423

Total Project Area (acres):	0
Percentage of Urban Green Open Space:	0.00%
Percentage of Rural Green Open Space:	0.00%
Percentage of Riparian:	0.00%
Percentage of Coastal Wetlands:	0.00%
Percentage of Inland Wetlands:	0.00%
Percentage of Forests:	0.00%
Percentage of Coral Reefs:	0.00%
Percentage of Shellfish Reefs:	0.00%
Percentage of Beaches and Dunes:	0.00%
Expected Annual Ecosystem Services Benefits:	\$0

Benefits-Costs Summary
Floodplain and Stream Restoration @ 121 Norwich Rd, East Haddam, Connecticut, 06423

Discount Rate (%):	7.0%	Use Default:Yes
Total Project Benefits:	\$10,125	
Total Project Cost:	\$0	
Benefit-Cost Ratio:	0	

Property Configuration

Property Title:	Floodplain and Stream Restoration @ 62 Creamery Rd, East Haddam, Connecticut, 06423
Property Location:	06423, Middlesex, Connecticut
Property Coordinates:	41.45280470673592, -72.4591169197996
Hazard Type:	Riverine Flood
Mitigation Action Type:	Floodplain and Stream Restoration
Property Type:	Non-Residential Building
Analysis Method Type:	Modeled Damages

Cost Estimation

Floodplain and Stream Restoration @ 62 Creamery Rd, East Haddam, Connecticut, 06423

Discount Rate (%):	7.0%	Use Default:Yes
Project Useful Life (years):	35	
Project Cost:	\$0	
Number of Maintenance Years:	35	Use Default:Yes
Annual Maintenance Cost:	\$0	

Comments

-

Project Useful Life:
Flood protection at this building is due to a combination of a floodwall/berm and a culvert with end treatments. However, the effectiveness of this alternative is expected to diminish as a result of projected future storms. Therefore, the minimum PUL for concrete infrastructure (35 years) was selected.

Hazard Probabilities Parameters - Flood

Floodplain and Stream Restoration @ 62 Creamery Rd, East Haddam, Connecticut, 06423

Lowest Floor Elevation of the Property (ft):	16.4
Streambed Elevation at the Property Location (ft):	10.5
Use Default Recurrence Intervals:	Use Default:Yes

Discharge

Floodplain and Stream Restoration @ 62 Creamery Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION		
Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)
10	15.44	533
50	15.72	971
100	15.84	1188
500	16.75	1884
AFTER MITIGATION		
Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)
10	13.78	533
50	13.78	971
100	13.78	1188
500	15	1884

Estimated Annual Damages by Category

Floodplain and Stream Restoration @ 62 Creamery Rd, East Haddam, Connecticut, 06423

Before Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-2.54	111	\$0	\$0	\$0	\$0
-2	171	\$0	\$0	\$0	\$0
-1.87	2	\$0	\$0	\$0	\$0
-1.38	5	\$0	\$0	\$0	\$0
-1.18	8	\$0	\$0	\$0	\$0
-1.09	1006	\$0	\$0	\$0	\$0
-0.84	20	\$0	\$0	\$0	\$0
-0.69	30	\$0	\$0	\$0	\$0
-0.6	40	\$0	\$0	\$0	\$0
-0.53	49.85	\$0	\$0	\$0	\$0
-0.49	60	\$0	\$0	\$0	\$0
-0.44	70	\$0	\$0	\$0	\$0
-0.4	80	\$0	\$0	\$0	\$0
-0.35	90	\$0	\$0	\$0	\$0
-0.35	95.93	\$0	\$0	\$0	\$0
-0.34	200	\$0	\$0	\$0	\$0
-0.01	300	\$0	\$0	\$0	\$0
0	334.28	\$0	\$0	\$0	\$0
0.05	400	\$1	\$1	\$1	\$0
0.13	537.72	\$373	\$93	\$808	\$0
Total (\$)		\$374	\$94	\$808	\$0

After Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-3.96	131	\$0	\$0	\$0	\$0
-3.46	2	\$0	\$0	\$0	\$0
-3.07	5	\$0	\$0	\$0	\$0
-2.91	8	\$0	\$0	\$0	\$0
-2.85	1006	\$0	\$0	\$0	\$0
-2.65	20	\$0	\$0	\$0	\$0
-2.51	30	\$0	\$0	\$0	\$0
-2.46	40	\$0	\$0	\$0	\$0
-2.4	49.85	\$0	\$0	\$0	\$0
-2.34	60	\$0	\$0	\$0	\$0
-2.3	70	\$0	\$0	\$0	\$0
-2.28	80	\$0	\$0	\$0	\$0
-2.25	90	\$0	\$0	\$0	\$0
-2.22	95.93	\$0	\$0	\$0	\$0
-2.04	200	\$0	\$0	\$0	\$0
-2	257.53	\$0	\$0	\$0	\$0
-1.96	300	\$0	\$0	\$0	\$0
-1.88	400	\$0	\$0	\$0	\$0
-1.81	537.72	\$0	\$0	\$0	\$0
0	307098.85	\$0	\$0	\$0	\$0
Total (\$)		\$0	\$0	\$0	\$0

Building Information

Floodplain and Stream Restoration @ 62 Creamery Rd, East Haddam, Connecticut, 06423

Non-Residential Occupancy Type:	COM8: Commercial - Entertainment and Recreation
Building is outside hundred-year flood area:	No
Building Type:	Recreation
Building Is Engineered:	Yes
NFIP:	No

Building Damages
Floodplain and Stream Restoration @ 62 Creamery Rd, East Haddam, Connecticut, 06423

Depth Damage Curve:	Recreation (Default)	Use Default:Yes
Building Size (sq.ft):	5,088	
Building Replacement Value (BRV) (\$/sq.ft):	\$79	Use Default: No
Demolition Threshold (%):	50/00%	Use Default:Yes
Expected Annual Losses due to Building Damages before Mitigation:	\$374	
Expected Annual Losses due to Building Damages after Mitigation:	\$0	
Expected Annual Benefits - Building:	\$374	

Depth Damage Curve - Building
Floodplain and Stream Restoration @ 62 Creamery Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION				AFTER MITIGATION			
	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)
-2	0	0	0	0	0	0	0	0
-1	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
1	11.9	23,879.81	0	0	11.9	23,879.81	0	0
2	20.2	40,535.48	0	0	20.2	40,535.48	0	0
3	26	52,174.38	0	0	26	52,174.38	0	0
4	32.2	64,615.97	0	0	32.2	64,615.97	0	0
5	38.8	73,846.82	0	0	38.8	73,846.82	0	0
6	40.7	81,672.98	0	0	40.7	81,672.98	0	0
7	43.4	87,091.09	0	0	43.4	87,091.09	0	0
8	47.4	95,117.92	0	0	47.4	95,117.92	0	0
9	49.4	99,131.33	0	0	49.4	99,131.33	0	0
10	51.6	200,670.72	0	0	51.6	200,670.72	0	0
11	51.6	200,670.72	0	0	51.6	200,670.72	0	0
12	51.6	200,670.72	0	0	51.6	200,670.72	0	0
13	51.6	200,670.72	0	0	51.6	200,670.72	0	0
14	51.6	200,670.72	0	0	51.6	200,670.72	0	0
15	51.6	200,670.72	0	0	51.6	200,670.72	0	0
16	51.6	200,670.72	0	0	51.6	200,670.72	0	0

Contents Damages
Floodplain and Stream Restoration @ 62 Creamery Rd, East Haddam, Connecticut, 06423

Contents Value in Dollars:	\$0	Use Default:Yes
Expected Annual Losses due to Contents Damages before Mitigation:	\$94	
Expected Annual Losses due to Contents Damages after Mitigation:	\$0	
Expected Annual Benefits - Contents:	\$94	

Depth Damage Curve - Contents
Floodplain and Stream Restoration @ 62 Creamery Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION			AFTER MITIGATION		
	Percent (%)	Damage Value (\$)		Percent (%)	Damage Value (\$)	
-2	0	0		0	0	
-1	0	0		0	0	
0	0	0		0	0	
1	26	13,043.59		26	13,043.59	
2	44	22,073.77		44	22,073.77	
3	63	31,605.63		63	31,605.63	
4	73	36,622.40		73	36,622.40	
5	80	40,134.14		80	40,134.14	
6	84	42,140.85		84	42,140.85	
7	91	45,652.58		91	45,652.58	
8	95	47,659.29		95	47,659.29	
9	95	47,659.29		95	47,659.29	
10	95	47,659.29		95	47,659.29	
11	95	47,659.29		95	47,659.29	
12	95	47,659.29		95	47,659.29	
13	95	47,659.29		95	47,659.29	
14	95	47,659.29		95	47,659.29	
15	95	47,659.29		95	47,659.29	
16	95	47,659.29		95	47,659.29	

Displacement Costs Avoided
Floodplain and Stream Restoration @ 62 Creamery Rd, East Haddam, Connecticut, 06423

Monthly Displacement Cost (\$/sq.ft/month):	2.29	Use Default:Yes
One-Time Displacement Cost (\$/sq.ft):	0	Use Default:Yes
Expected Annual Losses due to Displacement Damages before mitigation:	\$830	
Expected Annual Losses due to Displacement Damages after Mitigation:	\$0	
Expected Annual Losses - Displacement:	\$829	

Depth Damage Curve - Displacement
Floodplain and Stream Restoration @ 62 Creamery Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION			AFTER MITIGATION		
	Days	Damage Value (\$)		Days	Damage Value (\$)	
-2	0	0		0	0	
-1	0	0		0	0	
0	0	0		0	0	
1	45	27,293.28		45	27,293.28	
2	90	54,586.57		90	54,586.57	
3	135	81,879.85		135	81,879.85	
4	180	103,648.87		180	103,648.87	
5	225	179,561.09		225	179,561.09	
6	270	215,473.31		270	215,473.31	
7	315	251,385.53		315	251,385.53	
8	360	356,249.21		360	356,249.21	
9	405	400,780.36		405	400,780.36	
10	450	445,311.51		450	445,311.51	
11	450	445,311.51		450	445,311.51	
12	450	172,378.65		450	172,378.65	
13	450	172,378.65		450	172,378.65	
14	450	172,378.65		450	172,378.65	
15	450	172,378.65		450	172,378.65	
16	450	172,378.65		450	172,378.65	

Loss of Function/Loss of Income Avoided
Floodplain and Stream Restoration @ 62 Creamery Rd, East Haddam, Connecticut, 06423

Annual Operating Budget:	\$0
Loss of Function/Loss of Income Per Day:	\$0
Expected Annual Losses due to Loss of Function/Loss of Income before mitigation:	\$0
Expected Annual Losses due to Loss of Function/Loss of Income after mitigation:	\$0
Expected Annual Benefits - Loss of Function/Loss of Income Avoided:	\$0

Depth Damage Curve - Loss of Function/Loss of Income
Floodplain and Stream Restoration @ 62 Creamery Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION		AFTER MITIGATION	
	Days	Damage Value (\$)	Days	Damage Value (\$)
-2	0	0	0	0
-1	0	0	0	0
0	0	0	0	0
1	48	0	45	0
2	90	0	90	0
3	135	0	135	0
4	180	0	180	0
5	225	0	225	0
6	270	0	270	0
7	315	0	315	0
8	360	0	360	0
9	405	0	405	0
10	450	0	450	0
11	450	0	450	0
12	450	0	450	0
13	450	0	450	0
14	450	0	450	0
15	450	0	450	0
16	450	0	450	0

Volunteer Costs Avoided
Floodplain and Stream Restoration @ 62 Creamery Rd, East Haddam, Connecticut, 06423

Number of Volunteers (volunteers/event):	0
Number of Days of Lodging:	0
Expected Annual Volunteer Benefits:	\$0

Ecosystem Services Losses Avoided
Floodplain and Stream Restoration @ 62 Creamery Rd, East Haddam, Connecticut, 06423

Total Project Area (acres):	0
Percentage of Urban Green Open Space:	0.00%
Percentage of Rural Green Open Space:	0.00%
Percentage of Riparian:	0.00%
Percentage of Coastal Wetlands:	0.00%
Percentage of Inland Wetlands:	0.00%
Percentage of Forests:	0.00%
Percentage of Coral Reefs:	0.00%
Percentage of Shellfish Reefs:	0.00%
Percentage of Beaches and Dunes:	0.00%
Expected Annual Ecosystem Services Benefits:	\$0

Benefits-Costs Summary
Floodplain and Stream Restoration @ 62 Creamery Rd, East Haddam, Connecticut, 06423

Discount Rate (%):	7.0% Use Default:Yes
Total Project Benefits:	\$16,801
Total Project Cost:	\$0
Benefit-Cost Ratio:	0

Property Configuration

Property Title:	Floodplain and Stream Restoration @ 59 Creamery Rd, East Haddam, Connecticut, 06423
Property Location:	06423, Middlesex, Connecticut
Property Coordinates:	41.45229504511332, -72.45890946707638
Hazard Type:	Riverine Flood
Mitigation Action Type:	Floodplain and Stream Restoration
Property Type:	Residential Building
Analysis Method Type:	Modeled Damages

Cost Estimation
Floodplain and Stream Restoration @ 59 Creamery Rd, East Haddam, Connecticut, 06423

Discount Rate (%):	7.0% Use Default:Yes
Project Useful Life (years):	\$0
Project Cost:	\$1,550,000
Number of Maintenance Years:	50 Use Default:Yes
Annual Maintenance Cost:	\$0

Comments

-

Mitigation Project Cost:
Includes cost of replacing existing Creamery Road bridge with new, wider structure. This component has a PUL of 50 years.

Hazard Probabilities Parameters - Flood
Floodplain and Stream Restoration @ 59 Creamery Rd, East Haddam, Connecticut, 06423

Lowest Floor Elevation of the Property (ft):	13.6
Streambed Elevation at the Property Location (ft):	5.2
Use Default Recurrence Intervals:	Use Default:Yes

Discharge
Floodplain and Stream Restoration @ 59 Creamery Rd, East Haddam, Connecticut, 06423

Recurrence Interval (years)	BEFORE MITIGATION	
	Surface Elevation (ft)	Discharge (cfs)
10	12.28	533
50	13.09	971
100	13.25	1188
500	13.84	3884
Recurrence Interval (years)	AFTER MITIGATION	
	Surface Elevation (ft)	Discharge (cfs)
10	10.06	533
50	11.25	971
100	11.63	1188
500	12.94	3884

Estimated Annual Damages by Category
Floodplain and Stream Restoration @ 59 Creamery Rd, East Haddam, Connecticut, 06423

Before Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-3.19	111	\$ 0	\$ 0	\$ 0	\$ 0
-2.32	2	\$ 0	\$ 0	\$ 0	\$ 0
-2	238	\$ 1,627	\$ 1,589	\$ 0	\$ 0
-1.65	5	\$ 1,064	\$ 1,002	\$ 0	\$ 0
-1.4	8	\$ 988	\$ 968	\$ 0	\$ 0
-1.27	10,06	\$ 847	\$ 788	\$ 0	\$ 0
-0.95	20	\$ 316	\$ 278	\$ 0	\$ 0
-0.79	30	\$ 167	\$ 144	\$ 0	\$ 0
-0.67	40	\$ 103	\$ 87	\$ 0	\$ 0
-0.57	49.85	\$ 72	\$ 61	\$ 0	\$ 0
-0.51	60	\$ 52	\$ 43	\$ 0	\$ 0
-0.45	70	\$ 40	\$ 33	\$ 0	\$ 0
-0.4	80	\$ 31	\$ 26	\$ 0	\$ 0
-0.34	90	\$ 16	\$ 13	\$ 0	\$ 0
-0.32	95.93	\$ 129	\$ 104	\$ 0	\$ 0
-0.05	200	\$ 22	\$ 18	\$ 0	\$ 0
0	243.35	\$ 20	\$ 16	\$ 0	\$ 0
0.07	300	\$ 23	\$ 18	\$ 1	\$ 0
0.17	400	\$ 18	\$ 14	\$ 1	\$ 0
0.27	537.72	\$ 673	\$ 336	\$ 114	\$ 0
Total (\$)		\$ 5,616	\$ 4,916	\$ 116	\$ 0

After Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-6.07	131	\$ 0	\$ 0	\$ 0	\$ 0
-5.04	2	\$ 0	\$ 0	\$ 0	\$ 0
-4.13	5	\$ 0	\$ 0	\$ 0	\$ 0
-3.72	8	\$ 0	\$ 0	\$ 0	\$ 0
-3.55	10,06	\$ 0	\$ 0	\$ 0	\$ 0
-3.01	20	\$ 0	\$ 0	\$ 0	\$ 0
-2.71	30	\$ 0	\$ 0	\$ 0	\$ 0
-2.52	40	\$ 0	\$ 0	\$ 0	\$ 0
-2.36	49.85	\$ 0	\$ 0	\$ 0	\$ 0
-2.23	60	\$ 0	\$ 0	\$ 0	\$ 0
-2.12	70	\$ 0	\$ 0	\$ 0	\$ 0
-2.01	80	\$ 0	\$ 0	\$ 0	\$ 0
-2	83.25	\$ 10	\$ 10	\$ 0	\$ 0
-1.93	90	\$ 8	\$ 8	\$ 0	\$ 0
-1.9	95.93	\$ 72	\$ 69	\$ 0	\$ 0
-1.37	200	\$ 27	\$ 25	\$ 0	\$ 0
-1.09	300	\$ 15	\$ 13	\$ 0	\$ 0
-0.89	400	\$ 12	\$ 11	\$ 0	\$ 0
-0.7	537.72	\$ 27	\$ 22	\$ 0	\$ 0
0	1493.08	\$ 242	\$ 121	\$ 41	\$ 0
Total (\$)		\$ 414	\$ 279	\$ 41	\$ 0

Building Information
Floodplain and Stream Restoration @ 59 Creamery Rd, East Haddam, Connecticut, 06423

Building Type:	Two or More Stories
Foundation Type:	
Building Has Basement:	Yes
NFIP:	No

Building Damages
Floodplain and Stream Restoration @ 59 Creamery Rd, East Haddam, Connecticut, 06423

Depth Damage Curve:	USACE - Chicago: two story, w/ basement	Use Default:Yes
Building Size (sq.ft):	2,179	
Building Replacement Value (BRV) (\$/sq.ft):	\$166	Use Default: No
Demolition Threshold (%):	50.00%	Use Default:Yes
Expected Annual Losses due to Building Damages before Mitigation:	\$5,616	
Expected Annual Losses due to Building Damages after Mitigation:	\$414	
Expected Annual Benefits - Building:	\$5,203	

Depth Damage Curve - Building
Floodplain and Stream Restoration @ 59 Creamery Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION						AFTER MITIGATION					
Flood Depth (ft)	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)		Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)		
-2	3	10,851.42	0	0		3	10,851.42	0	0		
-4	5	18,085.7	0	0		5	18,085.7	0	0		
0	7	25,319.98	0	0		7	25,319.98	0	0		
1	11	38,788.54	0	0		11	38,788.54	0	0		
2	17	61,491.38	0	0		17	61,491.38	0	0		
3	22	79,577.08	0	0		22	79,577.08	0	0		
4	28	101,279.92	0	0		28	101,279.92	0	0		
5	33	119,365.62	0	0		33	119,365.62	0	0		
6	35	126,599.9	0	0		35	126,599.9	0	0		
7	38	137,431.32	0	0		38	137,431.32	0	0		
8	40	144,685.6	0	0		40	144,685.6	0	0		
9	44	159,541.16	0	0		44	159,541.16	0	0		
10	46	166,388.44	0	0		46	166,388.44	0	0		
11	48	173,622.72	0	0		48	173,622.72	0	0		
12	50	181,714	0	0		50	181,714	0	0		
13	52	181,714	0	0		52	181,714	0	0		
14	54	181,714	0	0		54	181,714	0	0		
15	54	181,714	0	0		54	181,714	0	0		
16	54	181,714	0	0		54	181,714	0	0		

Contents Damages
Floodplain and Stream Restoration @ 59 Creamery Rd, East Haddam, Connecticut, 06423

Contents Value in Dollars:	\$0	Use Default:Yes
Utilities Elevated:	No	
Expected Annual Losses due to Contents Damages before Mitigation:	\$4,916	
Expected Annual Losses due to Contents Damages after Mitigation:	\$279	
Expected Annual Benefits - Contents:	\$4,637	

Depth Damage Curve - Contents
Floodplain and Stream Restoration @ 59 Creamery Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION			AFTER MITIGATION		
	Percent (%)	Damage Value (\$)		Percent (%)	Damage Value (\$)	
-2	6	16,851.42		6	16,851.42	
-1	9	16,277.13		9	16,277.13	
0	11	16,894.27		11	16,894.27	
1	17	30,743.69		17	30,743.69	
2	22	39,788.54		22	39,788.54	
3	28	58,639.96		28	58,639.96	
4	33	59,682.81		33	59,682.81	
5	39	70,534.23		39	70,534.23	
6	44	79,577.08		44	79,577.08	
7	49	88,619.93		49	88,619.93	
8	55	99,471.35		55	99,471.35	
9	61	180,322.77		61	180,322.77	
10	64	115,748.48		64	115,748.48	
11	71	128,408.47		71	128,408.47	
12	76	137,451.32		76	137,451.32	
13	78	141,068.46		78	141,068.46	
14	79	142,877.03		79	142,877.03	
15	79	142,877.03		79	142,877.03	
16	87	157,345.59		87	157,345.59	

Displacement Costs Avoided
Floodplain and Stream Restoration @ 59 Creamery Rd, East Haddam, Connecticut, 06423

Lodging Per Diem:	\$110	Use Default:Yes
Meals Per Diem:	\$68	Use Default:Yes
Population Affected:	1	
Duration of Displacement (days):	365	Use Default:Yes
Total Residential Displacement Cost:	\$168	
Expected Annual Losses due to Displacement Damages before mitigation:	\$116	
Expected Annual Losses due to Displacement Damages after Mitigation:	\$41	
Expected Annual Losses - Displacement:	\$75	

Comments

- Number of Building Residents:
Building has two units.

Depth Damage Curve - Displacement
Floodplain and Stream Restoration @ 59 Creamery Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION			AFTER MITIGATION		
	Days	Damage Value (\$)		Days	Damage Value (\$)	
-2	0	0		0	0	
-1	0	0		0	0	
0	0	0		0	0	
1	45	7,560		45	7,560	
2	90	15,120		90	15,120	
3	135	22,680		135	22,680	
4	180	30,240		180	30,240	
5	225	37,800		225	37,800	
6	270	45,360		270	45,360	
7	315	52,920		315	52,920	
8	360	60,480		360	60,480	
9	405	68,040		405	68,040	
10	450	75,600		450	75,600	
11	495	83,160		495	83,160	
12	540	90,720		540	90,720	
13	585	98,280		585	98,280	
14	630	105,840		630	105,840	
15	675	113,400		675	113,400	
16	720	120,960		720	120,960	

Street Maintenance Costs Avoided
Floodplain and Stream Restoration @ 59 Creamery Rd, East Haddam, Connecticut, 06423

Total Annual Street Maintenance Budget:	\$0
Total Number of Street Miles Maintained:	0
Street Miles that will not require future maintenance:	0
Expected Annual Benefits - Street Maintenance:	\$0

Volunteer Costs Avoided
Floodplain and Stream Restoration @ 59 Creamery Rd, East Haddam, Connecticut, 06423

Number of Volunteers (volunteers/event):	0
Number of Days of Lodging:	0
Expected Annual Volunteer Benefits:	\$0

Ecosystem Services Losses Avoided
Floodplain and Stream Restoration @ 59 Creamery Rd, East Haddam, Connecticut, 06423

Total Project Area (acres):	0
Percentage of Urban Green Open Space:	0.00%
Percentage of Rural Green Open Space:	0.00%
Percentage of Riparian:	0.00%
Percentage of Coastal Wetlands:	0.00%
Percentage of Inland Wetlands:	0.00%
Percentage of Forests:	0.00%
Percentage of Coral Reefs:	0.00%
Percentage of Shellfish Reefs:	0.00%
Percentage of Beaches and Dunes:	0.00%
Expected Annual Ecosystem Services Benefits:	\$0

Benefits-Costs Summary
Floodplain and Stream Restoration @ 59 Creamery Rd, East Haddam, Connecticut, 06423

Discount Rate (%):	7.0%	Use Default:Yes
Total Project Benefits:	\$136,832	
Total Project Cost:	\$1,550,000	
Benefit-Cost Ratio:	0.09	

Property Configuration

Property Title:

Floodplain and Stream Restoration @ 20 Norwich Rd, East Haddam, Connecticut, 06423

Property Location:

06423, Middlesex, Connecticut

Property Coordinates:

41.45476900574508, -72.45860302469629

Hazard Type:

Riverine Flood

Mitigation Action Type:

Floodplain and Stream Restoration

Property Type:

Non-Residential Building

Analysis Method Type:

Modeled Damages

Cost Estimation

Floodplain and Stream Restoration @ 20 Norwich Rd, East Haddam, Connecticut, 06423

Discount Rate (%):

7.0%

Use Default:Yes

Project Useful Life (years):

30

Project Cost:

\$0

Number of Maintenance Years:

30

Use Default:Yes

Annual Maintenance Cost:

\$0

Hazard Probabilities Parameters - Flood

Floodplain and Stream Restoration @ 20 Norwich Rd, East Haddam, Connecticut, 06423

Lowest Floor Elevation of the Property (ft):

35.95

Streambed Elevation at the Property Location (ft):

29

Use Default Recurrence Intervals:

Use Default:Yes

Discharge

Floodplain and Stream Restoration @ 20 Norwich Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION

Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)
10	37.78	533
50	38.22	971
100	38.59	1188
500	42.75	1884

AFTER MITIGATION

Recurrence Interval (years)	Surface Elevation (ft)	Discharge (cfs)
10	32.84	533
50	34.9	971
100	35.83	1188
500	37.88	1884

Estimated Annual Damages by Category

Floodplain and Stream Restoration @ 20 Norwich Rd, East Haddam, Connecticut, 06423

Before Mitigation

Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-2.79	1	\$0	\$0	\$0	\$0
-2	138	\$0	\$0	\$0	\$0
-1.95	2	\$0	\$0	\$0	\$0
0	408	\$0	\$0	\$0	\$0
0.28	5	\$13,822	\$598	\$0	\$0
0.89	8	\$3,2649	\$283	\$0	\$0
1.18	3006	\$6,946	\$626	\$0	\$0
1.98	20	\$2,998	\$254	\$0	\$0
2.44	30	\$1,636	\$141	\$0	\$0
2.75	40	\$1,027	\$90	\$0	\$0
2.99	49.85	\$738	\$64	\$0	\$0
3.19	60	\$539	\$46	\$0	\$0
3.35	70	\$417	\$36	\$0	\$0
3.5	80	\$333	\$28	\$0	\$0
3.62	90	\$188	\$14	\$0	\$0
3.69	95.93	\$1,408	\$196	\$0	\$0
4.45	200	\$466	\$38	\$0	\$0
4.87	300	\$241	\$19	\$0	\$0
5.17	400	\$181	\$15	\$0	\$0
5.47	537.72	\$1,485	\$89	\$0	\$0
Total (\$)		\$25,164	\$2,238	\$0	\$0

After Mitigation

Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-5.91	131	\$0	\$0	\$0	\$0
-4.94	2	\$0	\$0	\$0	\$0
-3.84	5	\$0	\$0	\$0	\$0
-3.21	8	\$0	\$0	\$0	\$0
-3.03	3006	\$0	\$0	\$0	\$0
-2.24	20	\$0	\$0	\$0	\$0
-2	24.48	\$0	\$0	\$0	\$0
-1.75	30	\$0	\$0	\$0	\$0
-1.4	40	\$0	\$0	\$0	\$0
-1.11	49.85	\$0	\$0	\$0	\$0
-0.89	60	\$0	\$0	\$0	\$0
-0.69	70	\$0	\$0	\$0	\$0
-0.52	80	\$0	\$0	\$0	\$0
-0.35	90	\$0	\$0	\$0	\$0
-0.28	95.93	\$0	\$0	\$0	\$0
0	118.91	\$0	\$0	\$0	\$0
0.71	200	\$158	\$15	\$0	\$0
1.27	300	\$113	\$10	\$0	\$0
1.69	400	\$104	\$9	\$0	\$0
2.52	537.72	\$1,485	\$89	\$0	\$0
Total (\$)		\$1,881	\$124	\$0	\$0

Building Information

Floodplain and Stream Restoration @ 20 Norwich Rd, East Haddam, Connecticut, 06423

Non-Residential Occupancy Type:

EDUT: Education - Schools/Libraries

Building is outside hundred-year flood area:

No

Building Type:

Schools

Building Is Engineered:

Yes

NFIP:

No

Building Damages
Floodplain and Stream Restoration @ 20 Norwich Rd, East Haddam, Connecticut, 06423

Depth Damage Curve:

Schools (Default)

Use Default:Yes

Building Size (sq.ft):

13,156

Building Replacement Value (BRV) (\$/sq.ft):

\$96

Use Default: No

Demolition Threshold (%):

50.00%

Use Default:Yes

Expected Annual Losses due to Building Damages before Mitigation:

\$25,164

Expected Annual Losses due to Building Damages after Mitigation:

\$1,861

Expected Annual Benefits - Building:

\$23,304

Depth Damage Curve - Building
Floodplain and Stream Restoration @ 20 Norwich Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION				AFTER MITIGATION			
	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)
-2	0	0	0	0	0	0	0	0
-1	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
1	13	103,895.77	0	0	13	103,895.77	0	0
2	21.5	171,695.32	0	0	21.5	171,695.32	0	0
3	26.7	213,221.63	0	0	26.7	213,221.63	0	0
4	32.7	261,136.61	0	0	32.7	261,136.61	0	0
5	36.2	289,087.01	0	0	36.2	289,087.01	0	0
6	39.7	317,037.41	0	0	39.7	317,037.41	0	0
7	41.6	332,210.49	0	0	41.6	332,210.49	0	0
8	44.5	355,369.39	0	0	44.5	355,369.39	0	0
9	46.4	370,542.47	0	0	46.4	370,542.47	0	0
10	48.5	387,312.71	0	0	48.5	387,312.71	0	0
11	48.5	387,312.71	0	0	48.5	387,312.71	0	0
12	48.5	387,312.71	0	0	48.5	387,312.71	0	0
13	48.5	387,312.71	0	0	48.5	387,312.71	0	0
14	48.5	387,312.71	0	0	48.5	387,312.71	0	0
15	48.5	387,312.71	0	0	48.5	387,312.71	0	0
16	48.5	387,312.71	0	0	48.5	387,312.71	0	0

Contents Damages
Floodplain and Stream Restoration @ 20 Norwich Rd, East Haddam, Connecticut, 06423

Contents Value in Dollars:

\$0

Use Default:Yes

Expected Annual Losses due to Contents Damages before Mitigation:

\$2,238

Expected Annual Losses due to Contents Damages after Mitigation:

\$124

Expected Annual Benefits - Contents:

\$2,114

Depth Damage Curve - Contents
Floodplain and Stream Restoration @ 20 Norwich Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION			AFTER MITIGATION		
	Percent (%)	Damage Value (\$)		Percent (%)	Damage Value (\$)	
-2	0	0		0	0	
-1	0	0		0	0	
0	0	0		0	0	
1	22	10,541.29		22	10,541.29	
2	30	14,374.49		30	14,374.49	
3	39	18,686.84		39	18,686.84	
4	45	21,561.73		45	21,561.73	
5	48	22,999.18		48	22,999.18	
6	52	24,915.78		52	24,915.78	
7	56	26,832.38		56	26,832.38	
8	59	28,269.83		59	28,269.83	
9	61	29,228.13		61	29,228.13	
10	63	30,186.43		63	30,186.43	
11	63	30,186.43		63	30,186.43	
12	63	30,186.43		63	30,186.43	
13	63	30,186.43		63	30,186.43	
14	63	30,186.43		63	30,186.43	
15	63	30,186.43		63	30,186.43	
16	63	30,186.43		63	30,186.43	

Displacement Costs Avoided
Floodplain and Stream Restoration @ 20 Norwich Rd, East Haddam, Connecticut, 06423

Monthly Displacement Cost (\$/sq.ft/month):

0

Use Default: No

One-Time Displacement Cost (\$/sq.ft):

0

Use Default: No

Expected Annual Losses due to Displacement Damages before mitigation:

\$0

Expected Annual Losses due to Displacement Damages after Mitigation:

\$0

Expected Annual Losses - Displacement:

\$0

Depth Damage Curve - Displacement
Floodplain and Stream Restoration @ 20 Norwich Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION		AFTER MITIGATION	
	Days	Damage Value (\$)	Days	Damage Value (\$)
-2	0	0	0	0
-1	0	0	0	0
0	0	0	0	0
1	45	0	45	0
2	90	0	90	0
3	135	0	135	0
4	180	0	180	0
5	225	0	225	0
6	270	0	270	0
7	315	0	315	0
8	360	0	360	0
9	405	0	405	0
10	450	0	450	0
11	450	0	450	0
12	450	0	450	0
13	450	0	450	0
14	450	0	450	0
15	450	0	450	0
16	450	0	450	0

Loss of Function/Loss of Income Avoided
Floodplain and Stream Restoration @ 20 Norwich Rd, East Haddam, Connecticut, 06423

Annual Operating Budget:	\$0
Loss of Function/Loss of Income Per Day:	\$0
Expected Annual Losses due to Loss of Function/Loss of Income before mitigation:	\$0
Expected Annual Losses due to Loss of Function/Loss of Income after mitigation:	\$0
Expected Annual Benefits - Loss of Function/Loss of Income Avoided:	\$0

Depth Damage Curve - Loss of Function/Loss of Income
Floodplain and Stream Restoration @ 20 Norwich Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION		AFTER MITIGATION	
	Days	Damage Value (\$)	Days	Damage Value (\$)
-2	0	0	0	0
-1	0	0	0	0
0	0	0	0	0
1	48	0	45	0
2	90	0	90	0
3	135	0	135	0
4	180	0	180	0
5	225	0	225	0
6	270	0	270	0
7	315	0	315	0
8	360	0	360	0
9	405	0	405	0
10	450	0	450	0
11	450	0	450	0
12	450	0	450	0
13	450	0	450	0
14	450	0	450	0
15	450	0	450	0
16	450	0	450	0

Volunteer Costs Avoided
Floodplain and Stream Restoration @ 20 Norwich Rd, East Haddam, Connecticut, 06423

Number of Volunteers (volunteers/event):	0
Number of Days of Lodging:	0
Expected Annual Volunteer Benefits:	\$0

Ecosystem Services Losses Avoided
Floodplain and Stream Restoration @ 20 Norwich Rd, East Haddam, Connecticut, 06423

Total Project Area (acres):	0
Percentage of Urban Green Open Space:	0.00%
Percentage of Rural Green Open Space:	0.00%
Percentage of Riparian:	0.00%
Percentage of Coastal Wetlands:	0.00%
Percentage of Inland Wetlands:	0.00%
Percentage of Forests:	0.00%
Percentage of Coral Reefs:	0.00%
Percentage of Shellfish Reefs:	0.00%
Percentage of Beaches and Dunes:	0.00%
Expected Annual Ecosystem Services Benefits:	\$0

Benefits-Costs Summary
Floodplain and Stream Restoration @ 20 Norwich Rd, East Haddam, Connecticut, 06423

Discount Rate (%):	7.0% Use Default:Yes
Total Project Benefits:	\$315,405
Total Project Cost:	\$0
Benefit-Cost Ratio:	0

Property Configuration

Property Title:	Floodplain and Stream Restoration @ 12D Norwich Rd, East Haddam, Connecticut, 06423
Property Location:	06423, Middlesex, Connecticut
Property Coordinates:	41.45438196885874, -72.45918517190287
Hazard Type:	Riverine Flood
Mitigation Action Type:	Floodplain and Stream Restoration
Property Type:	Residential Building
Analysis Method Type:	Modeled Damages

Cost Estimation
Floodplain and Stream Restoration @ 12D Norwich Rd, East Haddam, Connecticut, 06423

Discount Rate (%):	7.0% Use Default:Yes
Project Useful Life (years):	35
Project Cost:	\$0
Number of Maintenance Years:	35 Use Default:Yes
Annual Maintenance Cost:	\$0

Comments

-

Project Useful Life:
Flood protection at this building is due to a combination of a floodwall/berm and a culvert with end treatments. However, the effectiveness of this alternative is expected to diminish as a result of projected future storms. Therefore, the minimum PUL for concrete infrastructure (35 years) was selected.

Hazard Probabilities Parameters - Flood
Floodplain and Stream Restoration @ 12D Norwich Rd, East Haddam, Connecticut, 06423

Lowest Floor Elevation of the Property (ft):	28.5
Streambed Elevation at the Property Location (ft):	16.4
Use Default Recurrence Intervals:	Use Default:Yes

Discharge
Floodplain and Stream Restoration @ 12D Norwich Rd, East Haddam, Connecticut, 06423

Recurrence Interval (years)	BEFORE MITIGATION	
	Surface Elevation (ft)	Discharge (cfs)
10	25.84	533
50	26.59	971
100	26.79	1180
500	27.03	1884

Recurrence Interval (years)	AFTER MITIGATION	
	Surface Elevation (ft)	Discharge (cfs)
10	21.25	533
50	23.55	971
100	24.3	1180
500	26.47	1884

Estimated Annual Damages by Category
Floodplain and Stream Restoration @ 12D Norwich Rd, East Haddam, Connecticut, 06423

Before Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-4.22	1	\$ 0	\$ 0	\$ 0	\$ 0
-3.43	2	\$ 0	\$ 0	\$ 0	\$ 0
-2.87	5	\$ 0	\$ 0	\$ 0	\$ 0
-2.67	8	\$ 0	\$ 0	\$ 0	\$ 0
-2.56	10	\$ 0	\$ 0	\$ 0	\$ 0
-2.3	20	\$ 0	\$ 0	\$ 0	\$ 0
-2.16	30	\$ 0	\$ 0	\$ 0	\$ 0
-2.08	40	\$ 0	\$ 0	\$ 0	\$ 0
-2.01	49.85	\$ 0	\$ 0	\$ 0	\$ 0
-2	52.15	\$ 21	\$ 21	\$ 0	\$ 0
-1.94	60	\$ 21	\$ 21	\$ 0	\$ 0
-1.9	70	\$ 16	\$ 16	\$ 0	\$ 0
-1.87	80	\$ 13	\$ 13	\$ 0	\$ 0
-1.82	90	\$ 6	\$ 6	\$ 0	\$ 0
-1.8	95.93	\$ 54	\$ 52	\$ 0	\$ 0
-1.61	200	\$ 18	\$ 17	\$ 0	\$ 0
-1.5	300	\$ 10	\$ 9	\$ 0	\$ 0
-1.41	400	\$ 8	\$ 7	\$ 0	\$ 0
-1.35	537.72	\$ 29	\$ 24	\$ 0	\$ 0
0	279880.96	\$ 1	\$ 1	\$ 0	\$ 0
Total (\$)		\$ 197	\$ 187	\$ 0	\$ 0

After Mitigation					
Flood Depth (ft)	Recurrence Interval (yr)	Building (\$)	Contents (\$)	Displacement (\$)	Loss of Function (\$)
-10.54	1	\$ 0	\$ 0	\$ 0	\$ 0
-9.34	2	\$ 0	\$ 0	\$ 0	\$ 0
-8.05	5	\$ 0	\$ 0	\$ 0	\$ 0
-7.46	8	\$ 0	\$ 0	\$ 0	\$ 0
-7.17	10	\$ 0	\$ 0	\$ 0	\$ 0
-6.3	20	\$ 0	\$ 0	\$ 0	\$ 0
-5.78	30	\$ 0	\$ 0	\$ 0	\$ 0
-5.41	40	\$ 0	\$ 0	\$ 0	\$ 0
-5.11	49.85	\$ 0	\$ 0	\$ 0	\$ 0
-4.88	60	\$ 0	\$ 0	\$ 0	\$ 0
-4.66	70	\$ 0	\$ 0	\$ 0	\$ 0
-4.5	80	\$ 0	\$ 0	\$ 0	\$ 0
-4.33	90	\$ 0	\$ 0	\$ 0	\$ 0
-4.26	95.93	\$ 0	\$ 0	\$ 0	\$ 0
-3.25	200	\$ 0	\$ 0	\$ 0	\$ 0
-2.68	300	\$ 0	\$ 0	\$ 0	\$ 0
-2.26	400	\$ 0	\$ 0	\$ 0	\$ 0
-2	488.32	\$ 2	\$ 2	\$ 0	\$ 0
-1.86	537.72	\$ 18	\$ 16	\$ 0	\$ 0
0	985.29	\$ 103	\$ 76	\$ 0	\$ 0
Total (\$)		\$ 170	\$ 93	\$ 0	\$ 0

Building Information
Floodplain and Stream Restoration @ 12D Norwich Rd, East Haddam, Connecticut, 06423

Building Type:	Two or More Stories
Foundation Type:	
Building Has Basement:	Yes
NFIP:	No

Building Damages
Floodplain and Stream Restoration @ 12D Norwich Rd, East Haddam, Connecticut, 06423

Depth Damage Curve:	USACE - Chicago: two story, w/ basement	Use Default:Yes
Building Size (sq.ft):	1426	
Building Replacement Value (BRV) (\$/sq.ft):	\$197	Use Default: No
Demolition Threshold (%):	50.00%	Use Default:Yes
Expected Annual Losses due to Building Damages before Mitigation:	\$ 197	
Expected Annual Losses due to Building Damages after Mitigation:	\$ 170	
Expected Annual Benefits - Building:	\$ 26	

Depth Damage Curve - Building
Floodplain and Stream Restoration @ 12D Norwich Rd, East Haddam, Connecticut, 06423

BEFORE MITIGATION					AFTER MITIGATION				
Flood Depth (ft)	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)	Percent (%)	Damage Value (\$)	NFIP (\$)	ICC Fees (\$)	
-2	3	8,424.23	0	0	3	8,424.23	0	0	
-4	5	14,040.39	0	0	5	14,040.39	0	0	
0	7	78,656.55	0	0	7	78,656.55	0	0	
1	11	30,888.87	0	0	11	30,888.87	0	0	
2	17	47,737.34	0	0	17	47,737.34	0	0	
3	22	61,777.74	0	0	22	61,777.74	0	0	
4	28	78,626.21	0	0	28	78,626.21	0	0	
5	33	92,686.61	0	0	33	92,686.61	0	0	
6	35	98,282.77	0	0	35	98,282.77	0	0	
7	38	106,707.00	0	0	38	106,707.00	0	0	
8	40	112,323.16	0	0	40	112,323.16	0	0	
9	44	123,555.48	0	0	44	123,555.48	0	0	
10	46	125,171.64	0	0	46	125,171.64	0	0	
11	48	134,787.80	0	0	48	134,787.80	0	0	
12	50	280,807.52	0	0	50	280,807.52	0	0	
13	52	280,807.52	0	0	52	280,807.52	0	0	
14	54	280,807.52	0	0	54	280,807.52	0	0	
15	54	280,807.52	0	0	54	280,807.52	0	0	
16	54	280,807.52	0	0	54	280,807.52	0	0	

Contents Damages
Floodplain and Stream Restoration @ 12D Norwich Rd, East Haddam, Connecticut, 06423

Contents Value in Dollars:	\$ 0	Use Default:Yes
Utilities Elevated:	No	
Expected Annual Losses due to Contents Damages before Mitigation:	\$ 187	
Expected Annual Losses due to Contents Damages after Mitigation:	\$ 93	
Expected Annual Benefits - Contents:	\$ 94	

Depth Damage Curve - Contents
Floodplain and Stream Restoration @ 12D Norwich Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION			AFTER MITIGATION		
	Percent (%)	Damage Value (\$)		Percent (%)	Damage Value (\$)	
-2	6	8,424.23		6	8,424.23	
-1	9	12,636.35		9	12,636.35	
0	11	15,444.43		11	15,444.43	
1	17	23,868.67		17	23,868.67	
2	22	30,888.87		22	30,888.87	
3	28	38,313.10		28	38,313.10	
4	33	46,333.30		33	46,333.30	
5	39	54,757.54		39	54,757.54	
6	44	61,777.74		44	61,777.74	
7	49	68,797.94		49	68,797.94	
8	55	77,222.17		55	77,222.17	
9	61	85,646.41		61	85,646.41	
10	64	89,858.53		64	89,858.53	
11	71	99,686.81		71	99,686.81	
12	76	106,707.00		76	106,707.00	
13	78	109,515.88		78	109,515.88	
14	79	110,919.12		79	110,919.12	
15	79	110,919.12		79	110,919.12	
16	87	122,514.44		87	122,514.44	

Displacement Costs Avoided
Floodplain and Stream Restoration @ 12D Norwich Rd, East Haddam, Connecticut, 06423

Lodging Per Diem:	\$110	Use Default:Yes
Meals Per Diem:	\$68	Use Default:Yes
Population Affected:	0	
Duration of Displacement (days):	365	Use Default:Yes
Total Residential Displacement Cost:	\$0	
Expected Annual Losses due to Displacement Damages before mitigation:	\$0	
Expected Annual Losses due to Displacement Damages after Mitigation:	\$0	
Expected Annual Losses - Displacement:	\$0	

Depth Damage Curve - Displacement
Floodplain and Stream Restoration @ 12D Norwich Rd, East Haddam, Connecticut, 06423

Flood Depth (ft)	BEFORE MITIGATION		AFTER MITIGATION	
	Days	Damage Value (\$)	Days	Damage Value (\$)
-2	0	0	0	0
-1	0	0	0	0
0	0	0	0	0
1	45	0	45	0
2	90	0	90	0
3	135	0	135	0
4	180	0	180	0
5	225	0	225	0
6	270	0	270	0
7	315	0	315	0
8	360	0	360	0
9	405	0	405	0
10	450	0	450	0
11	495	0	495	0
12	540	0	540	0
13	585	0	585	0
14	630	0	630	0
15	675	0	675	0
16	720	0	720	0

Street Maintenance Costs Avoided
Floodplain and Stream Restoration @ 12D Norwich Rd, East Haddam, Connecticut, 06423

Total Annual Street Maintenance Budget:	\$0
Total Number of Street Miles Maintained:	0
Street Miles that will not require future maintenance:	0
Expected Annual Benefits - Street Maintenance:	\$0

Volunteer Costs Avoided
Floodplain and Stream Restoration @ 12D Norwich Rd, East Haddam, Connecticut, 06423

Number of Volunteers (volunteers/event):	0
Number of Days of Lodging:	0
Expected Annual Volunteer Benefits:	\$0

Ecosystem Services Losses Avoided
Floodplain and Stream Restoration @ 12D Norwich Rd, East Haddam, Connecticut, 06423

Total Project Area (acres):	0
Percentage of Urban Green Open Space:	0.00%
Percentage of Rural Green Open Space:	0.00%
Percentage of Riparian:	0.00%
Percentage of Coastal Wetlands:	0.00%
Percentage of Inland Wetlands:	0.00%
Percentage of Forests:	0.00%
Percentage of Shellfish Reefs:	0.00%
Percentage of Beaches and Dunes:	0.00%
Expected Annual Ecosystem Services Benefits:	\$0

Benefits-Costs Summary
Floodplain and Stream Restoration @ 12D Norwich Rd, East Haddam, Connecticut, 06423

Discount Rate (%):	7.0%	Use Default:Yes
Total Project Benefits:	\$1,562	
Total Project Cost:	\$0	
Benefit-Cost Ratio:	0	

CIRCA - Resilient East Haddam
Concept Level Opinion of Probable Construction Cost
Alternative 1 Items - 3/24/2025

Prepared by: DP
Checked by: GA

Alternative 1 - Remove Rehearsal Studio, Widen Channel					
No.	Item	Quantity	Unit	Unit Cost	Total Cost
1	Building Demolition	4000	SF	\$ 25	\$ 100,000
2	Pavement Demolition	250	SY	\$ 20	\$ 5,000
3	Hazardous Materials Management	1	LS	\$ 20,000	\$ 20,000
4	Retaining Walls and Headwall for Existing Drain	450	SF	\$ 200	\$ 90,000
5	Channel Restoration (Earth Excavation)	1010	CY	\$ 80	\$ 80,800
6	Channel Restoration (Rock Excavation)	250	CY	\$ 200	\$ 50,000
7	Metal Beam Guardrail	200	LF	\$ 60	\$ 12,000
8	Rip Rap	500	TON	\$ 100	\$ 50,000
9	Turf Establishment	500	SY	\$ 20	\$ 10,000
10	Slope Stabilization	340	SY	\$ 25	\$ 8,500
	Subtotal Major Items				\$ 426,300
	Contingency (30%)		30%		\$ 127,890
	Subtotal Construction				\$ 554,190
	Survey (5%)		5%		\$ 27,710
	Permitting (5%)		5%		\$ 27,710
	Engineering (25%)		25%		\$ 138,548
	Project Total				\$ 748,157
	Rounded Total				\$ 750,000

Rehearsal Studio Removal Additional Costs				
1	Partial acquisition/easement on existing Rehearsal Studio property			\$ 10,000
2	Construction of new Rehearsal Studio on Chevy Building property			\$ 1,060,000
3	Chevy Building demolition & hazardous materials management/remediation			\$ 50,000
	Subtotal of Additional costs			\$ 1,120,000

Rounded Grand Total	\$ 1,870,000
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Annual Maintenance of New Headwall and Retaining Walls (5% of wall cost)	\$ 4,500
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CIRCA - Resilient East Haddam
Concept Level Opinion of Probable Construction Cost
Alternative 2 Items - 3/24/2025

Prepared by: DP
Checked by: GA

Alternative 2 - Replace (Widen) Creamery Road Bridge					
	Item	Quantity	Unit	Unit Cost	Total Cost
1	Bridge Replacement	600	SF	\$ 1,125	\$ 675,000
2	Channel Restoration	310	SY	\$ 50	\$ 15,500
3	Rip Rap	300	TON	\$ 100	\$ 30,000
4	Slope Stabilization	500	SY	\$ 25	\$ 12,500
5	Turf Establishment	500	SY	\$ 20	\$ 10,000
6	Reconstruct #62 Creamery Road Sewer Service	100	LF	\$ 240	\$ 24,000
7	Bank Widening	500	CY	\$ 80	\$ 40,000
8	Roadway Reconstruction	300	LF	\$ 250	\$ 75,000
	Subtotal Major Items				\$ 882,000
	Contingency (30%)		30%		\$ 264,600
	Subtotal Construction				\$ 1,146,600
	Survey (5%)		5%		\$ 57,330
	Permitting (5%)		5%		\$ 57,330
	Engineering (25%)		25%		\$ 286,650
	Project Total				\$ 1,547,910
	Rounded Total				\$ 1,550,000

CIRCA - Resilient East Haddam
Concept Level Opinion of Probable Construction Cost
Alternative 3 Items - 3/24/2025

Prepared by: DP
Checked by: GA

Alternative 3A - Raise Driveway					
No.	Item	Quantity	Unit	Unit Cost	Total Cost
1	Driveway Demo	400	SY	\$ 20	\$ 8,000
2	Shed Demo	260	SF	\$ 25	\$ 6,500
3	Retaining Wall for Driveway Near House	320	LF	\$ 200	\$ 64,000
4	Metal Beam Guardrail for Driveway	410	LF	\$ 60	\$ 24,600
5	Fill	350	CY	\$ 180	\$ 63,000
6	Asphalt Driveway	150	TON	\$ 200	\$ 30,000
7	Slope Stabilization	400	SY	\$ 25	\$ 10,000
8	Rip Rap	200	TON	\$ 100	\$ 20,000
	Subtotal Major Items				\$ 226,100
	Contingency (30%)		30%		\$ 67,830
	Subtotal Construction				\$ 293,930
	Survey (5%)		5%		\$ 14,697
	Permitting (5%)		5%		\$ 14,697
	Engineering (25%)		25%		\$ 73,483
	Project Total				\$ 396,806

Alternative 3B - Install Floodwall (Berm and Retaining Wall)					
No.	Item	Quantity	Unit	Unit Cost	Total Cost
1	Floodwall	2600	SF	\$ 300	\$ 780,000
2	Interior Drainage Pipe	100	LF	\$ 100	\$ 10,000
3	Interior Drainage Structures	4	EA	\$ 6,500	\$ 26,000
4	Backflow Prevention Valves	2	EA	\$ 5,000	\$ 10,000
5	4' Earthen Berm 2.5:1 slope	650	CY	\$ 180	\$ 117,000
6	2' Earthen Berm 2.5:1 slope	50	CY	\$ 180	\$ 9,000
7	Slope Stabilization	950	SY	\$ 25	\$ 23,750
8	Turf Establishment	1410	SY	\$ 20	\$ 28,200
9	Rip Rap	850	TON	\$ 100	\$ 85,000
	Subtotal Major Items				\$ 1,088,950
	Contingency (30%)		30%		\$ 326,685
	Subtotal Construction				\$ 1,415,635
	Survey (5%)		5%		\$ 70,782
	Permitting (5%)		5%		\$ 70,782
	Engineering (25%)		25%		\$ 353,909
	Acquisition of land/easement on 62 Creamery Road				\$ 10,000
	Acquisition of land/easement on 12 Norwich Road				\$ 10,000
	Project Total				\$ 1,931,107

CIRCA - Resilient East Haddam
Concept Level Opinion of Probable Construction Cost
Alternative 3 Items (Continued) - 3/24/2025

Prepared by: DP
Checked by: GA

Floodwall and Berm Additional Costs	
Annual Maintenance (5% of wall construction cost)	\$ 39,000

Alternative 3C - Norwich Road Bridge Inlet Improvements and Bypass Drainage					
	Item	Quantity	Unit	Unit Cost	Total Cost
1	Concrete Walls	970	SF	\$ 400	\$ 388,000
2	Channel at Upstream Entrance to Pipe	130	SY	\$ 50	\$ 6,500
3	Metal Beam Guardrail at Upstream Headwall	35	LF	\$ 60	\$ 2,100
4	42" RCP Drain Pipe	210	LF	\$ 400	\$ 84,000
5	Drainage Junction Structure	1	EA	\$ 25,000	\$ 25,000
6	Re-construction of sewer force main	40	LF	\$ 500	\$ 20,000
7	Pavement Restoration	50	TON	\$ 200	\$ 10,000
8	Rip Rap	100	TON	\$ 100	\$ 10,000
	Subtotal Major Items				\$ 545,600
	Contingency (30%)		30%		\$ 163,680
	Subtotal Construction				\$ 709,280
	Survey (5%)		5%		\$ 35,464
	Permitting (5%)		5%		\$ 35,464
	Engineering (25%)		25%		\$ 177,320
	Project Total				\$ 957,528

Alternative 3 Combined - Rounded Grand Total	\$ 3,290,000
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Square Foot Cost Estimate Report

Date: 3/5/2025

Estimate Name	Goodspeed Rehearsal Studio Replacement Value
	CIRCA 21 Norwich Road East Haddam Connecticut 06423
Building Type	Office, 1 Story with Brick Veneer / Reinforced Concrete
Location	NEW LONDON, CT
	1.00
Stories Height	14.00
Floor Area (S.F.)	3,425.00
LaborType	OPN
Basement Included	No
Data Release	Year 2024
Cost Per Square Foot	\$309.41
Total Building Cost	\$1,059,741.07



Costs are derived from a building model with basic components.
Scope differences and market conditions can cause costs to vary significantly.

Assembly Customization Type :

- ⊕ Added
- ⦿ Partially Swapped
- Fully Swapped

		Quantity	% of Total	Cost Per SF	Cost
A Substructure			9.0%	\$20.32	\$69,605.37
A1010	Standard Foundations			\$12.80	\$43,825.67
	Foundation wall, CIP, 4' wall height, direct chute, .148 CY/LF, 7.2 PLF, 12" thick	242.00		\$7.12	\$24,392.63
	Strip footing, concrete, reinforced, load 11.1 KLF, soil bearing capacity 6 KSF, 12" deep x 24" wide	242.00		\$3.83	\$13,134.43
	Spread footings, 3000 PSI concrete, load 100K, soil bearing capacity 6 KSF, 4' - 6" square x 15" deep	11.74		\$1.84	\$6,298.61
A1030	Slab on Grade			\$7.12	\$24,379.56
	Slab on grade, 4" thick, non industrial, reinforced	3,425.00		\$7.12	\$24,379.56

		Quantity	% of Total	Cost Per SF	Cost
A2010	Basement Excavation			\$0.41	\$1,400.14
	Excavate and fill, 10,000 SF, 4' deep, sand, gravel, or common earth, on site storage	3,425.00		\$0.41	\$1,400.14
B Shell			47.9%	\$107.75	\$369,038.50
B1010	Floor Construction			\$40.77	\$139,623.58
	Cast-in-place concrete column, 12", square, tied, minimum reinforcing, 150K load, 10'-14' story height, 135 lbs/LF, 4000PSI	193.60		\$4.51	\$15,430.21
	Concrete I beam, precast, 18" x 36", 790 PLF, 25' span, 6.44 KLF superimposed load	164.56		\$18.08	\$61,925.80
	Precast concrete double T beam, 2" topping, 24" deep x 8' wide, 50' span, 75 PSF superimposed load, 165 PSF total load	3,425.00		\$18.18	\$62,267.56
B2010	Exterior Walls			\$39.95	\$136,837.25
	Brick wall, composite double wythe, standard face/CMU back-up, 8" thick, perlite core fill, 3" XPS	2,710.40		\$39.95	\$136,837.25
B2020	Exterior Windows			\$6.96	\$23,835.61
	Windows, aluminum, awning, insulated glass, 4'-5" x 5'-3"	29.46		\$6.96	\$23,835.61
B2030	Exterior Doors			\$5.31	\$18,176.08
	Door, aluminum & glass, with transom, narrow stile, double door, hardware, 6'-0" x 10'-0" opening	0.98		\$2.78	\$9,523.07
	Door, aluminum & glass, with transom, bronze finish, hardware, 3'-0" x 10'-0" opening	0.98		\$1.41	\$4,824.16
	Door, steel 18 gauge, hollow metal, 1 door with frame, no label, 3'-0" x 7'-0" opening	0.98		\$1.12	\$3,828.86
B3010	Roof Coverings			\$12.79	\$43,817.94
	Roofing, single ply membrane, EPDM, 60 mils, loosely laid, stone ballast	3,425.00		\$2.66	\$9,104.06
	Insulation, rigid, roof deck, extruded polystyrene, 40 PSI compressive strength, 4" thick, R20	3,425.00		\$6.20	\$21,233.70
	Roof edges, aluminum, duranodic, .050" thick, 6" face	242.00		\$1.71	\$5,839.84
	Flashing, aluminum, no backing sides, .019"	242.00		\$0.81	\$2,775.49
	Gravel stop, aluminum, extruded, 8", duranodic, .050" thick	242.00		\$1.42	\$4,864.85
B3020	Roof Openings			\$1.97	\$6,748.04
	Roof hatch, with curb, 1" fiberglass insulation, 2'-6" x 3'-0", galvanized steel, 165 lbs	0.98		\$0.60	\$2,059.93
	Roof hatch, with curb, 1" fiberglass insulation, 2'-6" x 4'-6", aluminum curb and cover, 150lbs	1.00		\$0.64	\$2,204.16
	Smoke hatch, unlabeled, galvanized, 2'-6" x 3', not incl hand winch operator	0.98		\$0.73	\$2,483.95
C Interiors			12.0%	\$26.96	\$92,338.77

		Quantity	% of Total	Cost Per SF	Cost
C1010	Partitions			\$4.56	\$15,630.43
	Metal partition, 5/8"fire rated gypsum board face, no base,3 -5/8" @ 24" OC framing, same opposite face, no insulation	1,198.75		\$1.96	\$6,722.46
	Metal partition, 5/8"fire rated gypsum board face, no base,3 -5/8" @ 24" OC framing, same opposite face, sound attenuation insulation	513.75		\$1.09	\$3,719.27
	Gypsum board, 1 face only, exterior sheathing, fire resistant, 5/8"	2,710.40		\$0.96	\$3,288.96
	Add for the following: taping and finishing	2,710.40		\$0.55	\$1,899.75
C1020	Interior Doors			\$4.88	\$16,727.51
	Door, single leaf, kd steel frame, hollow metal, commercial quality, flush, 3'-0" x 7'-0" x 1-3/8"	10.77		\$4.88	\$16,727.51
C1030	Fittings			\$0.44	\$1,515.90
	Toilet partitions, cubicles, ceiling hung, plastic laminate	1.47		\$0.44	\$1,515.90
C3010	Wall Finishes			\$2.06	\$7,057.98
	Painting, interior on plaster and drywall, walls & ceilings, roller work, primer & 2 coats	2,710.40		\$0.91	\$3,117.96
	Painting, interior on plaster and drywall, walls & ceilings, roller work, primer & 2 coats	3,425.00		\$1.15	\$3,940.02
C3020	Floor Finishes			\$3.54	\$12,112.06
	Carpet tile, nylon, fusion bonded, 18" x 18" or 24" x 24", 35 oz	2,055.00		\$1.74	\$5,961.80
	Vinyl, composition tile, maximum	1,027.50		\$0.89	\$3,051.66
	Tile, ceramic natural clay	342.50		\$0.90	\$3,098.60
C3030	Ceiling Finishes			\$11.47	\$39,294.89
	Acoustic ceilings, 3/4" fiberglass board, 24" x 48" tile, tee grid, suspended support	3,425.00		\$11.47	\$39,294.89
D Services			31.1%	\$70.00	\$239,738.13
D2010	Plumbing Fixtures			\$4.00	\$13,711.61
	Water closet, vitreous china, bowl only with flush valve, wall hung	1.47		\$1.66	\$5,677.17
	Urinal, vitreous china, wall hung	0.49		\$0.24	\$824.77
	Lavatory w/trim, vanity top, PE on CI, 20" x 18"	1.47		\$0.78	\$2,665.97
	Service sink w/trim, PE on CI,wall hung w/rim guard, 24" x 20"	0.49		\$0.90	\$3,094.61
	Water cooler, electric, floor mounted, dual height, 14.3 GPH	0.49		\$0.42	\$1,449.08
D2020	Domestic Water Distribution			\$1.48	\$5,081.06
	Gas fired water heater, commercial, 100< F rise, 100 MBH input, 91 GPH	0.49		\$1.48	\$5,081.06
D2040	Rain Water Drainage			\$1.10	\$3,765.95

		Quantity	% of Total	Cost Per SF	Cost
	Roof drain, DWV PVC, 4" diam, diam, 10' high	1.96		\$1.03	\$3,544.11
	Roof drain, DWV PVC, 4" diam, for each additional foot add	4.84		\$0.06	\$221.84
D3050	Terminal & Package Units			\$21.54	\$73,777.58
	Rooftop, multizone, air conditioner, offices, 10,000 SF, 31.66 ton	3,425.00		\$21.54	\$73,777.58
D4010	Sprinklers			\$4.70	\$16,113.67
	Wet pipe sprinkler systems, steel, light hazard, 1 floor, 10,000 SF	3,425.00		\$4.70	\$16,113.67
D4020	Standpipes			\$2.43	\$8,325.39
	Wet standpipe risers, class III, steel, black, sch 40, 4" diam pipe, 1 floor	0.59		\$2.43	\$8,325.39
D5010	Electrical Service/Distribution			\$12.34	\$42,248.56
	Overhead service installation, includes breakers, metering, 20' conduit & wire, 3 phase, 4 wire, 120/208 V, 400 A	1.25		\$2.61	\$8,955.63
	Feeder installation 600 V, including RGS conduit and XHHW wire, 400 A	100.00		\$3.65	\$12,509.65
	Switchgear installation, incl switchboard, panels & circuit breaker, 120/208 V, 3 phase, 600 A	1.20		\$6.07	\$20,783.28
D5020	Lighting and Branch Wiring			\$16.80	\$57,537.96
	Receptacles incl plate, box, conduit, wire, 16.5 per 1000 SF, 2.0 W per SF, with transformer	3,425.00		\$5.78	\$19,808.90
	Miscellaneous power, 1.2 watts	3,425.00		\$0.38	\$1,292.12
	Central air conditioning power, 4 watts	3,425.00		\$0.71	\$2,426.44
	Motor installation, three phase, 460 V, 15 HP motor size	2.00		\$1.67	\$5,730.20
	Fluorescent fixtures recess mounted in ceiling, 1.6 watt per SF, 40 FC, 10 fixtures @32watt per 1000 SF	3,938.75		\$8.26	\$28,280.30
D5030	Communications and Security			\$5.60	\$19,176.36
	Telephone wiring for offices & laboratories, 8 jacks/MSF	2,568.75		\$1.77	\$6,066.23
	Communication and alarm systems, fire detection, addressable, 25 detectors, includes outlets, boxes, conduit and wire	0.49		\$3.30	\$11,314.63
	Fire alarm command center, addressable without voice, excl. wire & conduit	0.49		\$0.52	\$1,795.50
	Internet wiring, 8 data/voice outlets per 1000 S.F.	1.00		\$0.00	\$0.00
E Equipment & Furnishin			0.0%	\$0.00	\$0.00
E1090	Other Equipment			\$0.00	\$0.00
F Special Construction			0.0%	\$0.00	\$0.00
G Building Sitework			0.0%	\$0.00	\$0.00

	Quantity	% of Total	Cost Per SF	Cost
Sub Total		100%	\$225.03	\$770,720.78
Contractor's Overhead & Profit		25.0%	\$56.26	\$192,680.19
Architectural Fees		10.0%	\$28.13	\$96,340.10
User Fees		0.0%	\$0.00	\$0.00
Total Building Cost			\$309.41	\$1,059,741.07

Audit Trail Notes

There are no audit trail notes associated with this estimate.