Hazus: Flood Global Risk Report

Region Name: EastHampton

Flood Scenario: EastHamptonAll

Print Date: Thursday, January 2, 2020

Disclaimer:
This version of Hazus utilizes 2010 Census Data.
Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific Flood. These results can be improved by using enhanced inventory data and flood hazard information.

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General Description of the Region

Hazus is a regional multi-hazard loss estimation model that was developed by the Federal Emergency Management Agency (FEMA) and the National Institute of Building Sciences (NIBS). The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The flood loss estimates provided in this report were based on a region that included 1 county(ies) from the following state(s):

- Connecticut

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is approximately 37 square miles and contains 276 census blocks. The region contains over 5 thousand households and has a total population of 12,959 people (2010 Census Bureau data). The distribution of population by State and County for the study region is provided in Appendix B.

There are an estimated 5,356 buildings in the region with a total building replacement value (excluding contents) of 2,034 million dollars. Approximately 92.79% of the buildings (and 87.79% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

Hazus estimates that there are 5,356 buildings in the region which have an aggregate total replacement value of 2,034 million dollars. Table 1 and Table 2 present the relative distribution of the value with respect to the general occupancies by Study Region and Scenario respectively. Appendix B provides a general distribution of the building value by State and County.

Table 1
Building Exposure by Occupancy Type for the Study Region

Occupancy	Exposure ($1000)	Percent of Total
Residential	1,786,021	87.8%
Commercial	152,725	7.5%
Industrial	66,779	3.3%
Agricultural	2,431	0.1%
Religion	12,880	0.6%
Government	475	0.0%
Education	13,086	0.6%
Total	**2,034,397**	**100%**

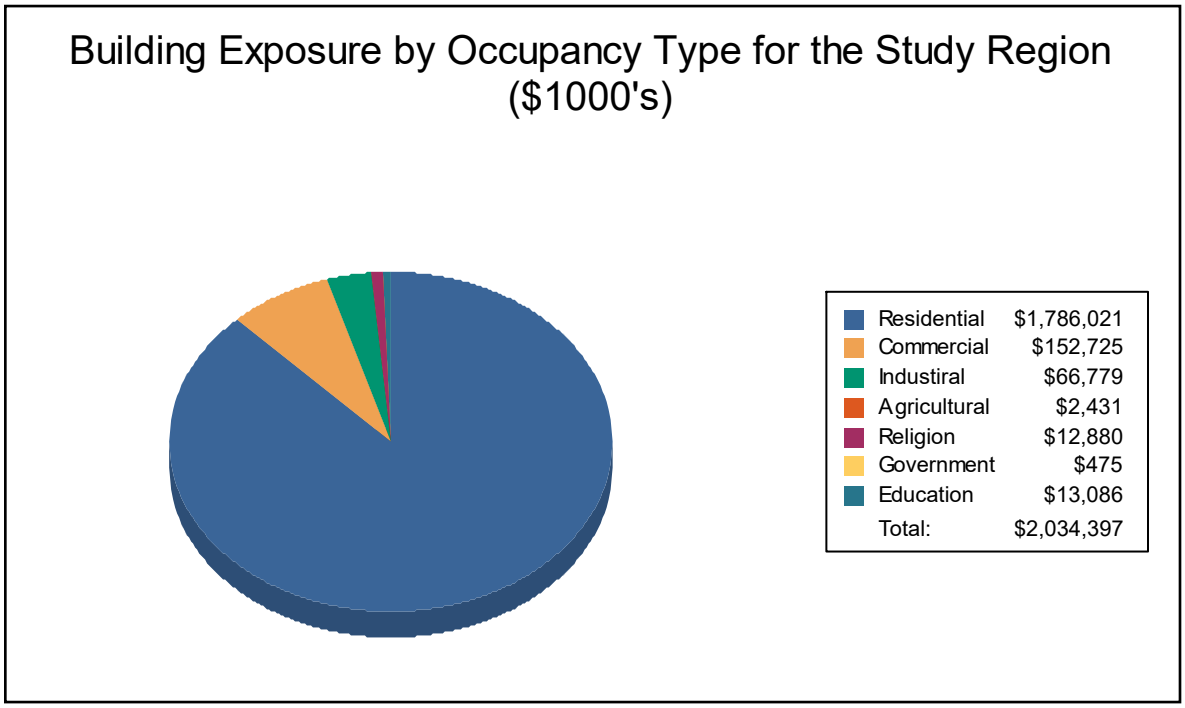
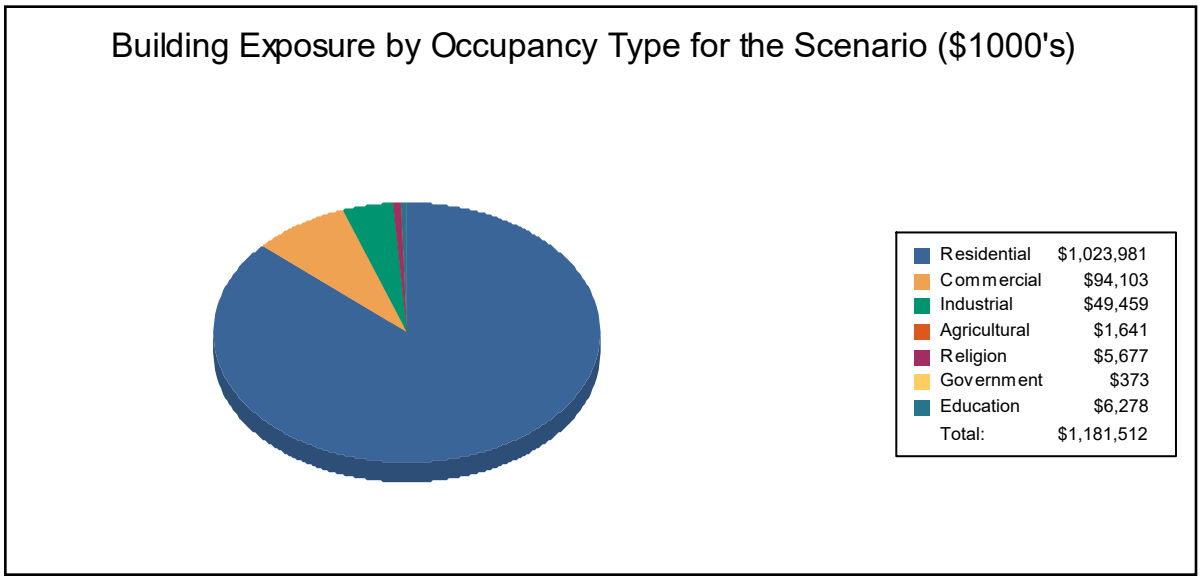


Table 2
Building Exposure by Occupancy Type for the Scenario

Occupancy	Exposure ($1000)	Percent of Total
Residential	1,023,981	86.7%
Commercial	94,103	8.0%
Industrial	49,459	4.2%
Agricultural	1,641	0.1%
Religion	5,677	0.5%
Government	373	0.0%
Education	6,278	0.5%
Total	**1,181,512**	**100%**



Essential Facility Inventory

For essential facilities, there are no hospitals in the region with a total bed capacity of no beds.
There are 5 schools, 3 fire stations, 1 police station and 1 emergency operation center.

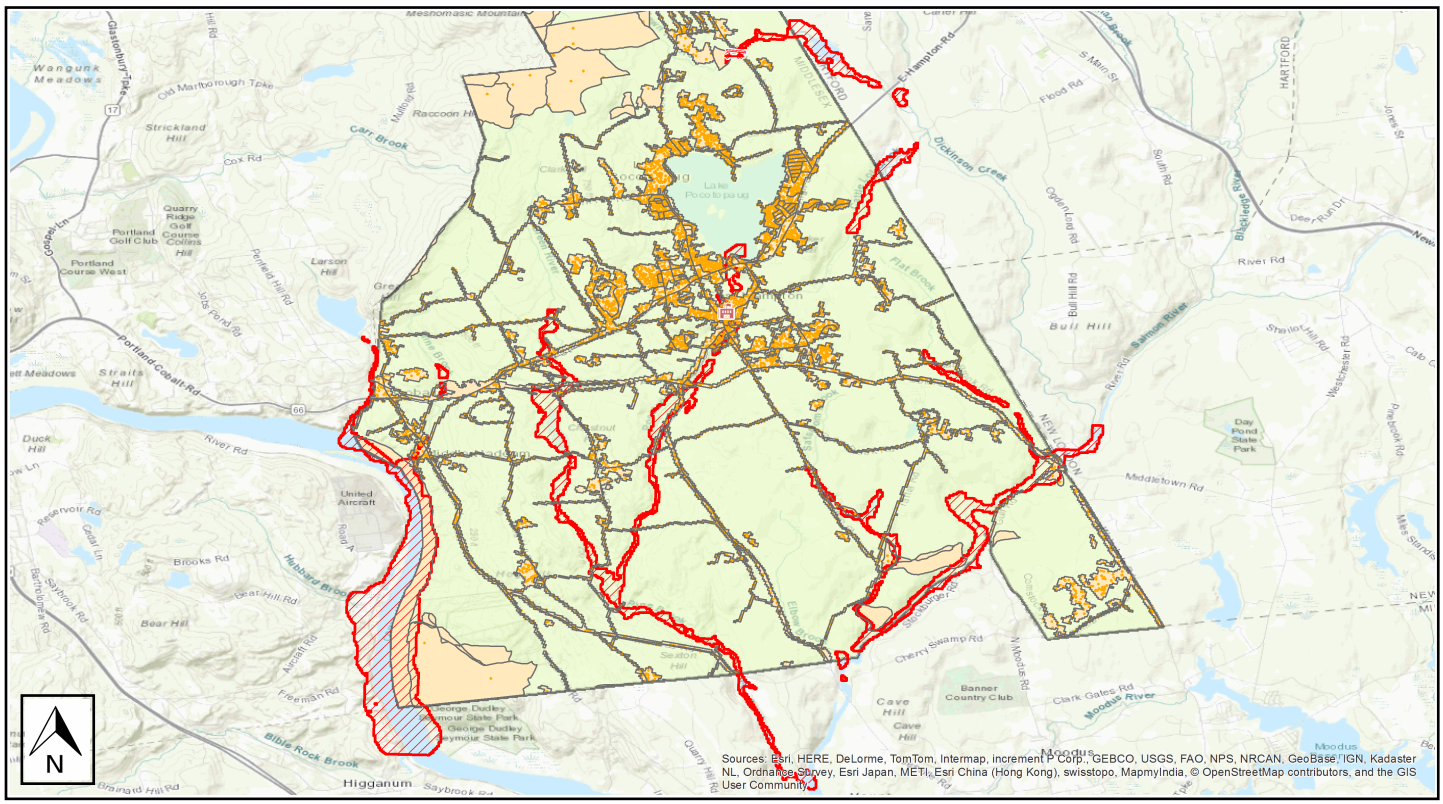
Flood Scenario Parameters

Hazus used the following set of information to define the flood parameters for the flood loss estimate provided in this report.

Study Region Name:	EastHampton
Scenario Name:	EastHamptonAll
Return Period Analyzed:	10
Analysis Options Analyzed:	No What-Ifs

Study Region Overview Map

Illustrating scenario flood extent, as well as exposed essential facilities and total exposure



Building Damage

General Building Stock Damage

Hazus estimates that about 2 buildings will be at least moderately damaged. This is over 87% of the total number of buildings in the scenario. There are an estimated 0 buildings that will be completely destroyed. The definition of the 'damage states' is provided in the Hazus Flood Technical Manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 summarizes the expected damage by general building type.

Total Economic Loss (1 dot = $300K) Overview Map

Table 3: Expected Building Damage by Occupancy

	1-10		11-20		21-30		31-40		41-50		>50	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	0	0	0	0	0	0	0	0	0	0	0	0
Commercial	0	0	0	0	0	0	0	0	0	0	0	0
Education	0	0	0	0	0	0	0	0	0	0	0	0
Government	0	0	0	0	0	0	0	0	0	0	0	0
Industrial	0	0	0	0	0	0	0	0	0	0	0	0
Religion	0	0	0	0	0	0	0	0	0	0	0	0
Residential	24	92	2	8	0	0	0	0	0	0	0	0
Total	**24**		**2**		**0**		**0**		**0**		**0**	

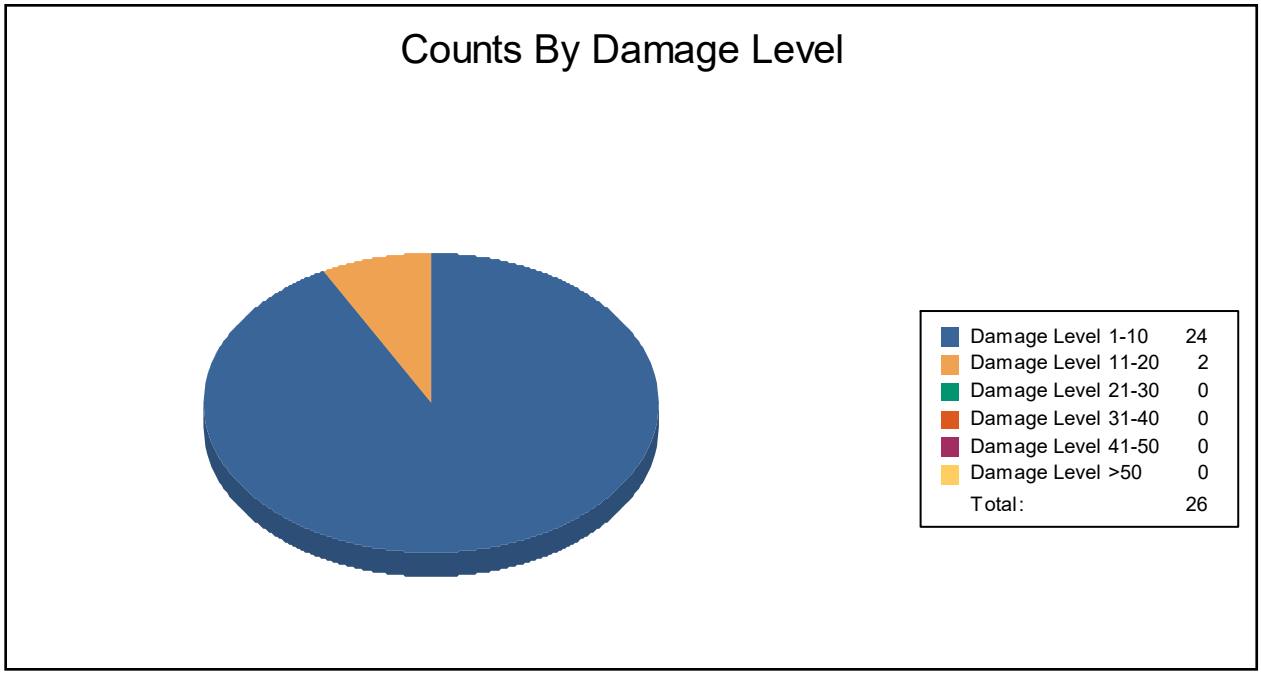


Table 4: Expected Building Damage by Building Type

Building Type	1-10		11-20		21-30		31-40		41-50		>50	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	0	0	0	0	0	0	0	0	0	0	0	0
ManufHousing	0	0	0	0	0	0	0	0	0	0	0	0
Masonry	0	0	0	0	0	0	0	0	0	0	0	0
Steel	0	0	0	0	0	0	0	0	0	0	0	0
Wood	24	92	2	8	0	0	0	0	0	0	0	0

Essential Facility Damage

Before the flood analyzed in this scenario, the region had 0 hospital beds available for use. On the day of the scenario flood event, the model estimates that 0 hospital beds are available in the region.

Table 5: Expected Damage to Essential Facilities

		# Facilities		
Classification	Total	At Least Moderate	At Least Substantial	Loss of Use
Emergency Operation Centers	1	0	0	0
Fire Stations	3	0	0	0
Hospitals	0	0	0	0
Police Stations	1	0	0	0
Schools	5	0	0	0

If this report displays all zeros or is blank, two possibilities can explain this.

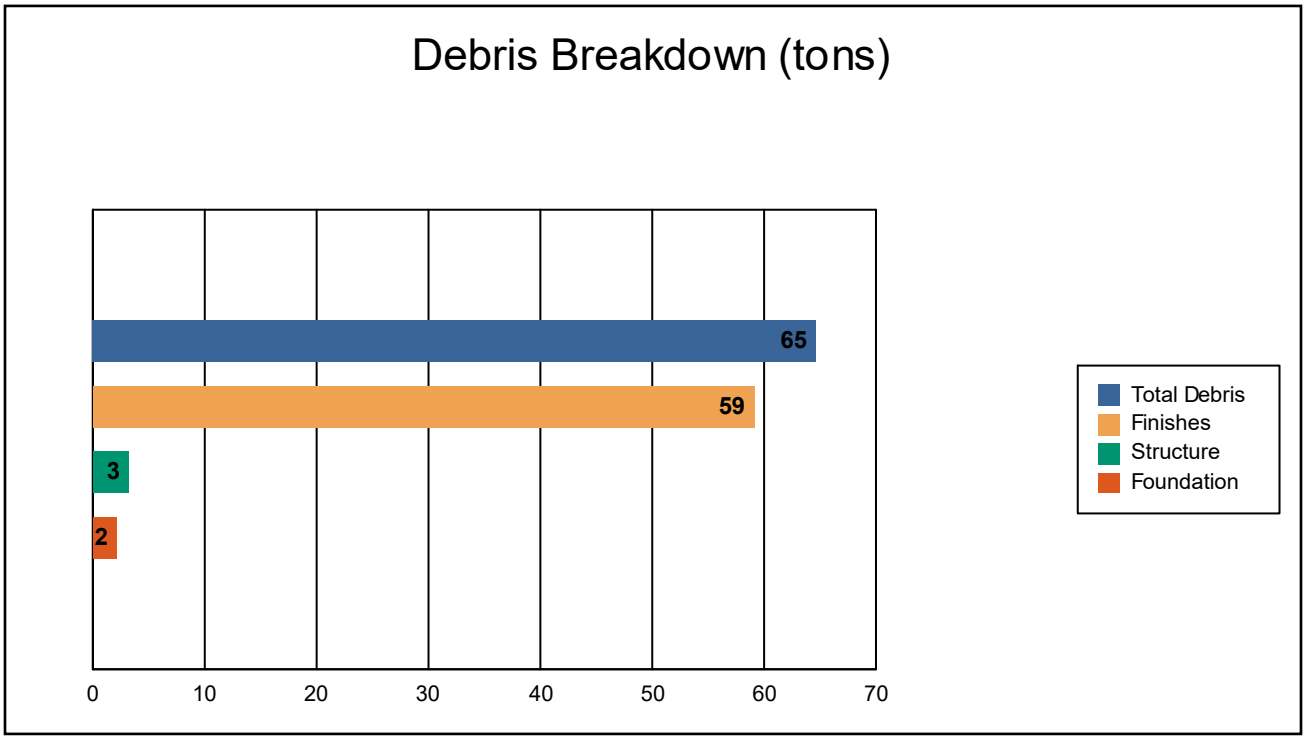
(1) None of your facilities were flooded. This can be checked by mapping the inventory data on the depth grid.

(2) The analysis was not run. This can be tested by checking the run box on the Analysis Menu and seeing if a message box asks you to replace the existing results.

Induced Flood Damage

Debris Generation

Hazus estimates the amount of debris that will be generated by the flood. The model breaks debris into three general categories: 1) Finishes (dry wall, insulation, etc.), 2) Structural (wood, brick, etc.) and 3) Foundations (concrete slab, concrete block, rebar, etc.). This distinction is made because of the different types of material handling equipment required to handle the debris.

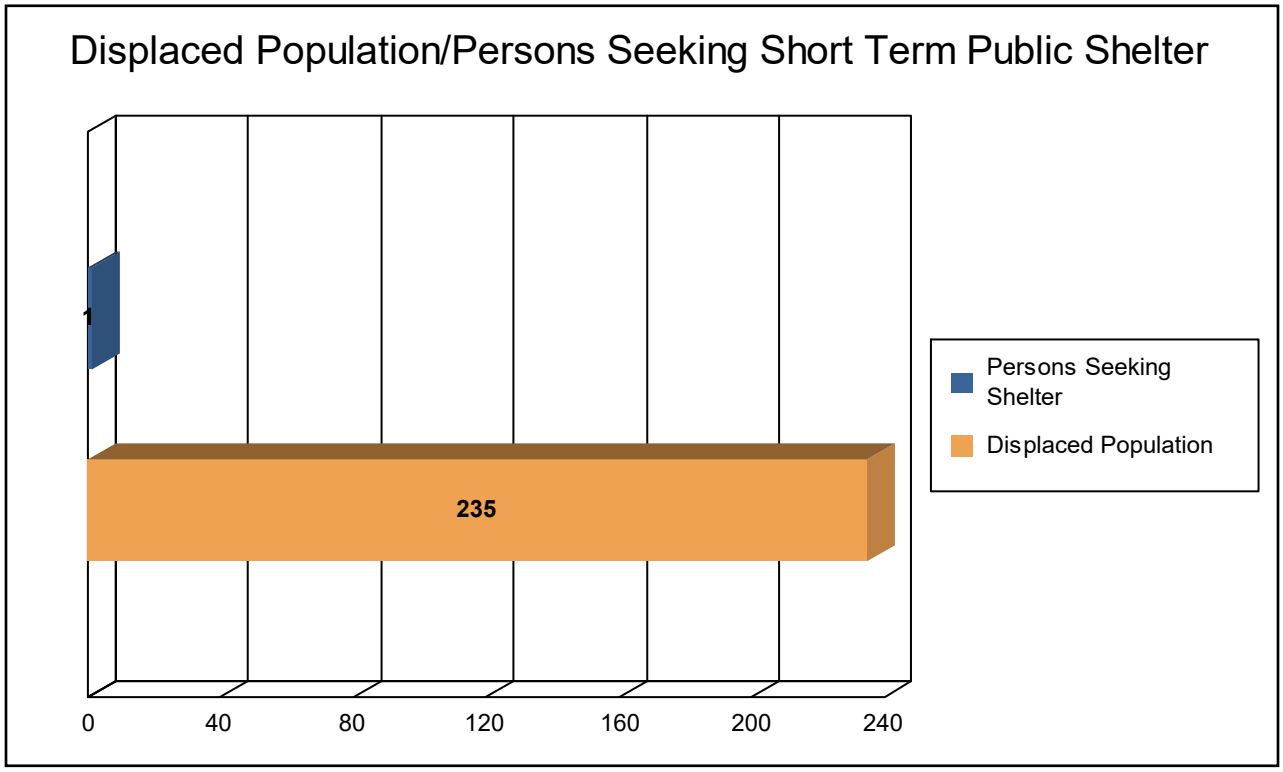


The model estimates that a total of 65 tons of debris will be generated. Of the total amount, Finishes comprises 92% of the total, Structure comprises 5% of the total, and Foundation comprises 3%. If the debris tonnage is converted into an estimated number of truckloads, it will require 3 truckloads (@25 tons/truck) to remove the debris generated by the flood.

Social Impact

Shelter Requirements

Hazus estimates the number of households that are expected to be displaced from their homes due to the flood and the associated potential evacuation. Hazus also estimates those displaced people that will require accommodations in temporary public shelters. The model estimates 78 households (or 235 of people) will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 1 people (out of a total population of 12,959) will seek temporary shelter in public shelters.



Economic Loss

The total economic loss estimated for the flood is 11.02 million dollars, which represents 0.93 % of the total replacement value of the scenario buildings.

Building-Related Losses

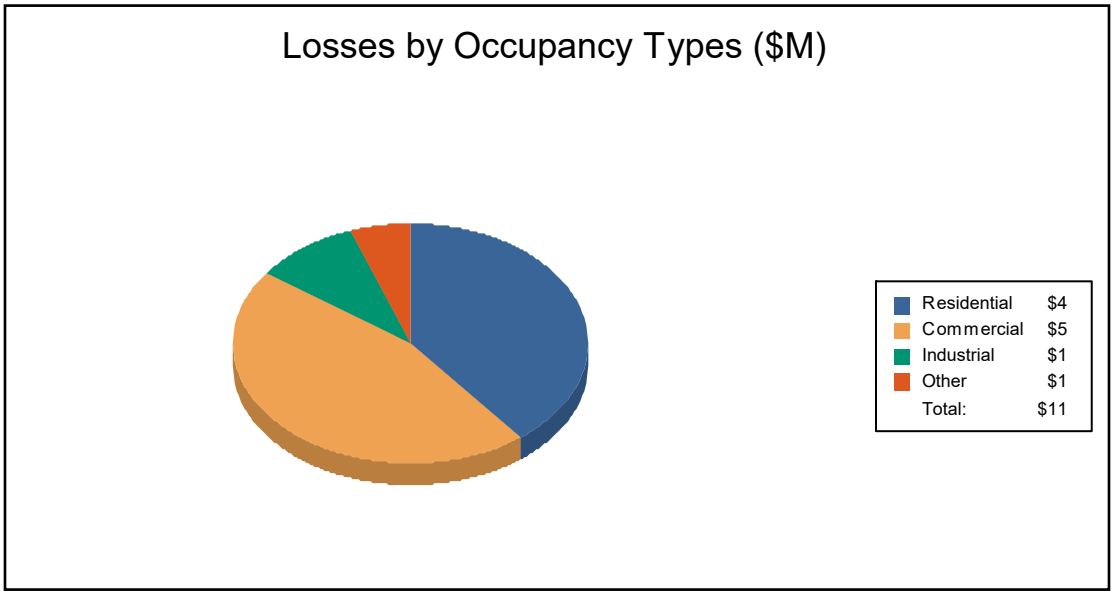
The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the flood. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the flood.

The total building-related losses were 5.20 million dollars. 53% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 39.39% of the total loss. Table 6 below provides a summary of the losses associated with the building damage.

Table 6: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss						
	Building	1.95	0.36	0.28	0.01	2.61
	Content	0.84	1.02	0.50	0.11	2.47
	Inventory	0.00	0.02	0.10	0.00	0.12
	Subtotal	**2.79**	**1.40**	**0.89**	**0.12**	**5.20**
Business Interruption						
	Income	0.00	1.44	0.04	0.12	1.59
	Relocation	1.20	0.39	0.04	0.02	1.64
	Rental Income	0.35	0.28	0.01	0.00	0.64
	Wage	0.01	1.53	0.07	0.35	1.96
	Subtotal	**1.56**	**3.63**	**0.16**	**0.49**	**5.83**
ALL	**Total**	**4.34**	**5.03**	**1.05**	**0.61**	**11.02**



Appendix A: County Listing for the Region

Connecticut

- Middlesex

Appendix B: Regional Population and Building Value Data

	Population	Building Value (thousands of dollars)		
		Residential	Non-Residential	Total
Connecticut				
Middlesex	12,959	1,786,021	248,376	2,034,397
Total	**12,959**	**1,786,021**	**248,376**	**2,034,397**
Total Study Region	**12,959**	**1,786,021**	**248,376**	**2,034,397**

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Note:
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There are an estimated 5,356 buildings in the region with a total building replacement value (excluding contents) of 2,034 million dollars. Approximately 92.79% of the buildings (and 87.79% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

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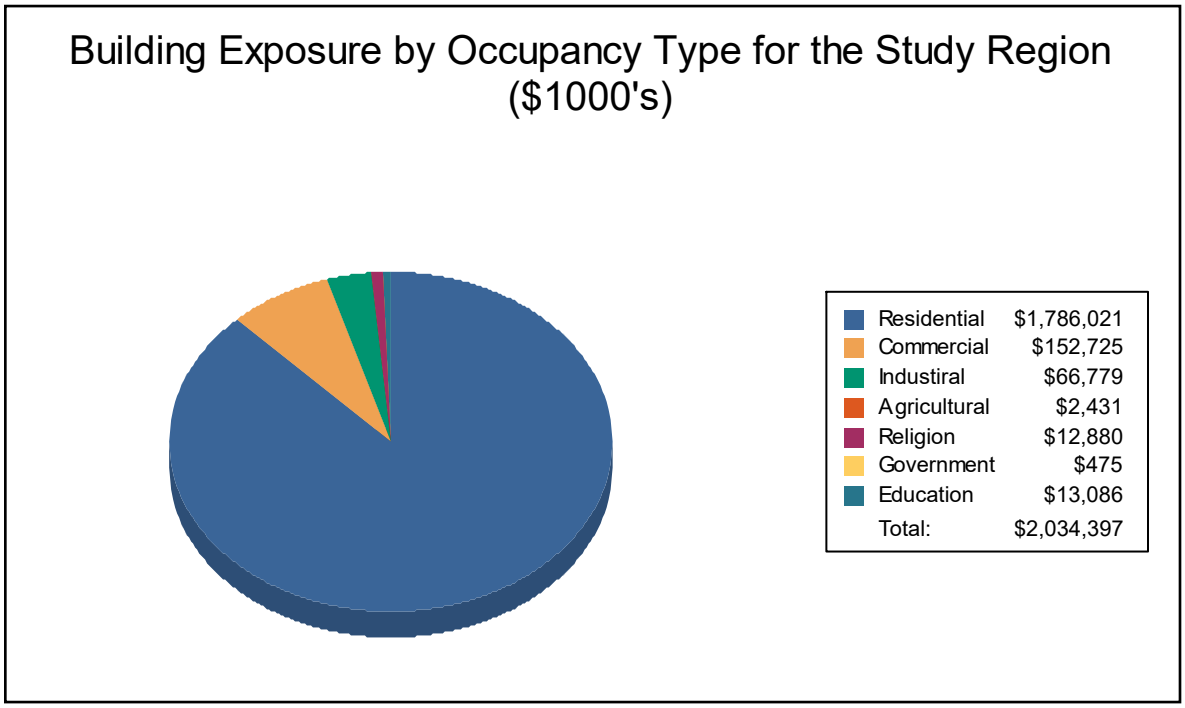

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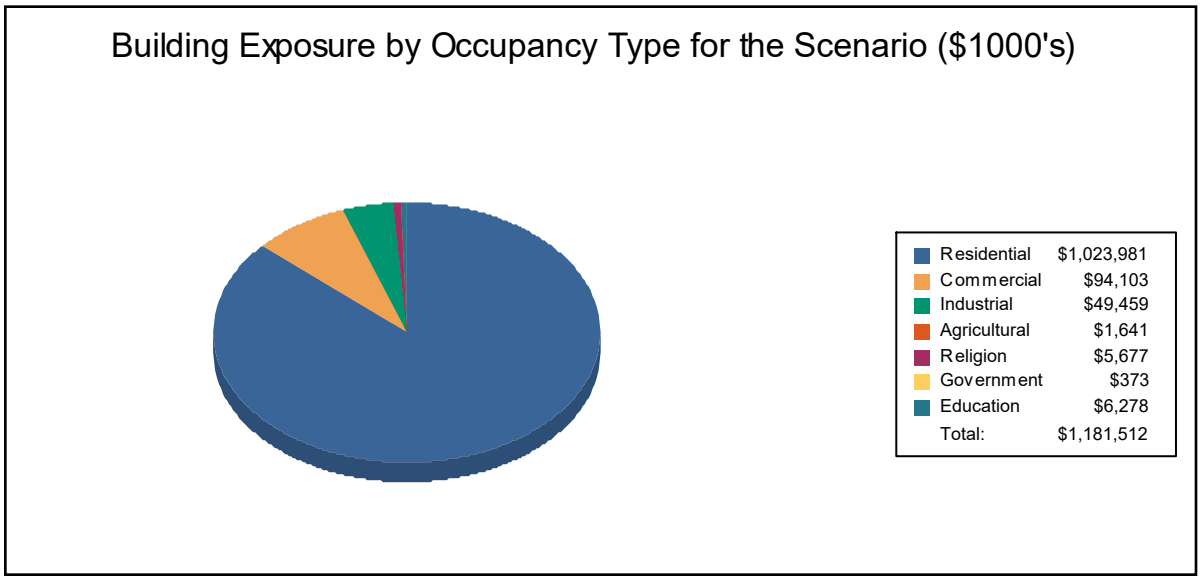


Essential Facility Inventory

For essential facilities, there are no hospitals in the region with a total bed capacity of no beds.
There are 5 schools, 3 fire stations, 1 police station and 1 emergency operation center.

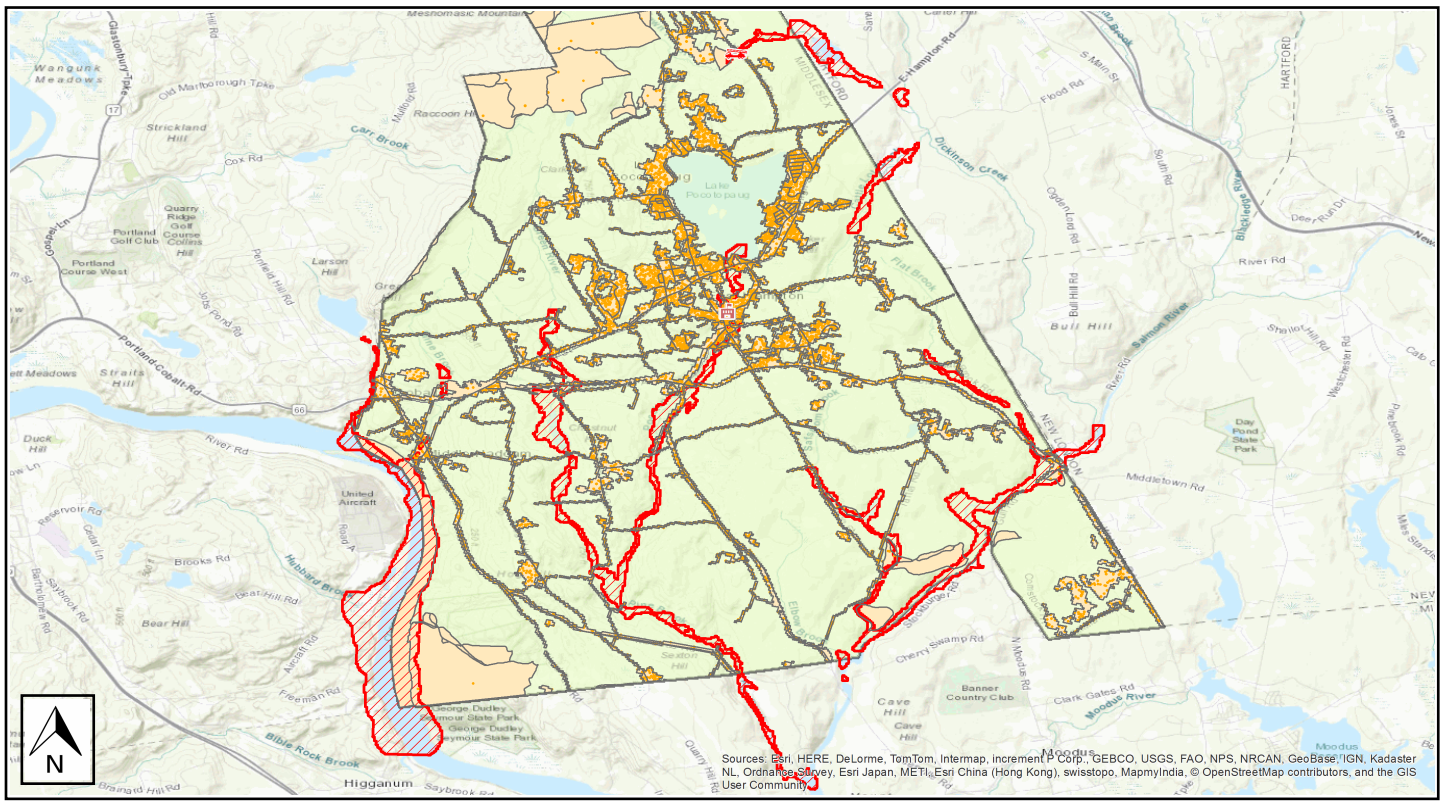
Flood Scenario Parameters

Hazus used the following set of information to define the flood parameters for the flood loss estimate provided in this report.

Study Region Name:	EastHampton
Scenario Name:	EastHamptonAll
Return Period Analyzed:	25
Analysis Options Analyzed:	No What-Ifs

Study Region Overview Map

Illustrating scenario flood extent, as well as exposed essential facilities and total exposure



Building Damage

General Building Stock Damage

Hazus estimates that about 3 buildings will be at least moderately damaged. This is over 88% of the total number of buildings in the scenario. There are an estimated 0 buildings that will be completely destroyed. The definition of the 'damage states' is provided in the Hazus Flood Technical Manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 summarizes the expected damage by general building type.

Total Economic Loss (1 dot = $300K) Overview Map

Table 3: Expected Building Damage by Occupancy

	1-10		11-20		21-30		31-40		41-50		>50	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	0	0	0	0	0	0	0	0	0	0	0	0
Commercial	0	0	0	0	0	0	0	0	0	0	0	0
Education	0	0	0	0	0	0	0	0	0	0	0	0
Government	0	0	0	0	0	0	0	0	0	0	0	0
Industrial	0	0	0	0	0	0	0	0	0	0	0	0
Religion	0	0	0	0	0	0	0	0	0	0	0	0
Residential	26	90	3	10	0	0	0	0	0	0	0	0
Total	**26**		**3**		**0**		**0**		**0**		**0**	

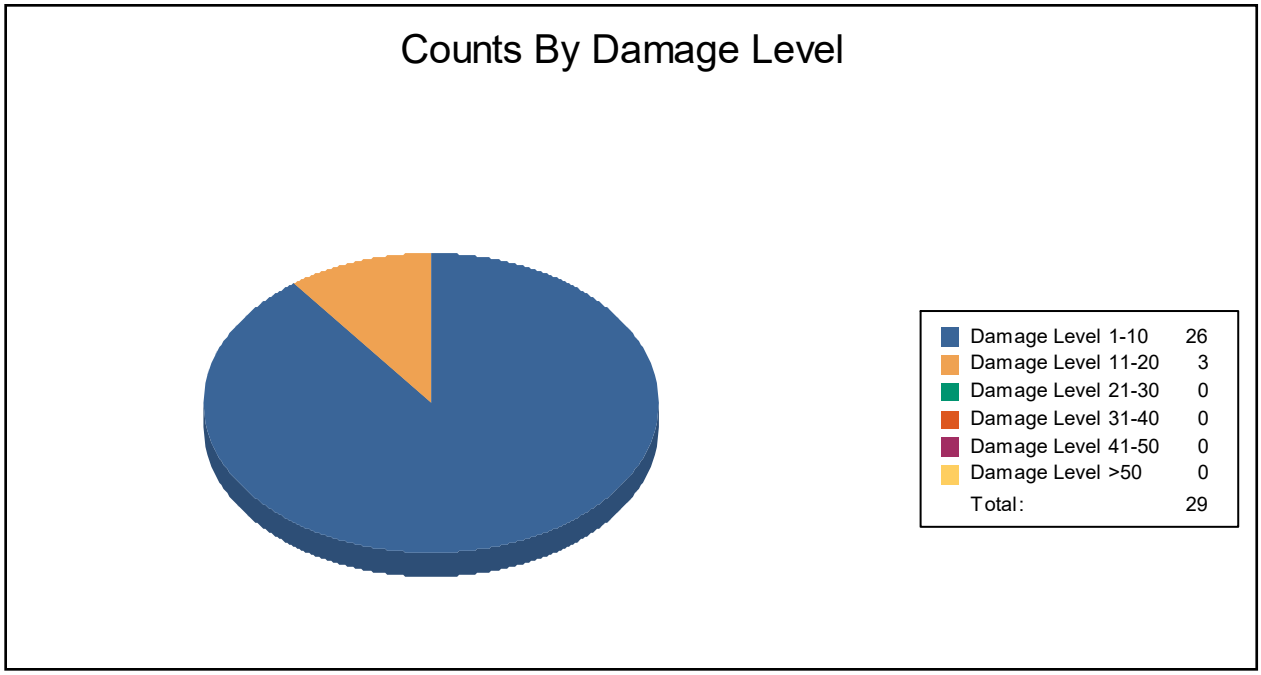


Table 4: Expected Building Damage by Building Type

Building Type	1-10		11-20		21-30		31-40		41-50		>50	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	0	0	0	0	0	0	0	0	0	0	0	0
ManufHousing	0	0	0	0	0	0	0	0	0	0	0	0
Masonry	0	0	0	0	0	0	0	0	0	0	0	0
Steel	0	0	0	0	0	0	0	0	0	0	0	0
Wood	26	90	3	10	0	0	0	0	0	0	0	0

Essential Facility Damage

Before the flood analyzed in this scenario, the region had 0 hospital beds available for use. On the day of the scenario flood event, the model estimates that 0 hospital beds are available in the region.

Table 5: Expected Damage to Essential Facilities

		# Facilities		
Classification	Total	At Least Moderate	At Least Substantial	Loss of Use
Emergency Operation Centers	1	0	0	0
Fire Stations	3	0	0	0
Hospitals	0	0	0	0
Police Stations	1	0	0	0
Schools	5	0	0	0

If this report displays all zeros or is blank, two possibilities can explain this.

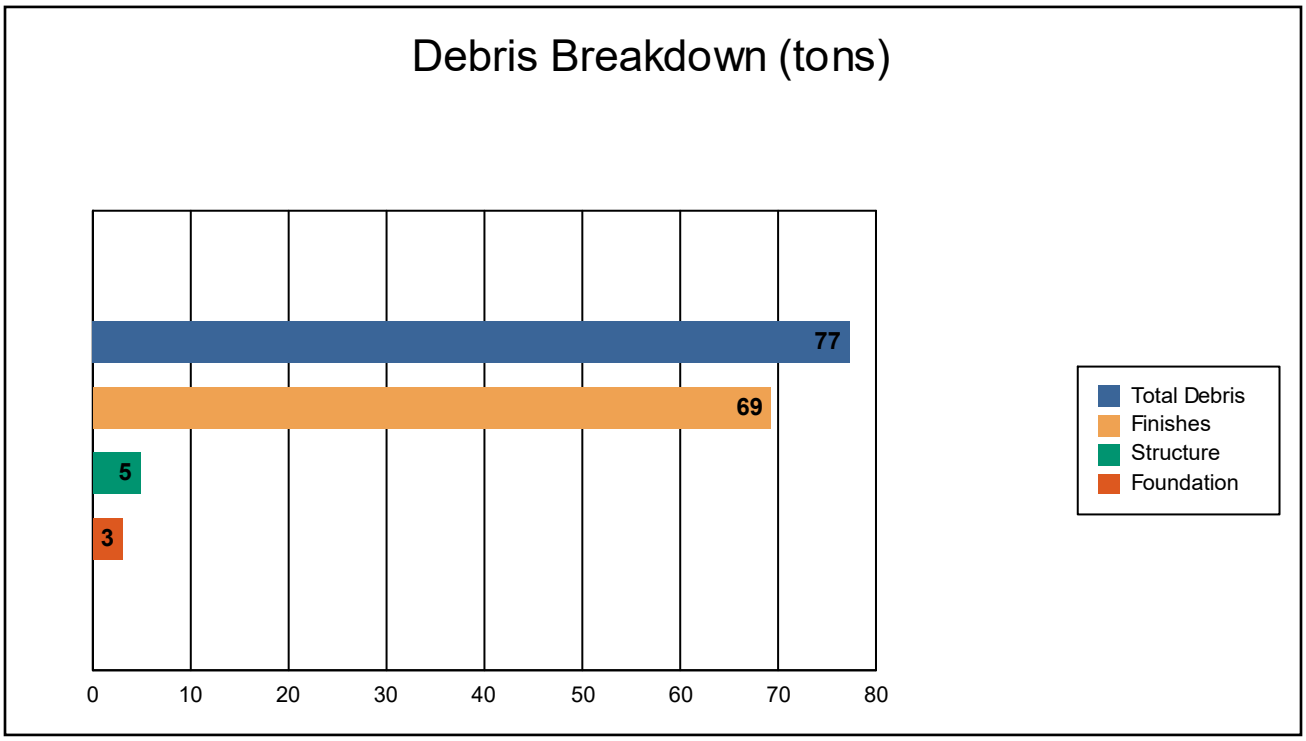
(1) None of your facilities were flooded. This can be checked by mapping the inventory data on the depth grid.

(2) The analysis was not run. This can be tested by checking the run box on the Analysis Menu and seeing if a message box asks you to replace the existing results.

Induced Flood Damage

Debris Generation

Hazus estimates the amount of debris that will be generated by the flood. The model breaks debris into three general categories: 1) Finishes (dry wall, insulation, etc.), 2) Structural (wood, brick, etc.) and 3) Foundations (concrete slab, concrete block, rebar, etc.). This distinction is made because of the different types of material handling equipment required to handle the debris.

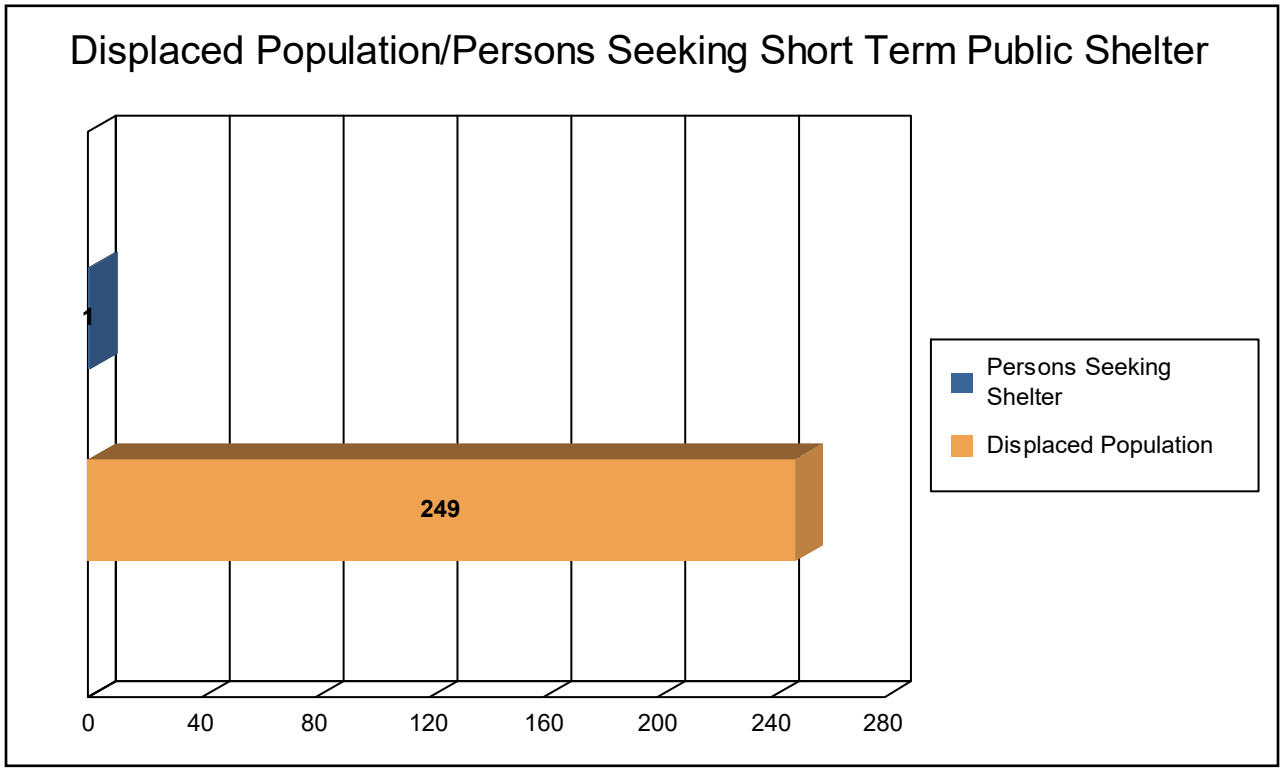


The model estimates that a total of 77 tons of debris will be generated. Of the total amount, Finishes comprises 89% of the total, Structure comprises 6% of the total, and Foundation comprises 4%. If the debris tonnage is converted into an estimated number of truckloads, it will require 4 truckloads (@25 tons/truck) to remove the debris generated by the flood.

Social Impact

Shelter Requirements

Hazus estimates the number of households that are expected to be displaced from their homes due to the flood and the associated potential evacuation. Hazus also estimates those displaced people that will require accommodations in temporary public shelters. The model estimates 83 households (or 249 of people) will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 1 people (out of a total population of 12,959) will seek temporary shelter in public shelters.



Economic Loss

The total economic loss estimated for the flood is 12.72 million dollars, which represents 1.08 % of the total replacement value of the scenario buildings.

Building-Related Losses

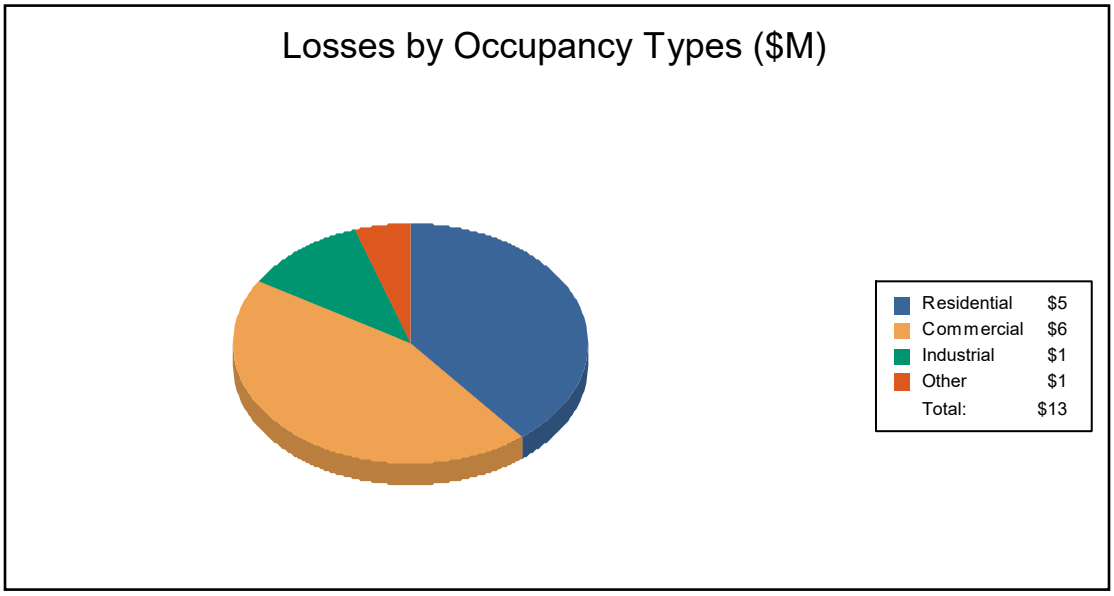
The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the flood. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the flood.

The total building-related losses were 6.34 million dollars. 50% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 39.16% of the total loss. Table 6 below provides a summary of the losses associated with the building damage.

Table 6: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss						
	Building	2.29	0.43	0.38	0.02	3.12
	Content	0.99	1.22	0.72	0.13	3.05
	Inventory	0.00	0.02	0.15	0.00	0.17
	Subtotal	**3.28**	**1.68**	**1.24**	**0.15**	**6.34**
Business Interruption						
	Income	0.00	1.55	0.05	0.12	1.72
	Relocation	1.31	0.43	0.05	0.02	1.81
	Rental Income	0.38	0.32	0.02	0.00	0.71
	Wage	0.01	1.68	0.08	0.37	2.14
	Subtotal	**1.71**	**3.97**	**0.20**	**0.51**	**6.38**
ALL	**Total**	**4.98**	**5.65**	**1.44**	**0.65**	**12.72**



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Total	**12,959**	**1,786,021**	**248,376**	**2,034,397**
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Education	13,086	0.6%
Total	**2,034,397**	**100%**

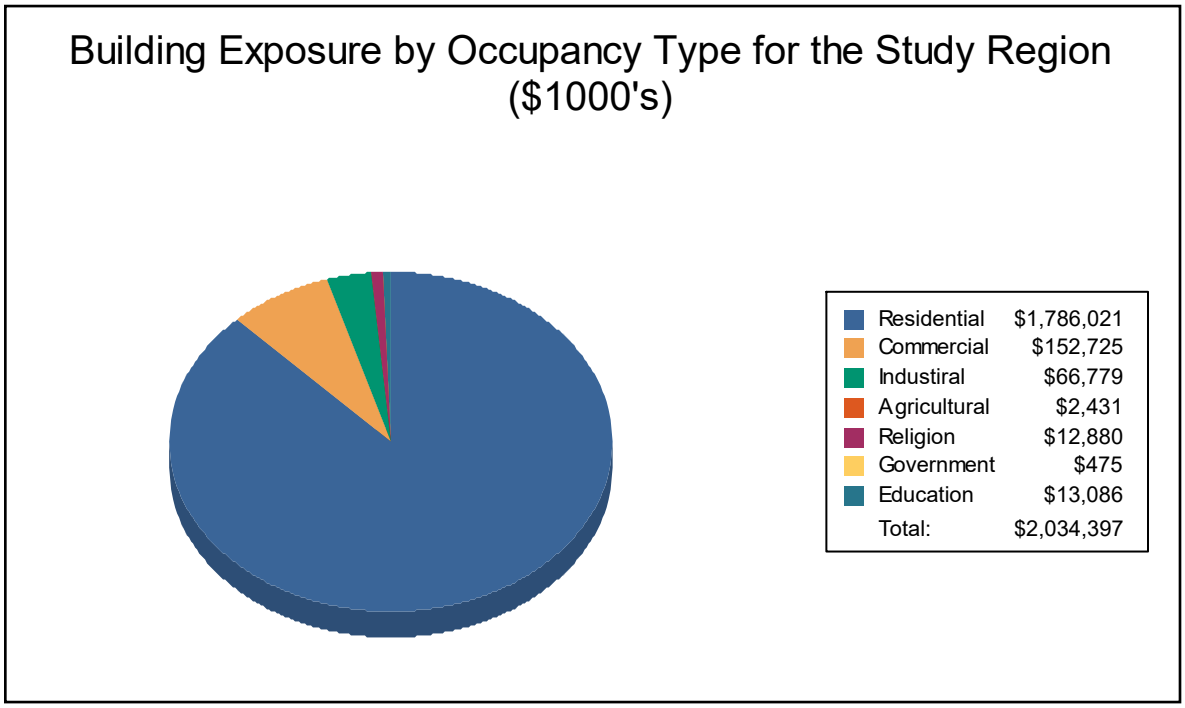
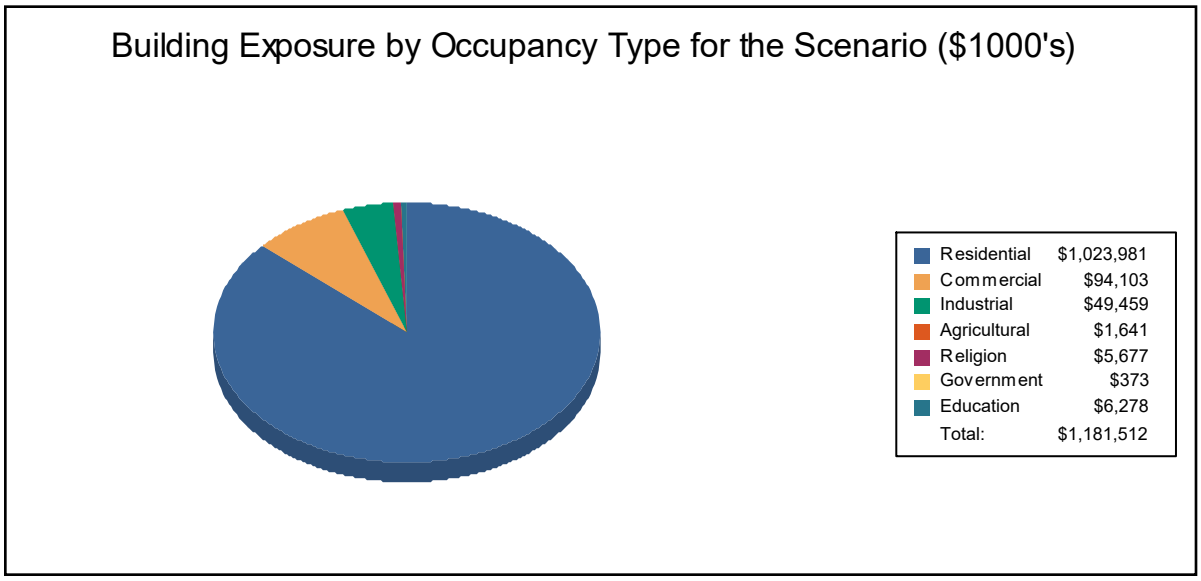


Table 2
Building Exposure by Occupancy Type for the Scenario

Occupancy	Exposure ($1000)	Percent of Total
Residential	1,023,981	86.7%
Commercial	94,103	8.0%
Industrial	49,459	4.2%
Agricultural	1,641	0.1%
Religion	5,677	0.5%
Government	373	0.0%
Education	6,278	0.5%
Total	**1,181,512**	**100%**



Essential Facility Inventory

For essential facilities, there are no hospitals in the region with a total bed capacity of no beds.
There are 5 schools, 3 fire stations, 1 police station and 1 emergency operation center.

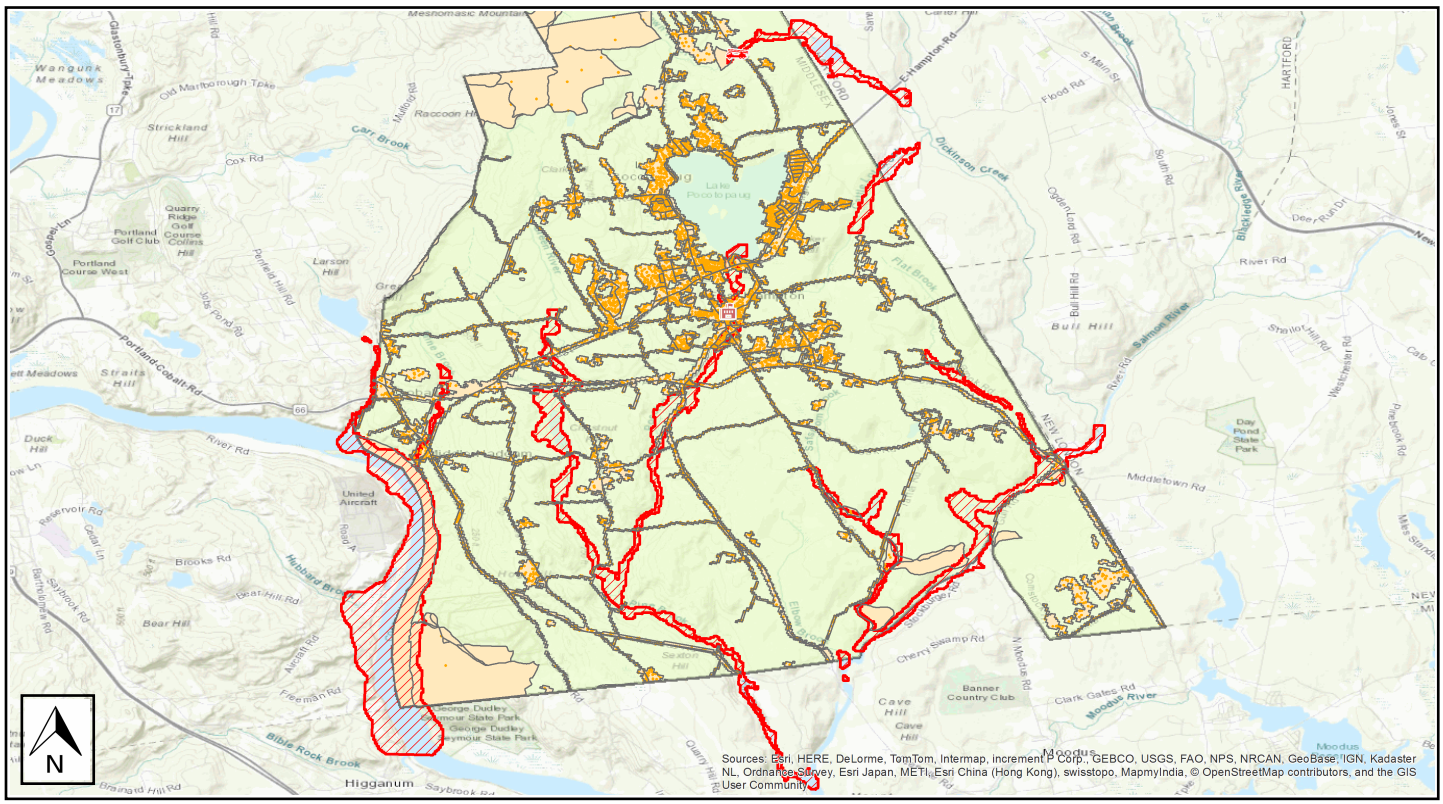
Flood Scenario Parameters

Hazus used the following set of information to define the flood parameters for the flood loss estimate provided in this report.

Study Region Name:	EastHampton
Scenario Name:	EastHamptonAll
Return Period Analyzed:	50
Analysis Options Analyzed:	No What-Ifs

Study Region Overview Map

Illustrating scenario flood extent, as well as exposed essential facilities and total exposure



Building Damage

General Building Stock Damage

Hazus estimates that about 10 buildings will be at least moderately damaged. This is over 88% of the total number of buildings in the scenario. There are an estimated 0 buildings that will be completely destroyed. The definition of the 'damage states' is provided in the Hazus Flood Technical Manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 summarizes the expected damage by general building type.

Total Economic Loss (1 dot = $300K) Overview Map

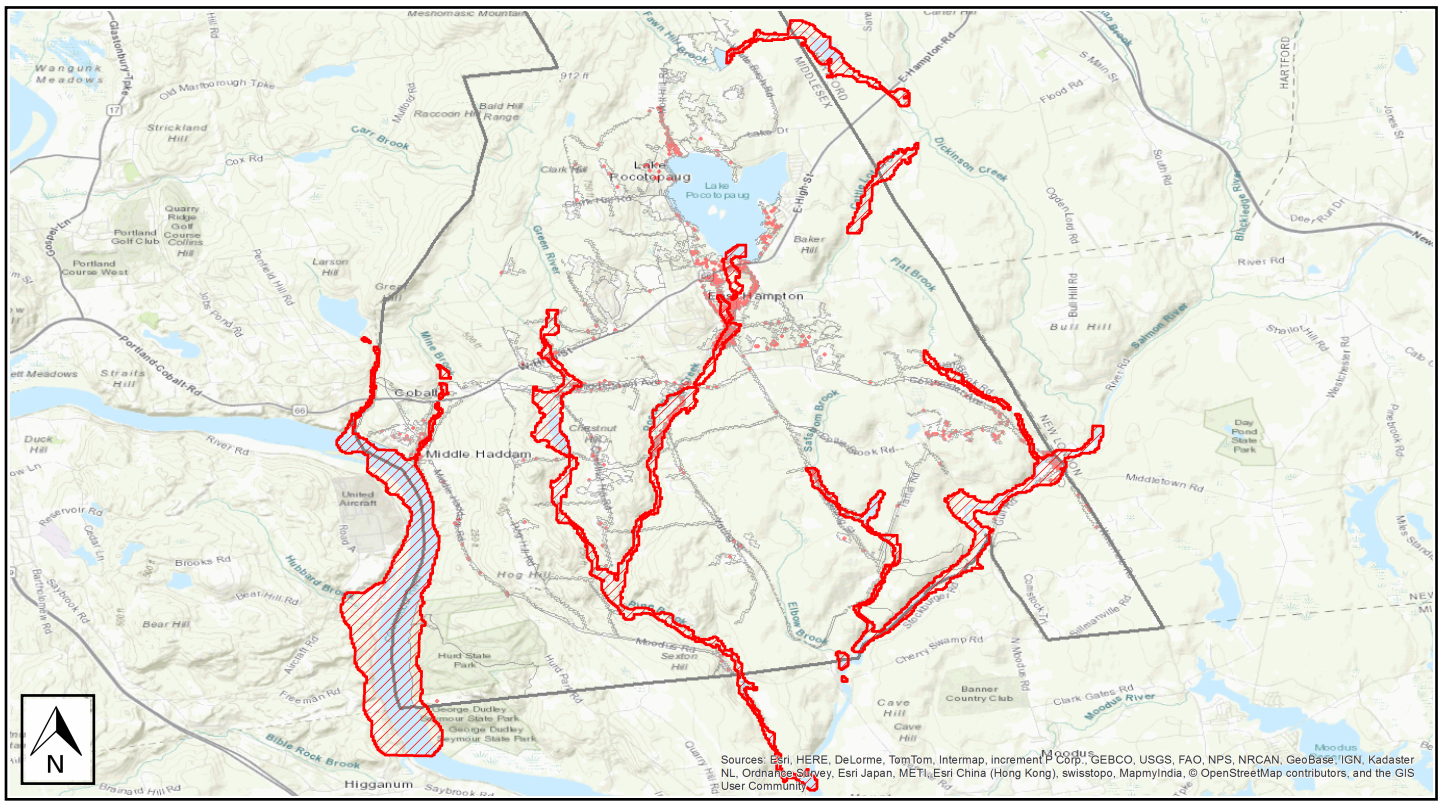


Table 3: Expected Building Damage by Occupancy

	1-10		11-20		21-30		31-40		41-50		>50	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	0	0	0	0	0	0	0	0	0	0	0	0
Commercial	0	0	0	0	0	0	0	0	0	0	0	0
Education	0	0	0	0	0	0	0	0	0	0	0	0
Government	0	0	0	0	0	0	0	0	0	0	0	0
Industrial	0	0	0	0	0	0	0	0	0	0	0	0
Religion	0	0	0	0	0	0	0	0	0	0	0	0
Residential	25	71	8	23	2	6	0	0	0	0	0	0
Total	**25**		**8**		**2**		**0**		**0**		**0**	

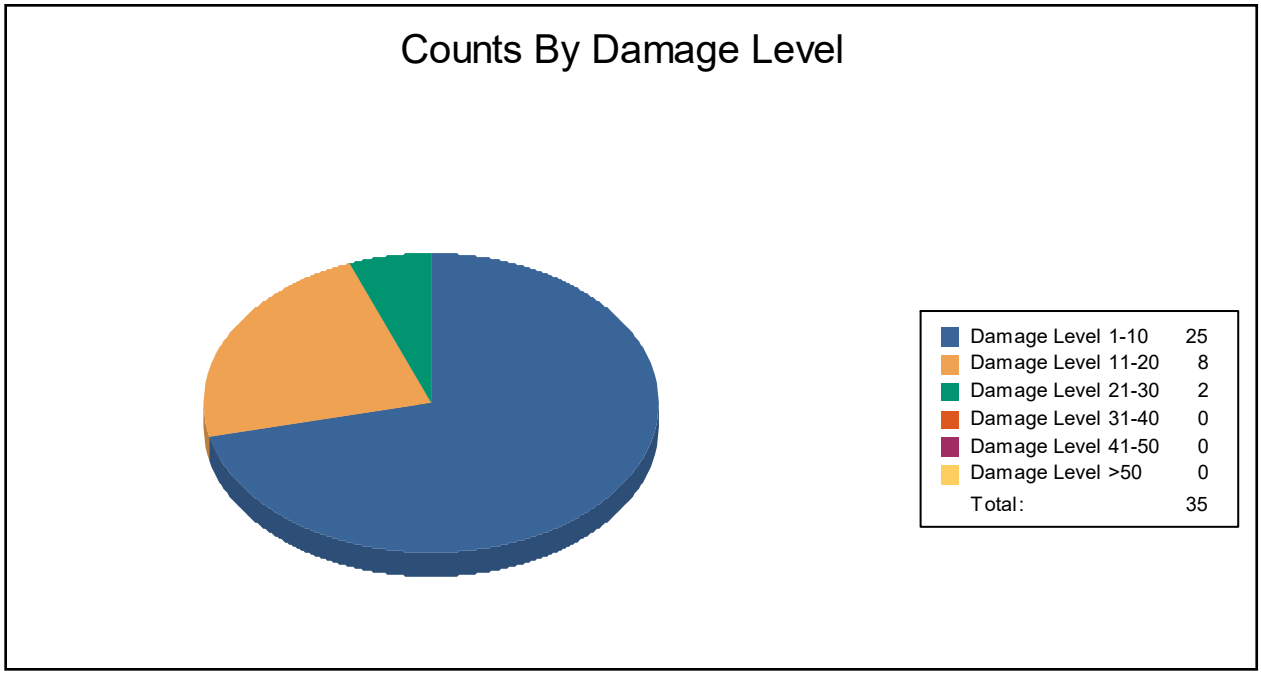


Table 4: Expected Building Damage by Building Type

Building Type	1-10		11-20		21-30		31-40		41-50		>50	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	0	0	0	0	0	0	0	0	0	0	0	0
ManufHousing	0	0	0	0	0	0	0	0	0	0	0	0
Masonry	0	0	0	0	0	0	0	0	0	0	0	0
Steel	0	0	0	0	0	0	0	0	0	0	0	0
Wood	25	71	8	23	2	6	0	0	0	0	0	0

Essential Facility Damage

Before the flood analyzed in this scenario, the region had 0 hospital beds available for use. On the day of the scenario flood event, the model estimates that 0 hospital beds are available in the region.

Table 5: Expected Damage to Essential Facilities

		# Facilities		
Classification	Total	At Least Moderate	At Least Substantial	Loss of Use
Emergency Operation Centers	1	0	0	0
Fire Stations	3	0	0	0
Hospitals	0	0	0	0
Police Stations	1	0	0	0
Schools	5	1	0	0

If this report displays all zeros or is blank, two possibilities can explain this.

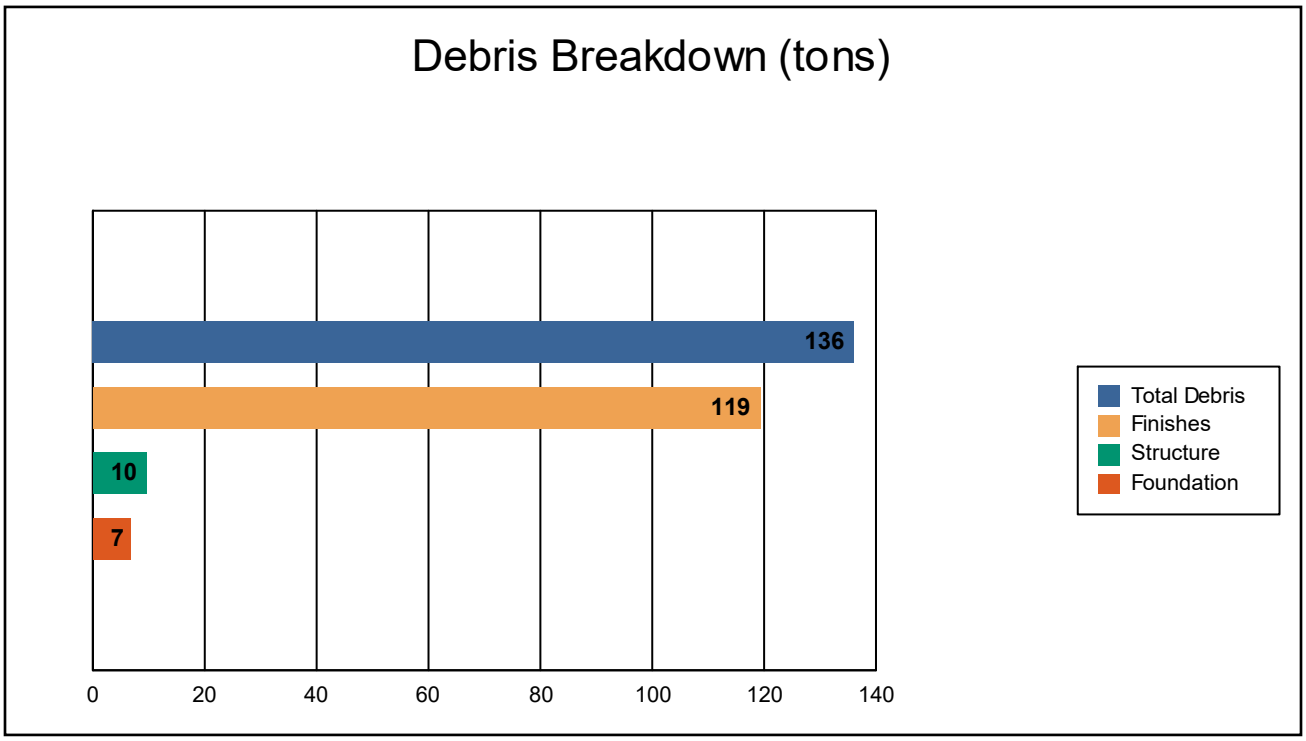
(1) None of your facilities were flooded. This can be checked by mapping the inventory data on the depth grid.

(2) The analysis was not run. This can be tested by checking the run box on the Analysis Menu and seeing if a message box asks you to replace the existing results.

Induced Flood Damage

Debris Generation

Hazus estimates the amount of debris that will be generated by the flood. The model breaks debris into three general categories: 1) Finishes (dry wall, insulation, etc.), 2) Structural (wood, brick, etc.) and 3) Foundations (concrete slab, concrete block, rebar, etc.). This distinction is made because of the different types of material handling equipment required to handle the debris.

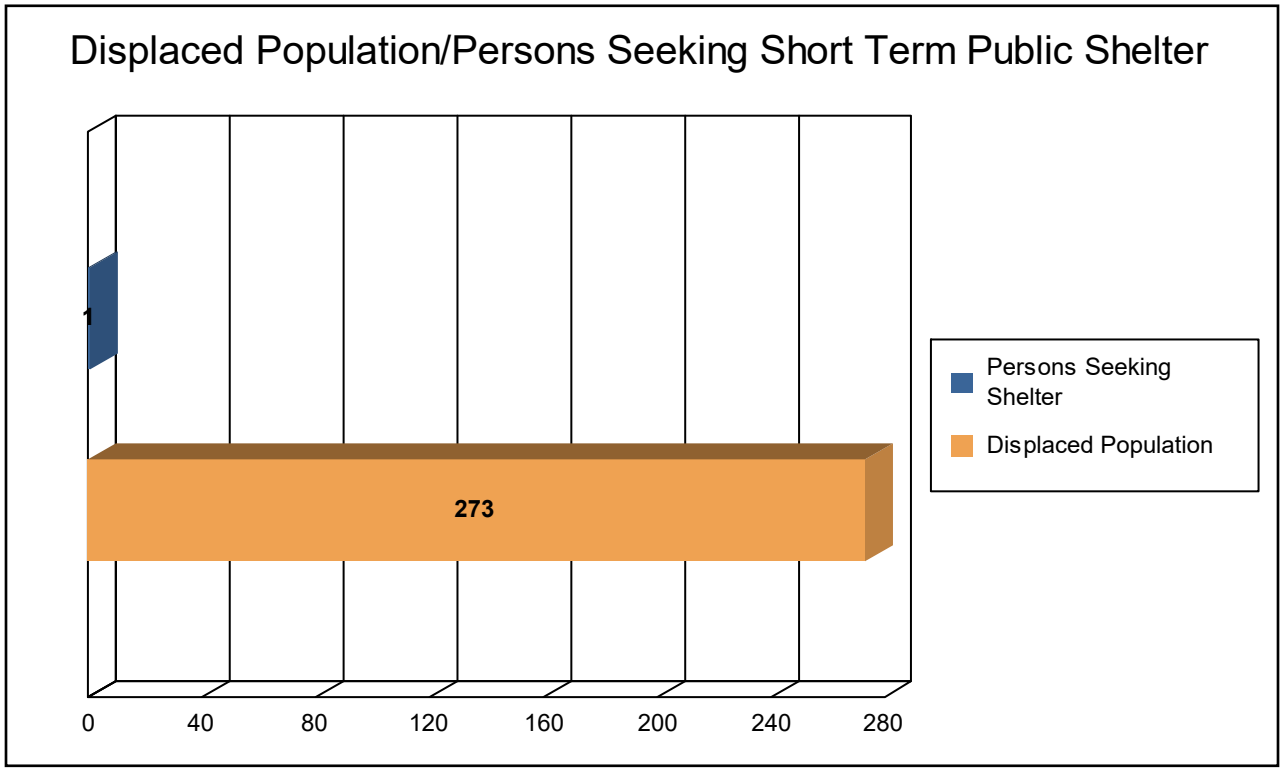


The model estimates that a total of 136 tons of debris will be generated. Of the total amount, Finishes comprises 88% of the total, Structure comprises 7% of the total, and Foundation comprises 5%. If the debris tonnage is converted into an estimated number of truckloads, it will require 6 truckloads (@25 tons/truck) to remove the debris generated by the flood.

Social Impact

Shelter Requirements

Hazus estimates the number of households that are expected to be displaced from their homes due to the flood and the associated potential evacuation. Hazus also estimates those displaced people that will require accommodations in temporary public shelters. The model estimates 91 households (or 273 of people) will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 1 people (out of a total population of 12,959) will seek temporary shelter in public shelters.



Economic Loss

The total economic loss estimated for the flood is 16.80 million dollars, which represents 1.42 % of the total replacement value of the scenario buildings.

Building-Related Losses

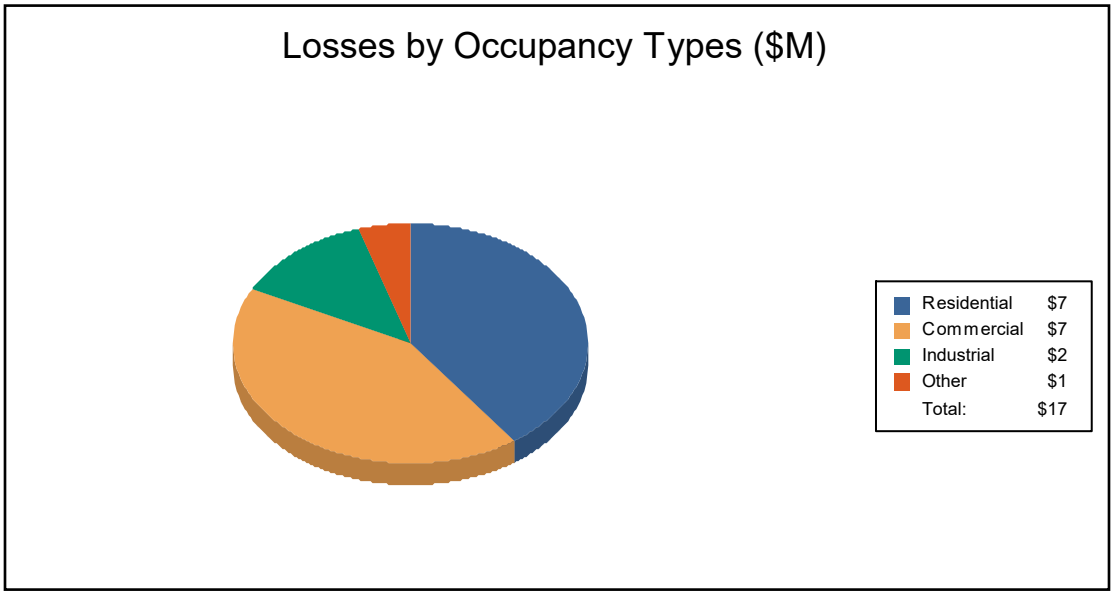
The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the flood. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the flood.

The total building-related losses were 9.39 million dollars. 44% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 39.87% of the total loss. Table 6 below provides a summary of the losses associated with the building damage.

Table 6: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss						
	Building	3.32	0.63	0.55	0.03	4.52
	Content	1.45	1.82	1.12	0.21	4.60
	Inventory	0.00	0.04	0.22	0.00	0.26
	Subtotal	**4.77**	**2.49**	**1.89**	**0.24**	**9.39**
Business Interruption						
	Income	0.01	1.83	0.05	0.13	2.02
	Relocation	1.48	0.51	0.07	0.02	2.07
	Rental Income	0.43	0.38	0.02	0.00	0.83
	Wage	0.01	1.98	0.10	0.41	2.50
	Subtotal	**1.93**	**4.69**	**0.24**	**0.57**	**7.42**
ALL	**Total**	**6.70**	**7.18**	**2.13**	**0.80**	**16.80**



Appendix A: County Listing for the Region

Connecticut

- Middlesex

Appendix B: Regional Population and Building Value Data

	Population	Building Value (thousands of dollars)		
		Residential	Non-Residential	Total
Connecticut				
Middlesex	12,959	1,786,021	248,376	2,034,397
Total	**12,959**	**1,786,021**	**248,376**	**2,034,397**
Total Study Region	**12,959**	**1,786,021**	**248,376**	**2,034,397**

Hazus: Flood Global Risk Report

Region Name: EastHampton

Flood Scenario: EastHamptonAll

Print Date: Thursday, January 2, 2020

Disclaimer:
This version of Hazus utilizes 2010 Census Data.
Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific Flood. These results can be improved by using enhanced inventory data and flood hazard information.

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General Description of the Region

Hazus is a regional multi-hazard loss estimation model that was developed by the Federal Emergency Management Agency (FEMA) and the National Institute of Building Sciences (NIBS). The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The flood loss estimates provided in this report were based on a region that included 1 county(ies) from the following state(s):

- Connecticut

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is approximately 37 square miles and contains 276 census blocks. The region contains over 5 thousand households and has a total population of 12,959 people (2010 Census Bureau data). The distribution of population by State and County for the study region is provided in Appendix B.

There are an estimated 5,356 buildings in the region with a total building replacement value (excluding contents) of 2,034 million dollars. Approximately 92.79% of the buildings (and 87.79% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

Hazus estimates that there are 5,356 buildings in the region which have an aggregate total replacement value of 2,034 million dollars. Table 1 and Table 2 present the relative distribution of the value with respect to the general occupancies by Study Region and Scenario respectively. Appendix B provides a general distribution of the building value by State and County.

Table 1
Building Exposure by Occupancy Type for the Study Region

Occupancy	Exposure ($1000)	Percent of Total
Residential	1,786,021	87.8%
Commercial	152,725	7.5%
Industrial	66,779	3.3%
Agricultural	2,431	0.1%
Religion	12,880	0.6%
Government	475	0.0%
Education	13,086	0.6%
Total	**2,034,397**	**100%**

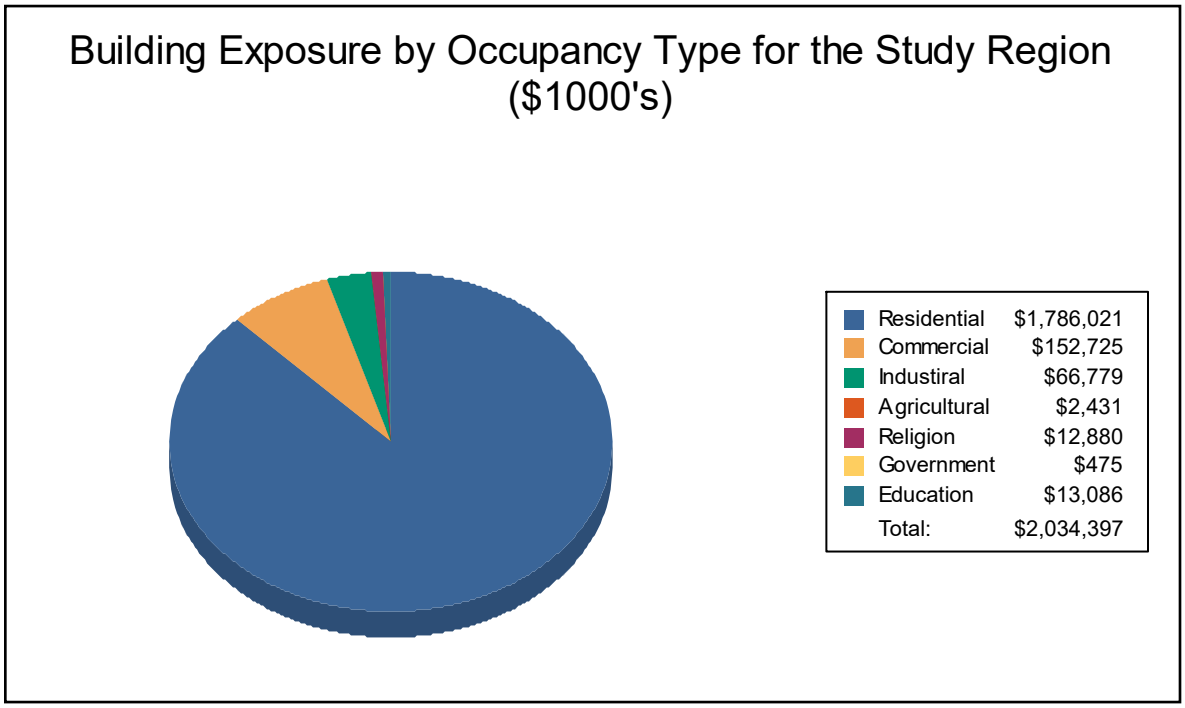
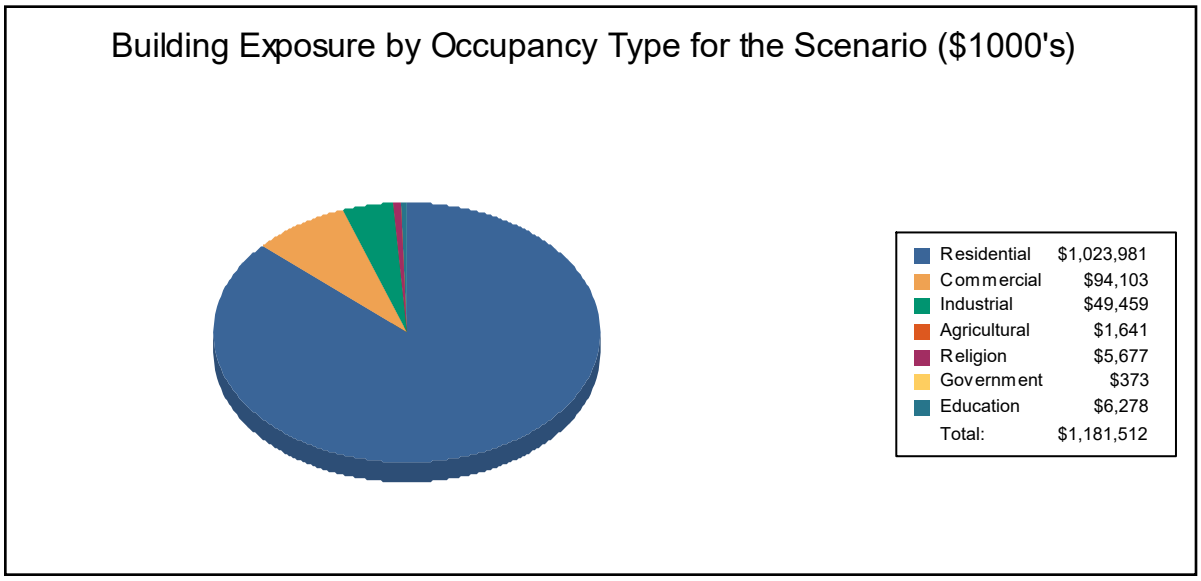


Table 2
Building Exposure by Occupancy Type for the Scenario

Occupancy	Exposure ($1000)	Percent of Total
Residential	1,023,981	86.7%
Commercial	94,103	8.0%
Industrial	49,459	4.2%
Agricultural	1,641	0.1%
Religion	5,677	0.5%
Government	373	0.0%
Education	6,278	0.5%
Total	**1,181,512**	**100%**



Essential Facility Inventory

For essential facilities, there are no hospitals in the region with a total bed capacity of no beds.
There are 5 schools, 3 fire stations, 1 police station and 1 emergency operation center.

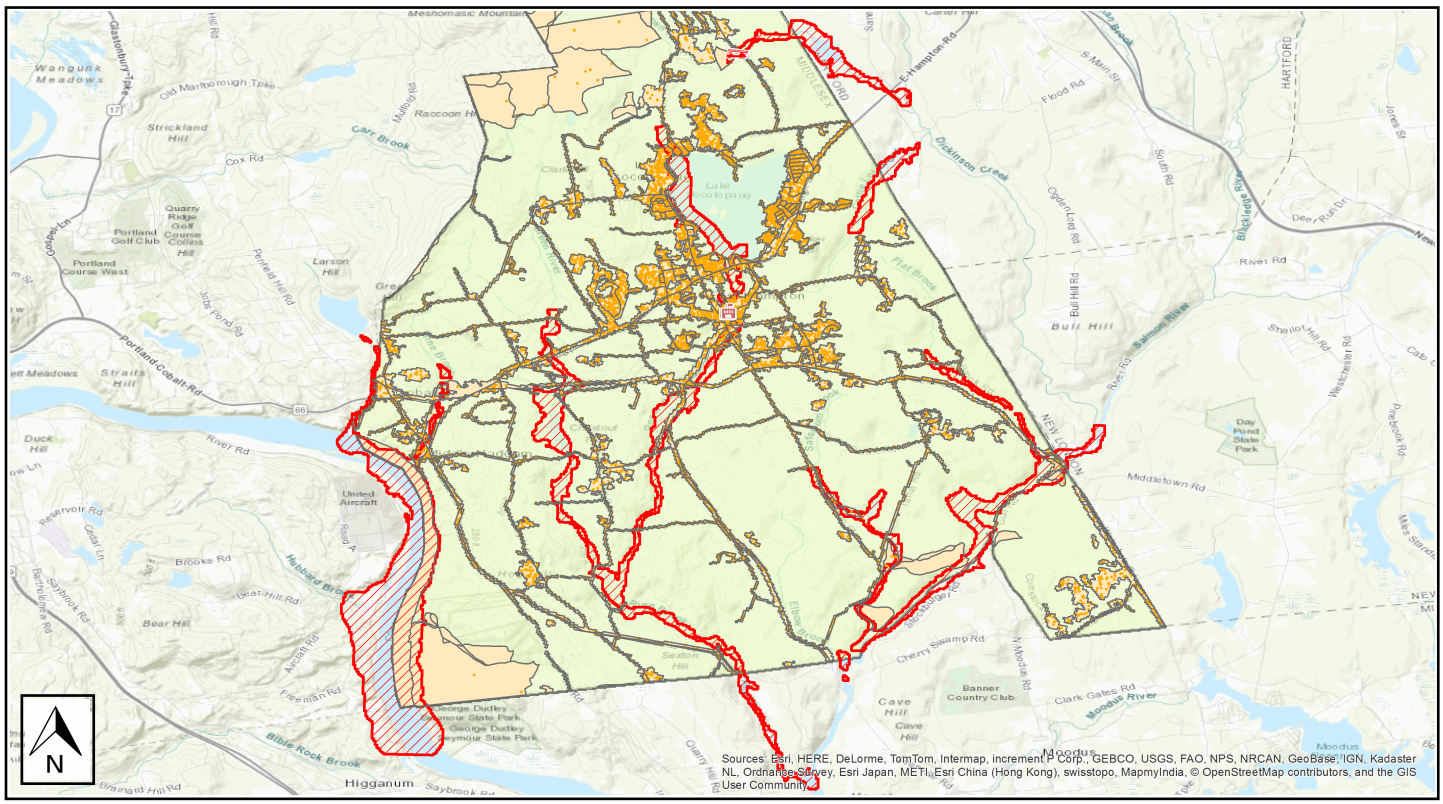
Flood Scenario Parameters

Hazus used the following set of information to define the flood parameters for the flood loss estimate provided in this report.

Study Region Name:	EastHampton
Scenario Name:	EastHamptonAll
Return Period Analyzed:	100
Analysis Options Analyzed:	No What-Ifs

Study Region Overview Map

Illustrating scenario flood extent, as well as exposed essential facilities and total exposure



Building Damage

General Building Stock Damage

Hazus estimates that about 14 buildings will be at least moderately damaged. This is over 89% of the total number of buildings in the scenario. There are an estimated 0 buildings that will be completely destroyed. The definition of the 'damage states' is provided in the Hazus Flood Technical Manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 summarizes the expected damage by general building type.

Total Economic Loss (1 dot = $300K) Overview Map

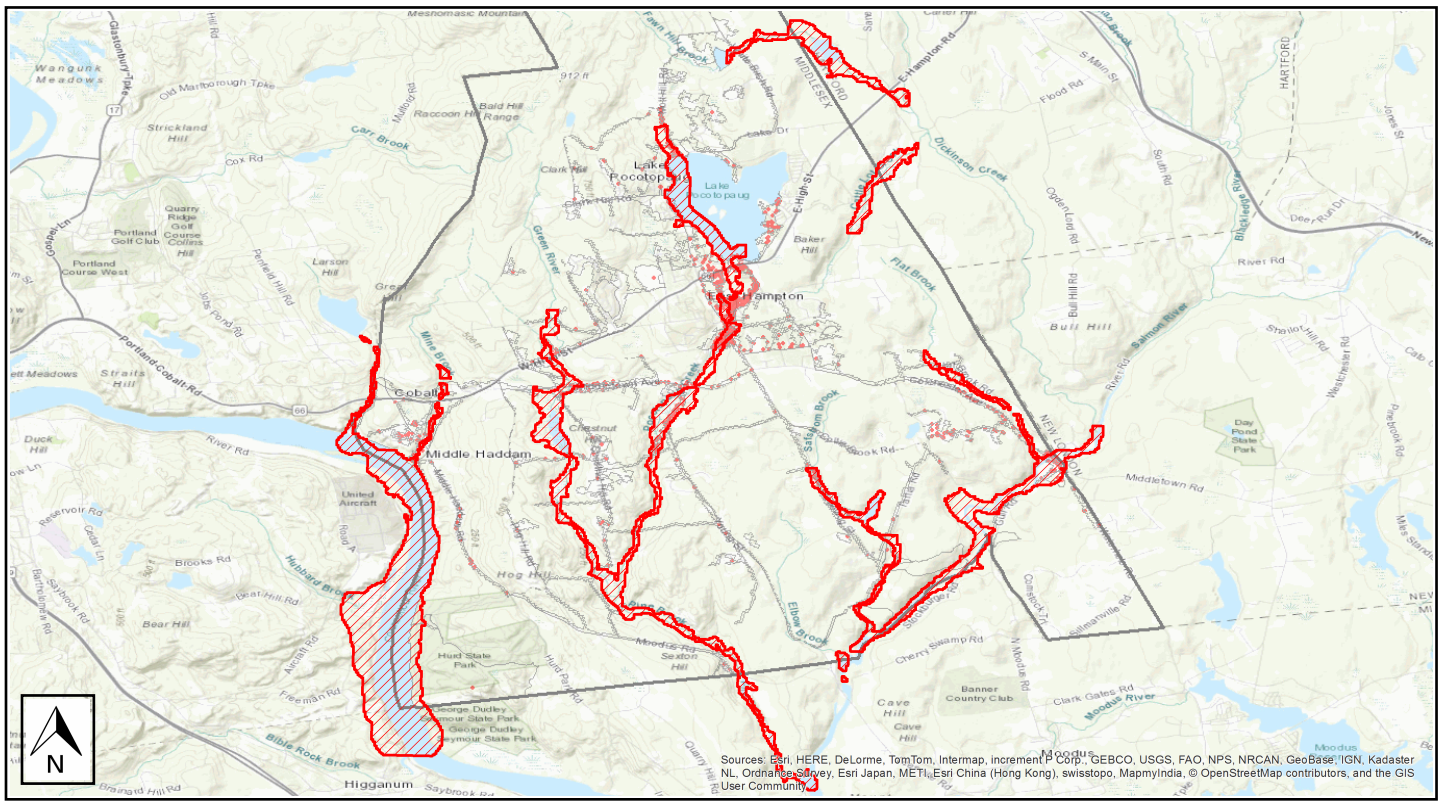


Table 3: Expected Building Damage by Occupancy

	1-10		11-20		21-30		31-40		41-50		>50	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	0	0	0	0	0	0	0	0	0	0	0	0
Commercial	0	0	0	0	0	0	0	0	0	0	0	0
Education	0	0	0	0	0	0	0	0	0	0	0	0
Government	0	0	0	0	0	0	0	0	0	0	0	0
Industrial	0	0	0	0	0	0	0	0	0	0	0	0
Religion	0	0	0	0	0	0	0	0	0	0	0	0
Residential	35	71	12	24	2	4	0	0	0	0	0	0
Total	**35**		**12**		**2**		**0**		**0**		**0**	

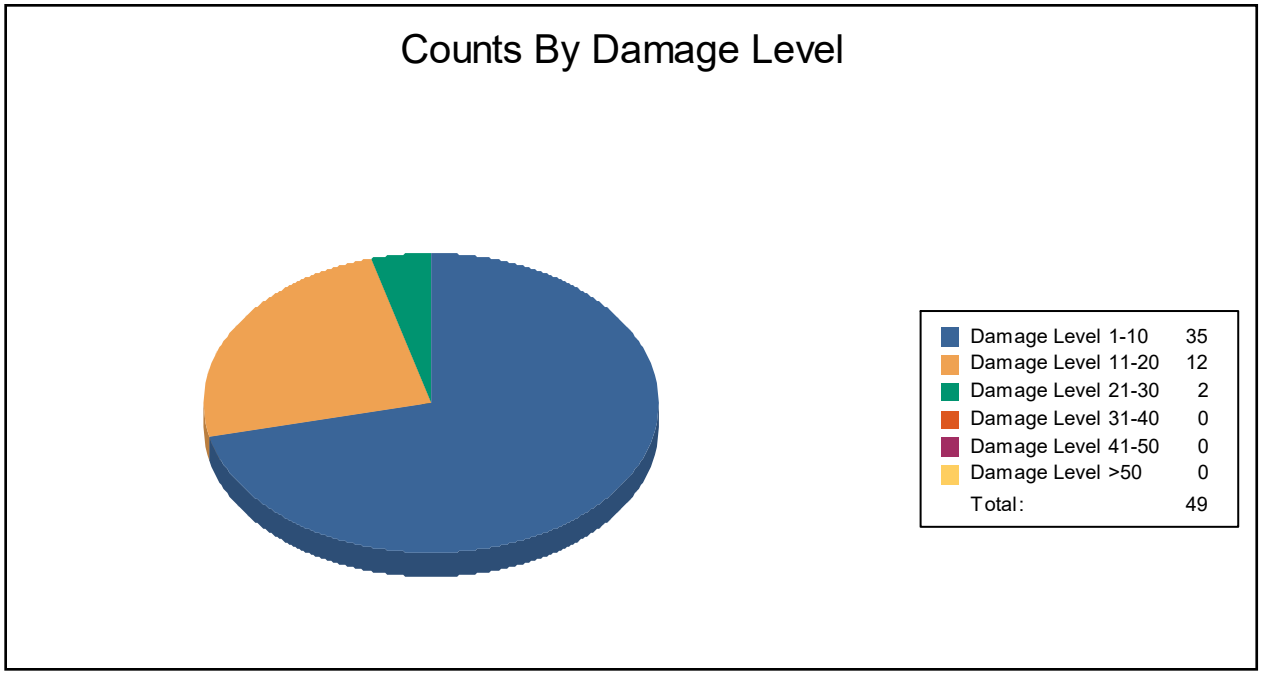


Table 4: Expected Building Damage by Building Type

Building Type	1-10		11-20		21-30		31-40		41-50		>50	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	0	0	0	0	0	0	0	0	0	0	0	0
ManufHousing	0	0	0	0	0	0	0	0	0	0	0	0
Masonry	0	0	0	0	0	0	0	0	0	0	0	0
Steel	0	0	0	0	0	0	0	0	0	0	0	0
Wood	35	71	12	24	2	4	0	0	0	0	0	0

Essential Facility Damage

Before the flood analyzed in this scenario, the region had 0 hospital beds available for use. On the day of the scenario flood event, the model estimates that 0 hospital beds are available in the region.

Table 5: Expected Damage to Essential Facilities

		# Facilities		
Classification	Total	At Least Moderate	At Least Substantial	Loss of Use
Emergency Operation Centers	1	0	0	0
Fire Stations	3	0	0	0
Hospitals	0	0	0	0
Police Stations	1	0	0	0
Schools	5	1	0	0

If this report displays all zeros or is blank, two possibilities can explain this.

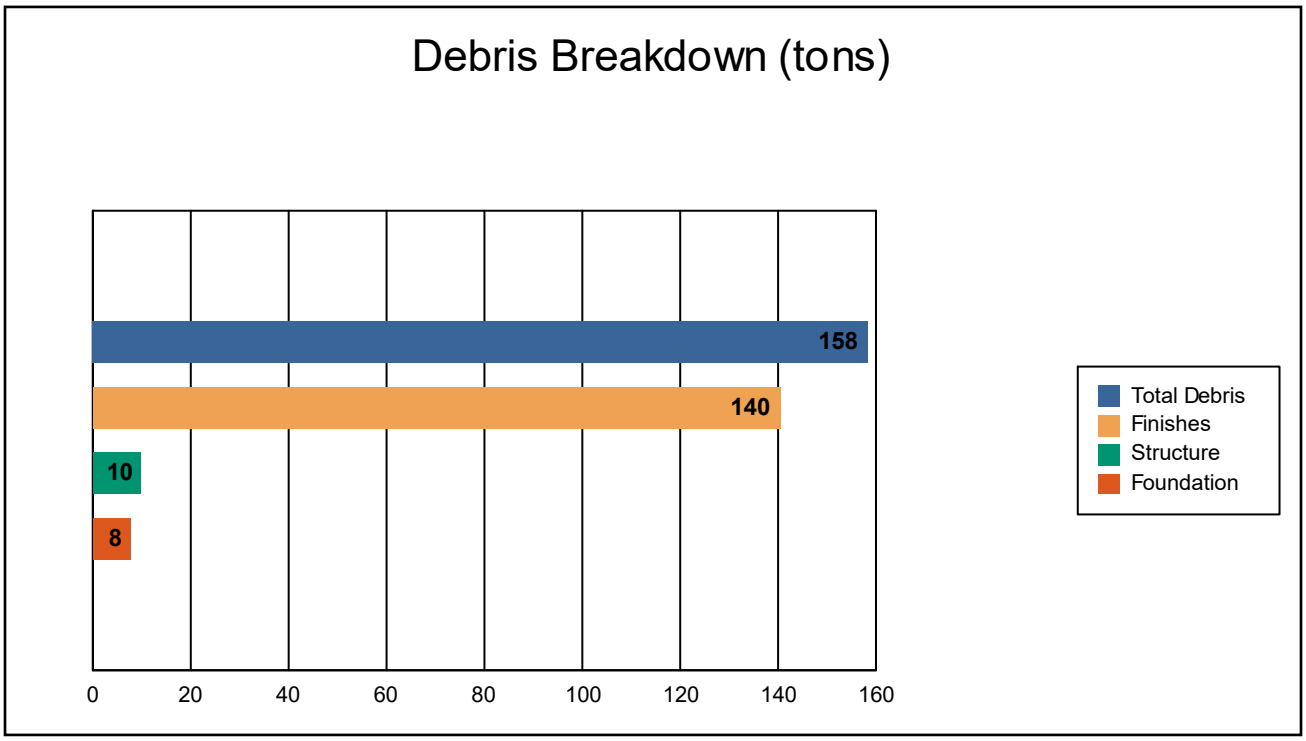
(1) None of your facilities were flooded. This can be checked by mapping the inventory data on the depth grid.

(2) The analysis was not run. This can be tested by checking the run box on the Analysis Menu and seeing if a message box asks you to replace the existing results.

Induced Flood Damage

Debris Generation

Hazus estimates the amount of debris that will be generated by the flood. The model breaks debris into three general categories: 1) Finishes (dry wall, insulation, etc.), 2) Structural (wood, brick, etc.) and 3) Foundations (concrete slab, concrete block, rebar, etc.). This distinction is made because of the different types of material handling equipment required to handle the debris.

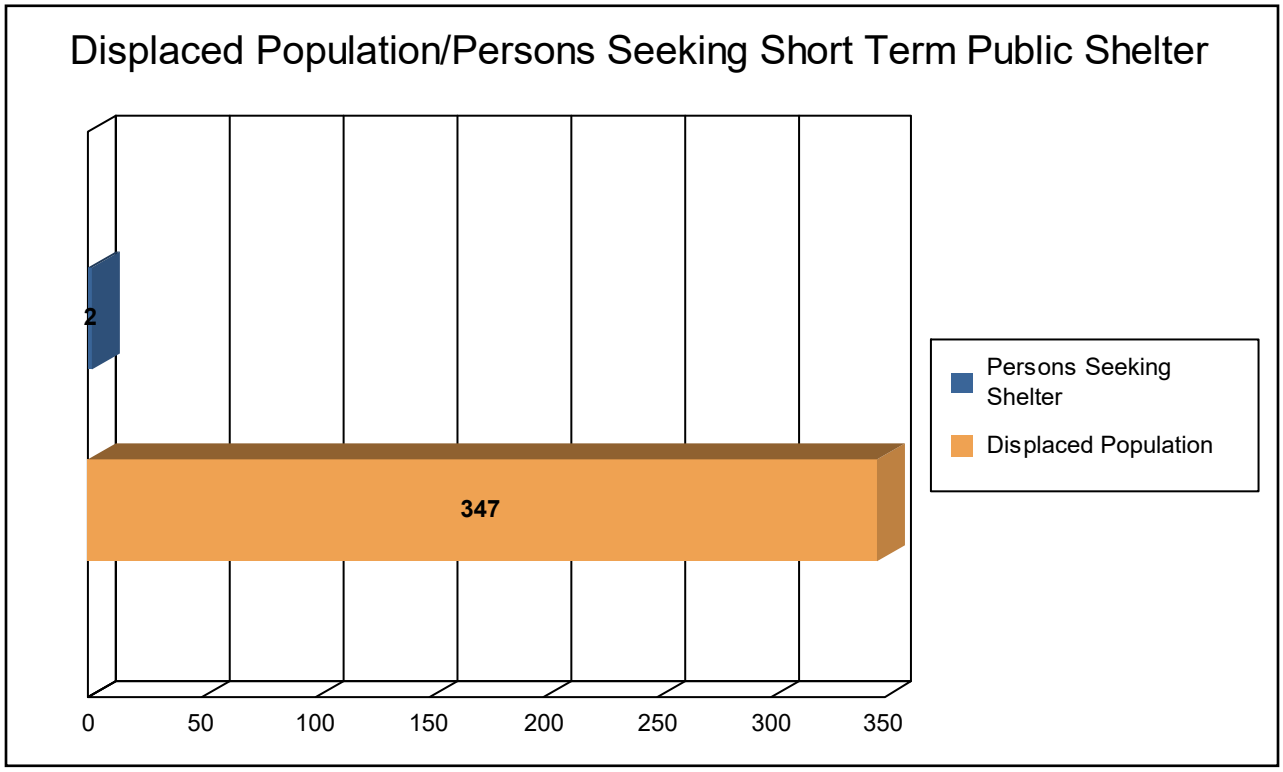


The model estimates that a total of 158 tons of debris will be generated. Of the total amount, Finishes comprises 89% of the total, Structure comprises 6% of the total, and Foundation comprises 5%. If the debris tonnage is converted into an estimated number of truckloads, it will require 7 truckloads (@25 tons/truck) to remove the debris generated by the flood.

Social Impact

Shelter Requirements

Hazus estimates the number of households that are expected to be displaced from their homes due to the flood and the associated potential evacuation. Hazus also estimates those displaced people that will require accommodations in temporary public shelters. The model estimates 116 households (or 347 of people) will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 2 people (out of a total population of 12,959) will seek temporary shelter in public shelters.



Economic Loss

The total economic loss estimated for the flood is 20.60 million dollars, which represents 1.74 % of the total replacement value of the scenario buildings.

Building-Related Losses

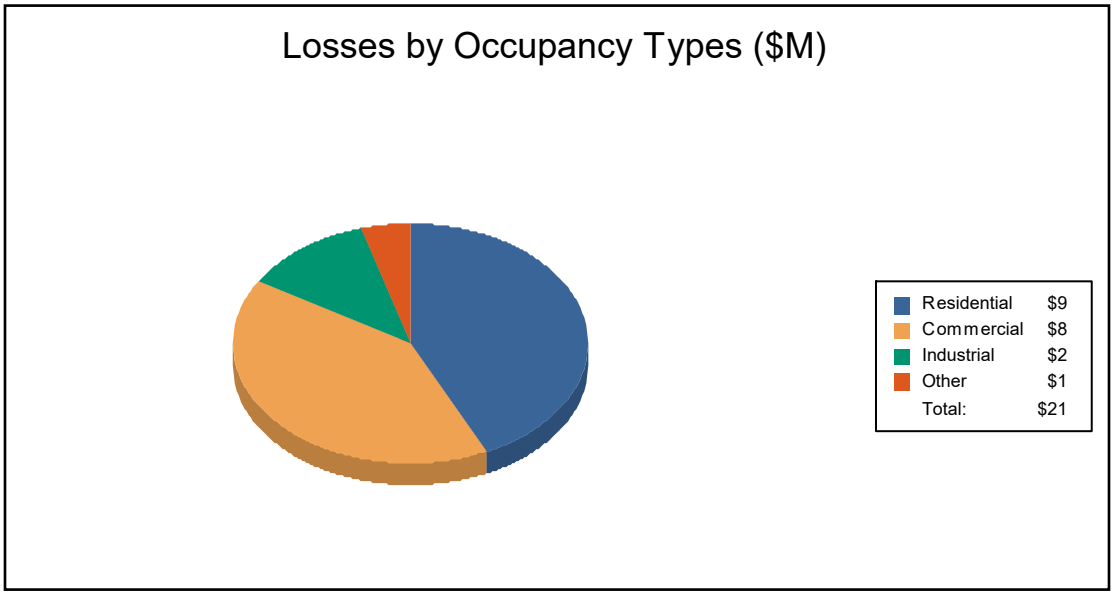
The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the flood. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the flood.

The total building-related losses were 11.71 million dollars. 43% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 43.13% of the total loss. Table 6 below provides a summary of the losses associated with the building damage.

Table 6: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss						
	Building	4.44	0.72	0.63	0.04	5.83
	Content	1.90	2.10	1.33	0.25	5.58
	Inventory	0.00	0.04	0.26	0.00	0.31
	Subtotal	**6.34**	**2.86**	**2.22**	**0.29**	**11.71**
Business Interruption						
	Income	0.01	2.19	0.06	0.14	2.40
	Relocation	1.96	0.54	0.07	0.02	2.58
	Rental Income	0.57	0.40	0.02	0.00	0.99
	Wage	0.01	2.36	0.10	0.45	2.93
	Subtotal	**2.55**	**5.49**	**0.25**	**0.61**	**8.90**
ALL	**Total**	**8.89**	**8.35**	**2.47**	**0.90**	**20.60**



Appendix A: County Listing for the Region

Connecticut

- Middlesex

Appendix B: Regional Population and Building Value Data

	Population	Building Value (thousands of dollars)		
		Residential	Non-Residential	Total
Connecticut				
Middlesex	12,959	1,786,021	248,376	2,034,397
Total	**12,959**	**1,786,021**	**248,376**	**2,034,397**
Total Study Region	**12,959**	**1,786,021**	**248,376**	**2,034,397**

Hazus: Flood Global Risk Report

Region Name: EastHampton

Flood Scenario: EastHamptonAll

Print Date: Thursday, January 2, 2020

Disclaimer:
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Note:
Appendix A contains a complete listing of the counties contained in the region.

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Building Inventory

General Building Stock

Hazus estimates that there are 5,356 buildings in the region which have an aggregate total replacement value of 2,034 million dollars. Table 1 and Table 2 present the relative distribution of the value with respect to the general occupancies by Study Region and Scenario respectively. Appendix B provides a general distribution of the building value by State and County.

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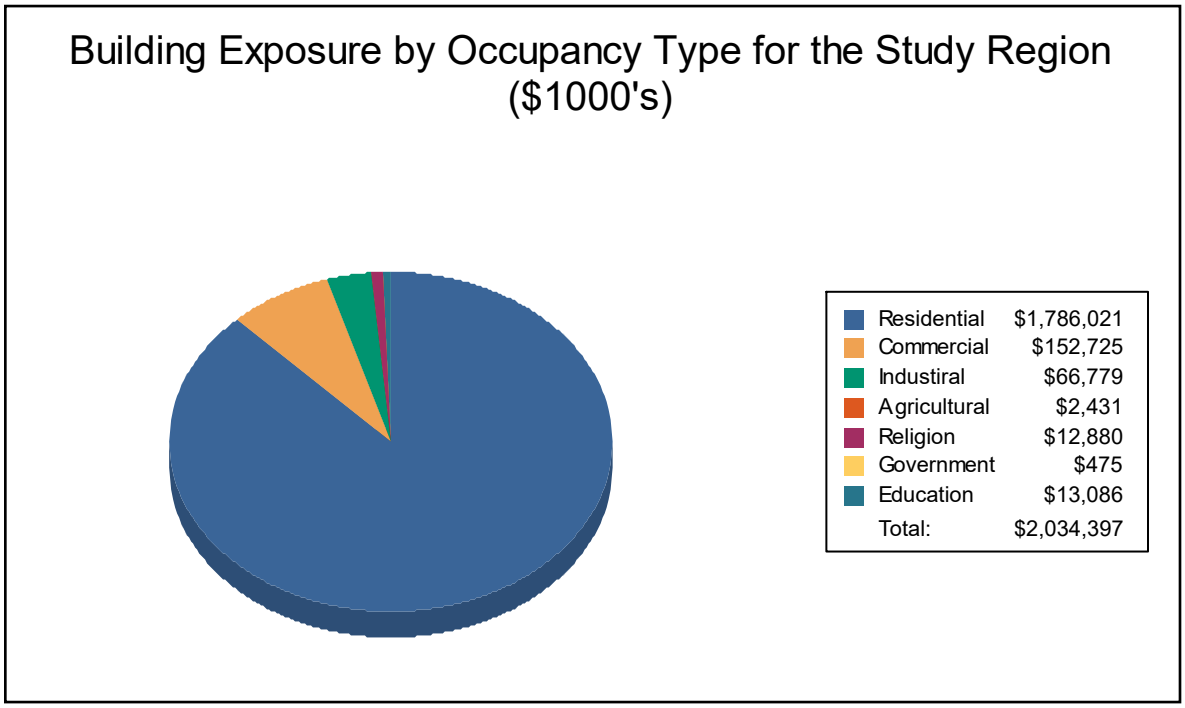

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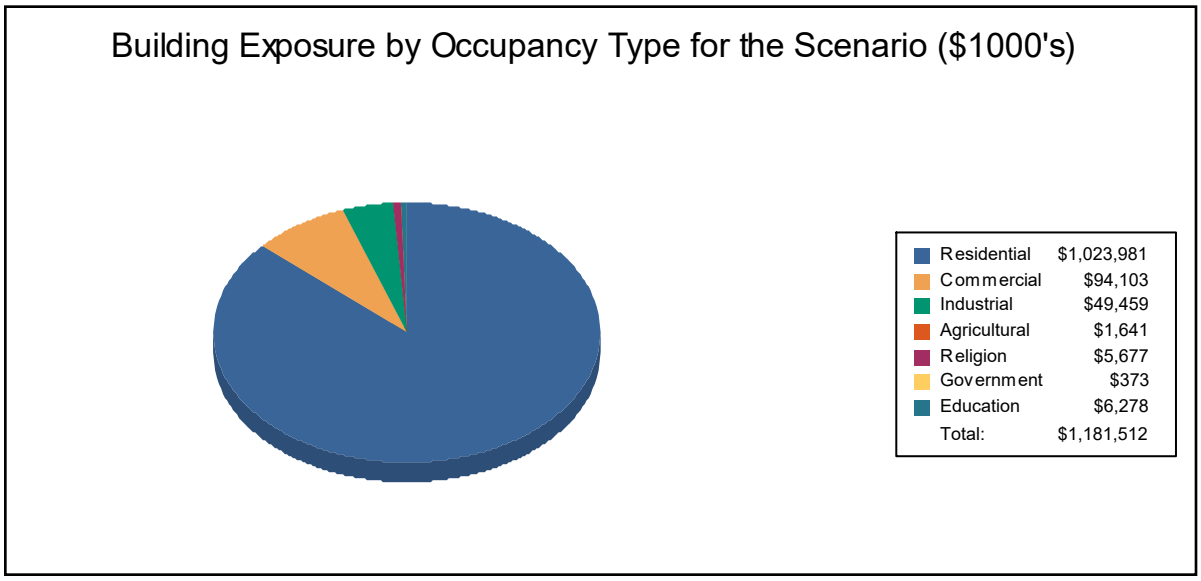
Education	6,278	0.5%
Total	**1,181,512**	**100%**



Essential Facility Inventory

For essential facilities, there are no hospitals in the region with a total bed capacity of no beds.
There are 5 schools, 3 fire stations, 1 police station and 1 emergency operation center.

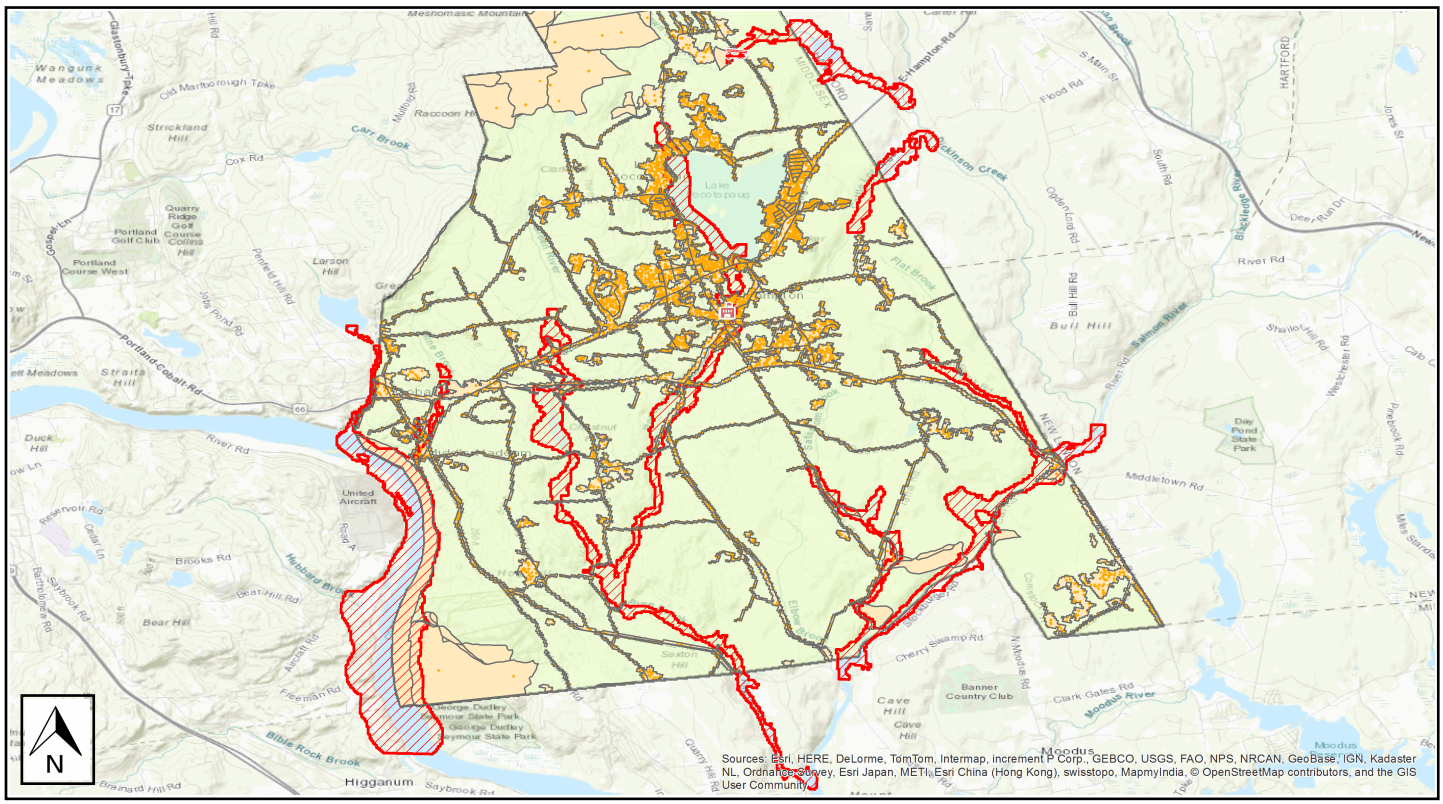
Flood Scenario Parameters

Hazus used the following set of information to define the flood parameters for the flood loss estimate provided in this report.

Study Region Name:	EastHampton
Scenario Name:	EastHamptonAll
Return Period Analyzed:	500
Analysis Options Analyzed:	No What-Ifs

Study Region Overview Map

Illustrating scenario flood extent, as well as exposed essential facilities and total exposure



Building Damage

General Building Stock Damage

Hazus estimates that about 36 buildings will be at least moderately damaged. This is over 90% of the total number of buildings in the scenario. There are an estimated 0 buildings that will be completely destroyed. The definition of the 'damage states' is provided in the Hazus Flood Technical Manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 summarizes the expected damage by general building type.

Total Economic Loss (1 dot = $300K) Overview Map

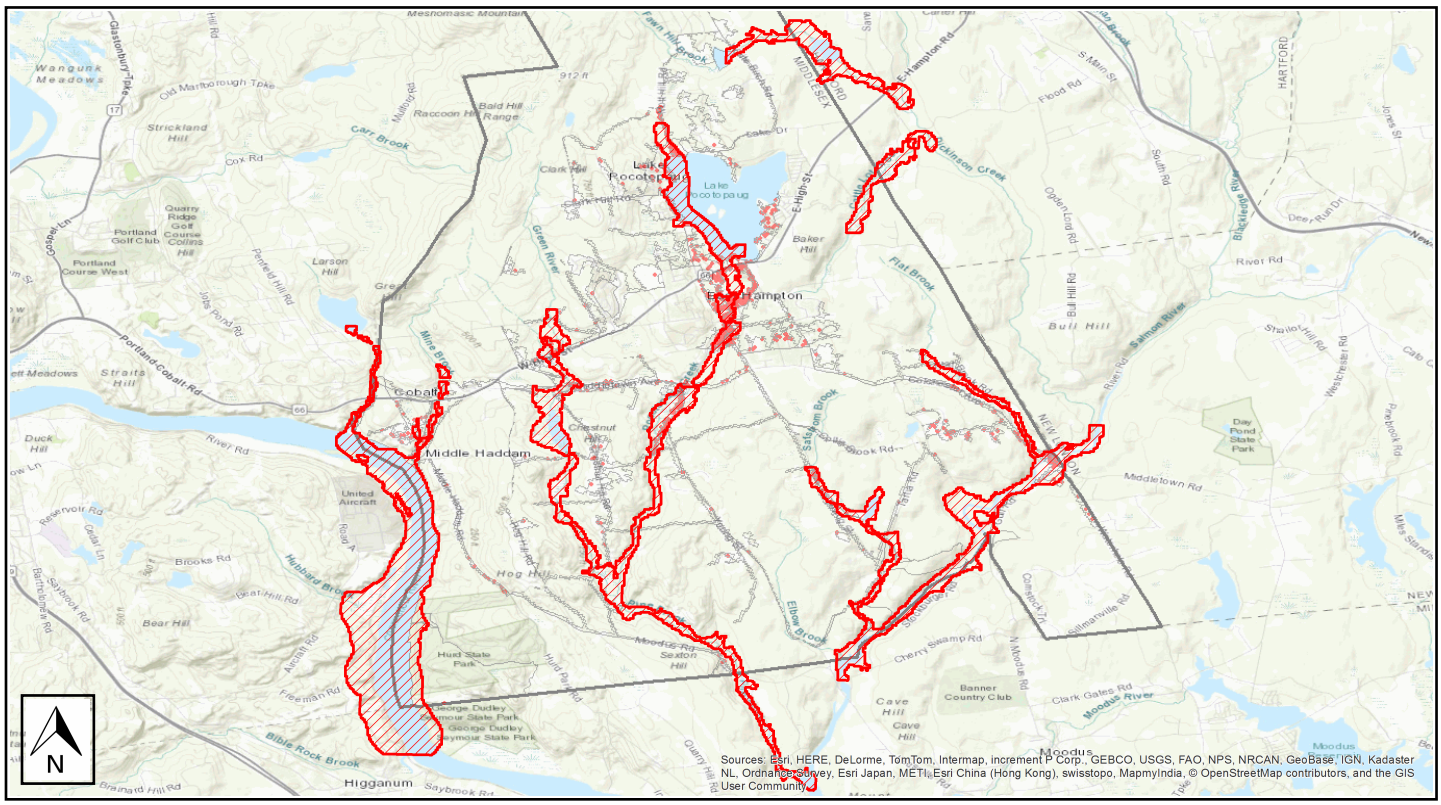


Table 3: Expected Building Damage by Occupancy

	1-10		11-20		21-30		31-40		41-50		>50	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	0	0	0	0	0	0	0	0	0	0	0	0
Commercial	0	0	0	0	0	0	0	0	0	0	0	0
Education	0	0	0	0	0	0	0	0	0	0	0	0
Government	0	0	0	0	0	0	0	0	0	0	0	0
Industrial	0	0	0	0	0	0	0	0	0	0	0	0
Religion	0	0	0	0	0	0	0	0	0	0	0	0
Residential	44	55	33	41	2	3	1	1	0	0	0	0
Total	**44**		**33**		**2**		**1**		**0**		**0**	

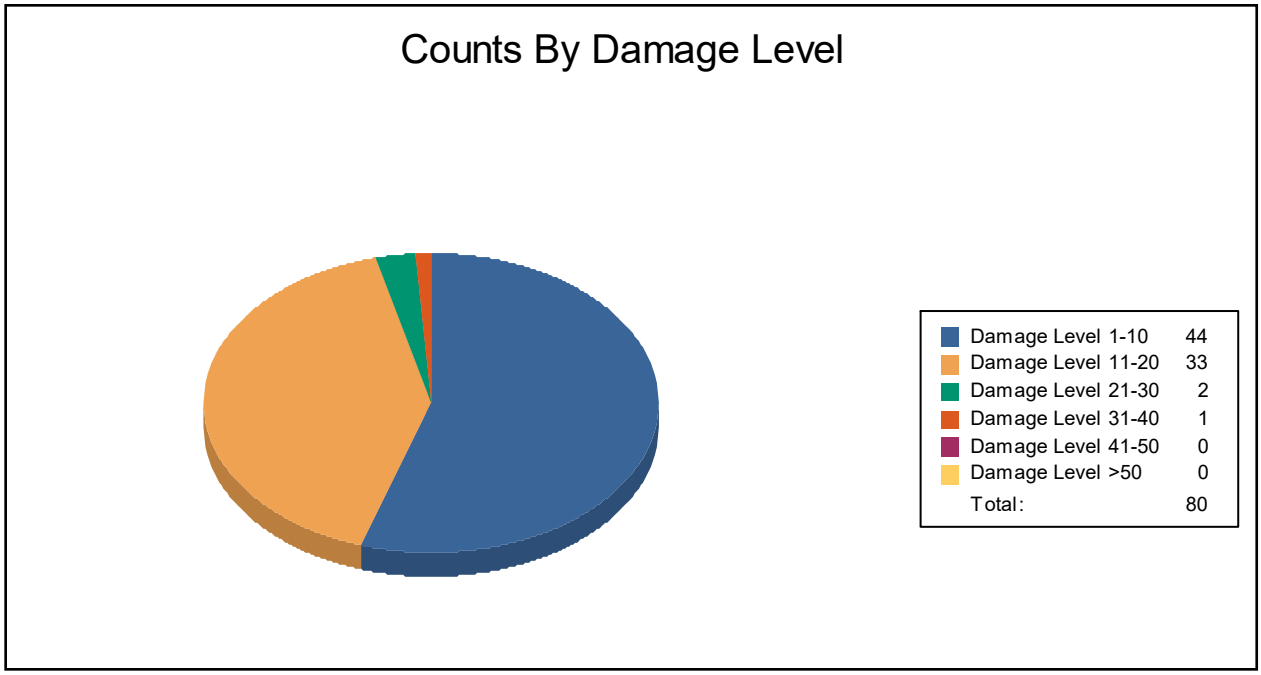


Table 4: Expected Building Damage by Building Type

Building Type	1-10		11-20		21-30		31-40		41-50		>50	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	0	0	0	0	0	0	0	0	0	0	0	0
ManufHousing	0	0	0	0	0	0	0	0	0	0	0	0
Masonry	0	0	0	0	0	0	0	0	0	0	0	0
Steel	0	0	0	0	0	0	0	0	0	0	0	0
Wood	44	55	33	41	2	3	1	1	0	0	0	0

Essential Facility Damage

Before the flood analyzed in this scenario, the region had 0 hospital beds available for use. On the day of the scenario flood event, the model estimates that 0 hospital beds are available in the region.

Table 5: Expected Damage to Essential Facilities

		# Facilities		
Classification	Total	At Least Moderate	At Least Substantial	Loss of Use
Emergency Operation Centers	1	0	0	0
Fire Stations	3	1	0	1
Hospitals	0	0	0	0
Police Stations	1	0	0	0
Schools	5	2	0	2

If this report displays all zeros or is blank, two possibilities can explain this.

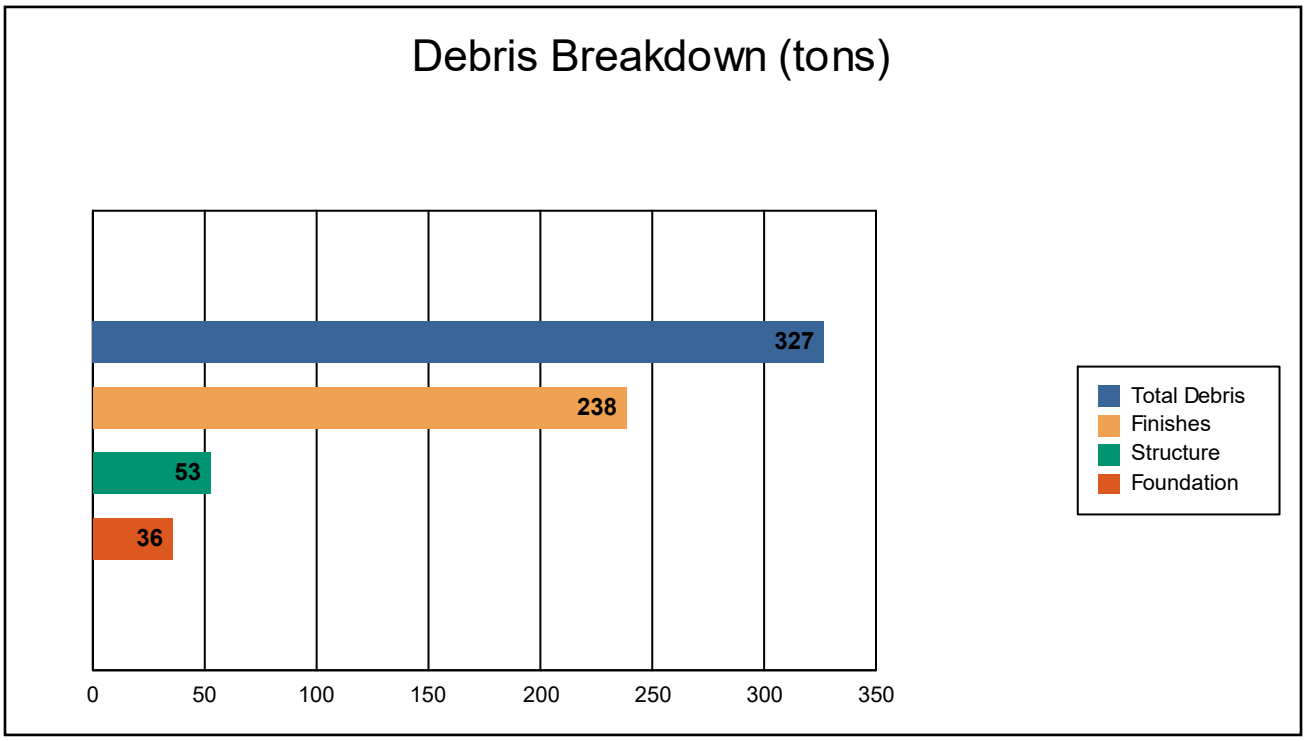
(1) None of your facilities were flooded. This can be checked by mapping the inventory data on the depth grid.

(2) The analysis was not run. This can be tested by checking the run box on the Analysis Menu and seeing if a message box asks you to replace the existing results.

Induced Flood Damage

Debris Generation

Hazus estimates the amount of debris that will be generated by the flood. The model breaks debris into three general categories: 1) Finishes (dry wall, insulation, etc.), 2) Structural (wood, brick, etc.) and 3) Foundations (concrete slab, concrete block, rebar, etc.). This distinction is made because of the different types of material handling equipment required to handle the debris.

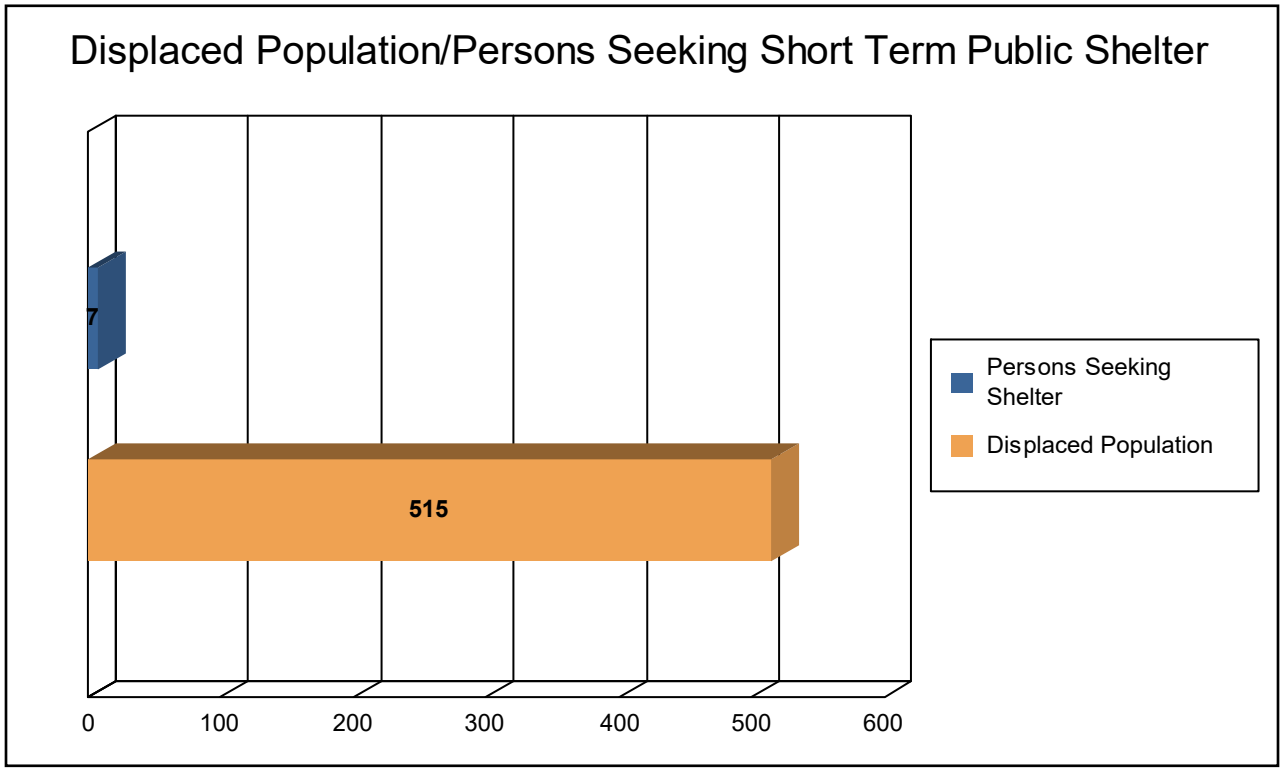


The model estimates that a total of 327 tons of debris will be generated. Of the total amount, Finishes comprises 73% of the total, Structure comprises 16% of the total, and Foundation comprises 11%. If the debris tonnage is converted into an estimated number of truckloads, it will require 14 truckloads (@25 tons/truck) to remove the debris generated by the flood.

Social Impact

Shelter Requirements

Hazus estimates the number of households that are expected to be displaced from their homes due to the flood and the associated potential evacuation. Hazus also estimates those displaced people that will require accommodations in temporary public shelters. The model estimates 172 households (or 515 of people) will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 7 people (out of a total population of 12,959) will seek temporary shelter in public shelters.



Economic Loss

The total economic loss estimated for the flood is 34.32 million dollars, which represents 2.90 % of the total replacement value of the scenario buildings.

Building-Related Losses

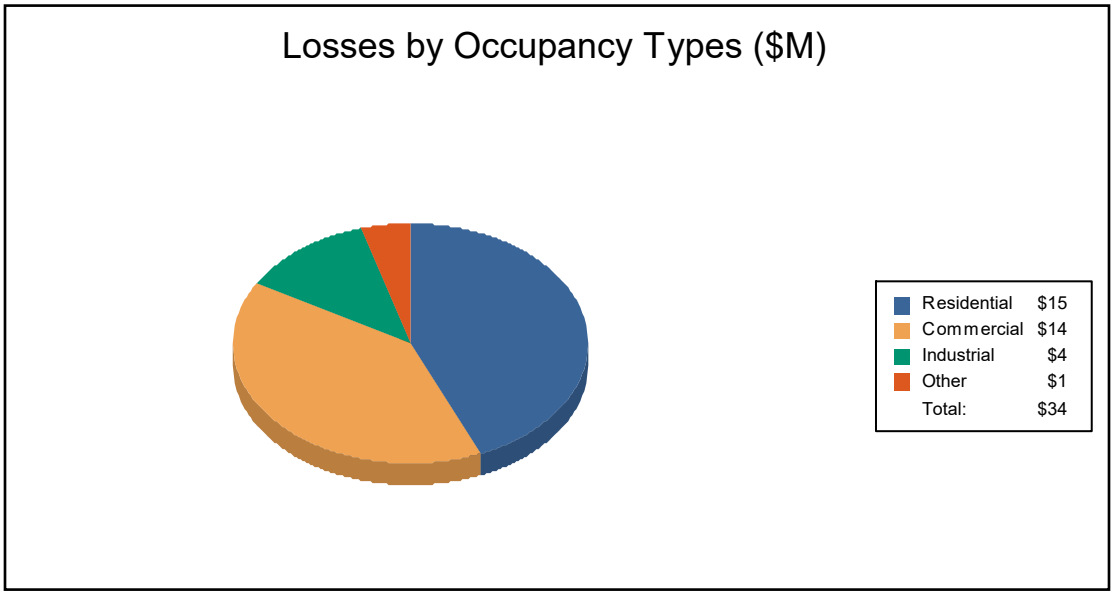
The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the flood. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the flood.

The total building-related losses were 20.34 million dollars. 41% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 43.49% of the total loss. Table 6 below provides a summary of the losses associated with the building damage.

Table 6: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss						
	Building	7.82	1.24	1.01	0.07	10.14
	Content	3.28	3.57	2.35	0.45	9.65
	Inventory	0.00	0.07	0.47	0.00	0.55
	Subtotal	**11.10**	**4.88**	**3.84**	**0.52**	**20.34**
Business Interruption						
	Income	0.01	3.50	0.10	0.22	3.82
	Relocation	2.93	0.87	0.12	0.04	3.96
	Rental Income	0.87	0.65	0.04	0.00	1.55
	Wage	0.02	3.74	0.18	0.71	4.65
	Subtotal	**3.82**	**8.76**	**0.44**	**0.97**	**13.98**
ALL	**Total**	**14.93**	**13.64**	**4.27**	**1.48**	**34.32**



Appendix A: County Listing for the Region

Connecticut

- Middlesex

Appendix B: Regional Population and Building Value Data

	Population	Building Value (thousands of dollars)		
		Residential	Non-Residential	Total
Connecticut				
Middlesex	12,959	1,786,021	248,376	2,034,397
Total	**12,959**	**1,786,021**	**248,376**	**2,034,397**
Total Study Region	**12,959**	**1,786,021**	**248,376**	**2,034,397**

Hazus: Hurricane Global Risk Report

Region Name: EastHampton

Hurricane Scenario: UN-NAMED-1938-4

Print Date: Monday, October 14, 2019

Disclaimer:
This version of Hazus utilizes 2010 Census Data.
Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific Hurricane. These results can be improved by using enhanced inventory data.

Table of Contents

General Description of the Region

Hazus is a regional multi-hazard loss estimation model that was developed by the Federal Emergency Management Agency and the National Institute of Building Sciences. The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The hurricane loss estimates provided in this report are based on a region that includes 1 county(ies) from the following state(s):

- Connecticut

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 36.90 square miles and contains 3 census tracts. There are over 5 thousand households in the region and a total population of 12,959 people (2010 Census Bureau data). The distribution of population by State and County is provided in Appendix B.

There are an estimated 5 thousand buildings in the region with a total building replacement value (excluding contents) of 2,034 million dollars (2014 dollars). Approximately 93% of the buildings (and 88% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

Hazus estimates that there are 5,356 buildings in the region which have an aggregate total replacement value of 2,034 million (2014 dollars). Table 1 presents the relative distribution of the value with respect to the general occupancies. Appendix B provides a general distribution of the building value by State and County.

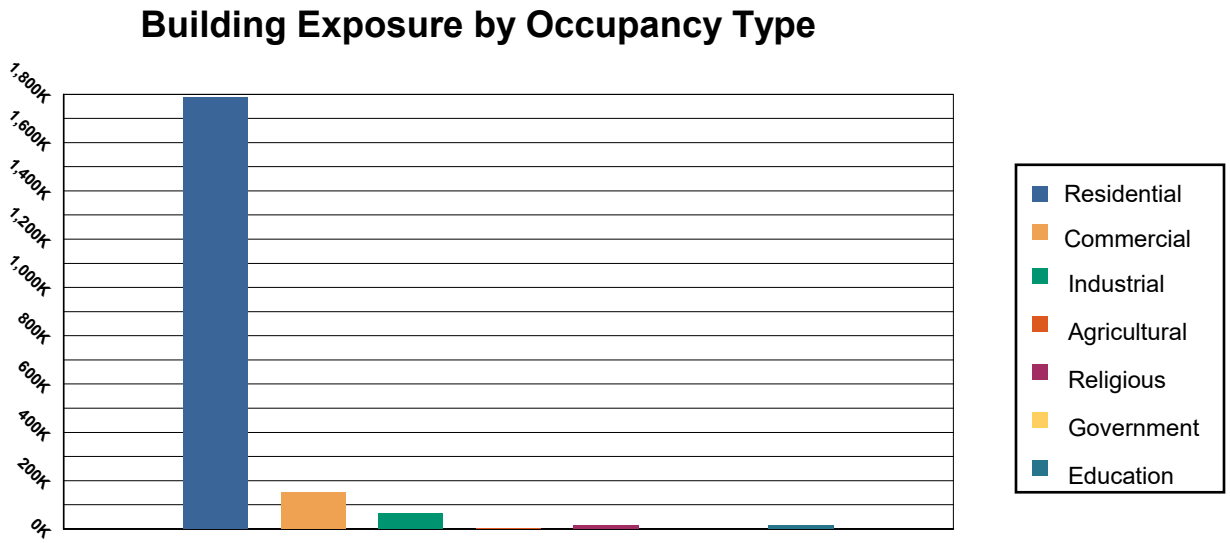


Table 1: Building Exposure by Occupancy Type

Occupancy	Exposure ($1000)	Percent of Tot
Residential	1,786,021	87.79%
Commercial	152,725	7.51%
Industrial	66,779	3.28%
Agricultural	2,431	0.12%
Religious	12,880	0.63%
Government	475	0.02%
Education	13,086	0.64%
Total	**2,034,397**	**100.00%**

Essential Facility Inventory

For essential facilities, there are no hospitals in the region with a total bed capacity of no beds. There are 5 schools, 3 fire stations, 1 police stations and 1 emergency operation facilities.

Hurricane Scenario

Hazus used the following set of information to define the hurricane parameters for the hurricane loss estimate provided in this report.

Scenario Name:	UN-NAMED-1938-4
Type:	Historic
Max Peak Gust in Study Region:	111 mph

Building Damage

General Building Stock Damage

Hazus estimates that about 294 buildings will be at least moderately damaged. This is over 5% of the total number of buildings in the region. There are an estimated 12 buildings that will be completely destroyed. The definition of the 'damage states' is provided in the Hazus Hurricane technical manual. Table 2 below summarizes the expected damage by general occupancy for the buildings in the region. Table 3 summarizes the expected damage by general building type.

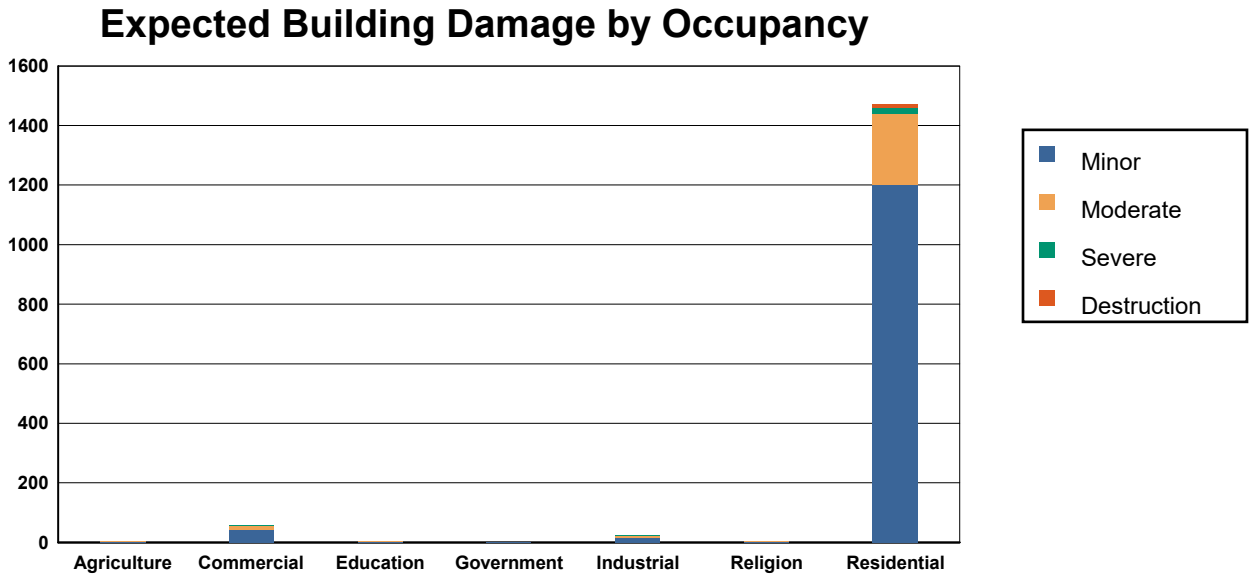


Table 2: Expected Building Damage by Occupancy

	None		Minor		Moderate		Severe		Destruction	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	7.94	72.14	2.10	19.12	0.62	5.65	0.30	2.73	0.04	0.36
Commercial	183.25	76.04	42.20	17.51	13.57	5.63	1.98	0.82	0.01	0.01
Education	13.78	76.55	3.18	17.65	0.96	5.33	0.08	0.46	0.00	0.00
Government	1.43	71.63	0.39	19.34	0.16	8.03	0.02	1.01	0.00	0.00
Industrial	74.82	76.35	16.28	16.61	5.55	5.66	1.23	1.25	0.12	0.13
Religion	12.16	76.00	3.07	19.16	0.72	4.48	0.06	0.35	0.00	0.00
Residential	3,500.57	70.43	1,200.91	24.16	239.54	4.82	17.36	0.35	11.61	0.23
Total	**3,793.95**		**1,268.12**		**261.11**		**21.03**		**11.79**	

Table 3: Expected Building Damage by Building Type

Building Type	None		Minor		Moderate		Severe		Destruction	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	15	74.39	4	18.18	1	7.04	0	0.38	0	0.00
Masonry	187	69.73	54	20.10	25	9.22	2	0.81	0	0.14
MH	81	86.20	7	7.18	4	4.61	0	0.25	2	1.77
Steel	133	77.65	27	15.62	10	5.73	2	0.99	0	0.01
Wood	3,287	70.64	1,141	24.53	199	4.27	16	0.35	10	0.21

Essential Facility Damage

Before the hurricane, the region had no hospital beds available for use. On the day of the hurricane, the model estimates that 0 hospital beds (0%) are available for use by patients already in the hospital and those injured by the hurricane. After one week, none of the beds will be in service. By 30 days, none will be operational.

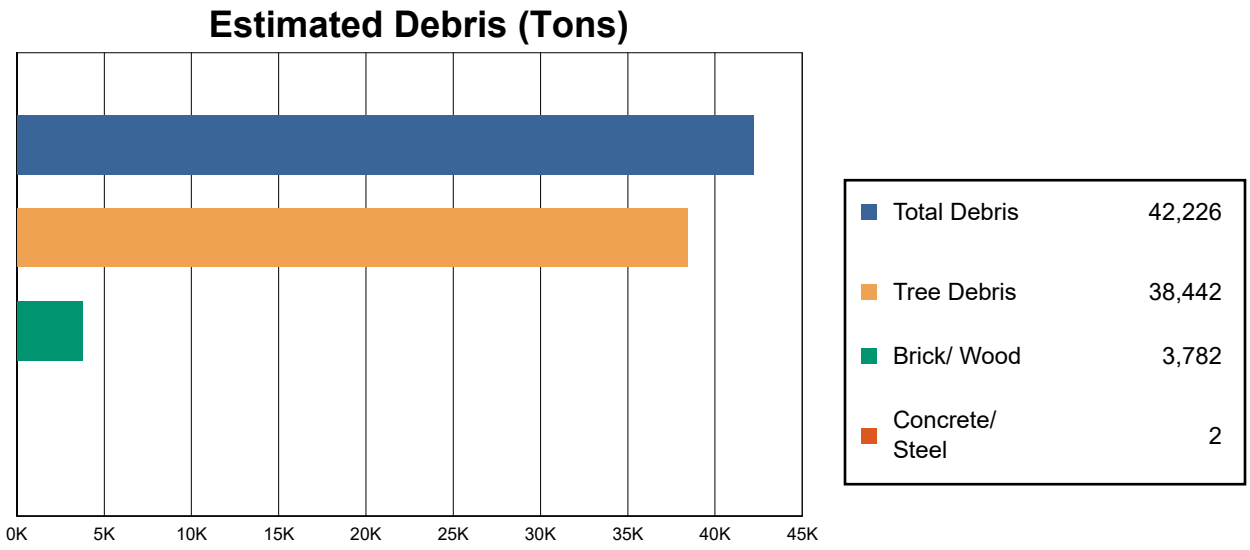
Thematic Map of Essential Facilities with greater than 50% moderate

Table 4: Expected Damage to Essential Facilities

		# Facilities		
Classification	Total	Probability of at Least Moderate Damage > 50%	Probability of Complete Damage > 50%	Expected Loss of Use < 1 day
EOCs	1	0	0	1
Fire Stations	3	0	0	3
Police Stations	1	0	0	1
Schools	5	0	0	3

Induced Hurricane Damage

Debris Generation

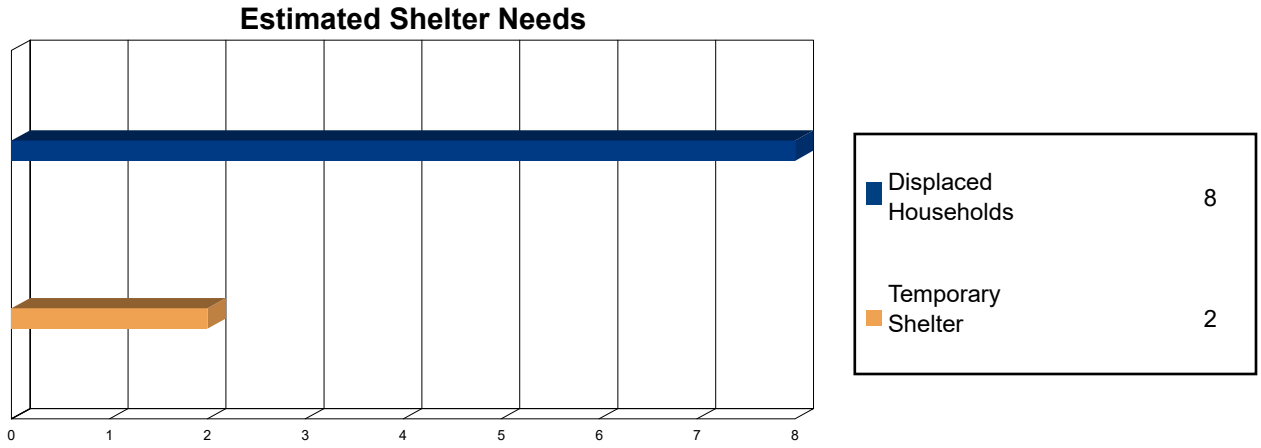


Hazus estimates the amount of debris that will be generated by the hurricane. The model breaks the debris into four general categories: a) Brick/Wood, b) Reinforced Concrete/Steel, c) Eligible Tree Debris, and d) Other Tree Debris. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 42,226 tons of debris will be generated. Of the total amount, 32,642 tons (77%) is Other Tree Debris. Of the remaining 9,584 tons, Brick/Wood comprises 39% of the total, Reinforced Concrete/Steel comprises of 0% of the total, with the remainder being Eligible Tree Debris. If the building debris tonnage is converted to an estimated number of truckloads, it will require 151 truckloads (@25 tons/truck) to remove the building debris generated by the hurricane. The number of Eligible Tree Debris truckloads will depend on how the 5,800 tons of Eligible Tree Debris are collected and processed. The volume of tree debris generally ranges from about 4 cubic yards per ton for chipped or compacted tree debris to about 10 cubic yards per ton for bulkier, uncompacted debris.

Social Impact

Shelter Requirement



Hazus estimates the number of households that are expected to be displaced from their homes due to the hurricane and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 8 households to be displaced due to the hurricane. Of these, 2 people (out of a total population of 12,959) will seek temporary shelter in public shelters.

Economic Loss

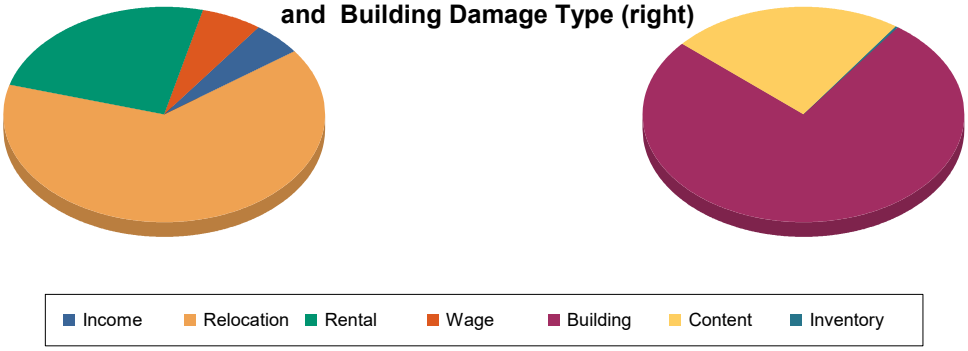
The total economic loss estimated for the hurricane is 64.4 million dollars, which represents 3.17 % of the total replacement value of the region's buildings.

Building-Related Losses

The building related losses are broken into two categories: direct property damage losses and business interruption losses. The direct property damage losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the hurricane. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the hurricane.

The total property damage losses were 64 million dollars. 7% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 93% of the total loss. Table 5 below provides a summary of the losses associated with the building damage.

Loss by Business Interruption Type (left) and Building Damage Type (right)



Loss Type by General Occupancy

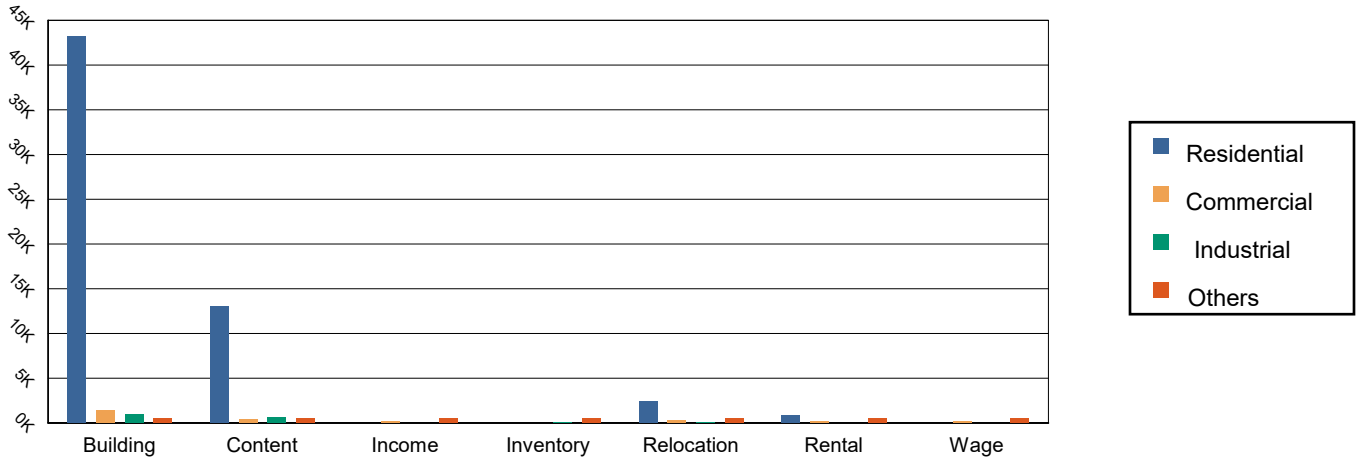


Table 5: Building-Related Economic Loss Estimates

(Thousands of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Property Damage						
	Building	43,234.74	1,433.00	956.74	271.56	45,896.04
	Content	13,090.00	399.82	607.57	68.62	14,166.01
	Inventory	0.00	9.57	97.67	1.79	109.02
	Subtotal	**56,324.74**	**1,842.39**	**1,661.97**	**341.97**	**60,171.08**
Business Interruption Loss						
	Income	0.00	179.79	10.52	27.60	217.91
	Relocation	2,409.96	243.02	50.70	45.63	2,749.31
	Rental	883.46	142.04	9.01	3.28	1,037.79
	Wage	0.00	174.77	17.63	69.15	261.55
	Subtotal	**3,293.42**	**739.62**	**87.86**	**145.66**	**4,266.56**

Total

Total	**59,618.16**	**2,582.01**	**1,749.83**	**487.63**	**64,437.64**

Appendix A: County Listing for the Region

Connecticut
- Middlesex

Appendix B: Regional Population and Building Value Data

		Building Value (thousands of dollars)		
	Population	Residential	Non-Residential	Total
Connecticut				
Middlesex	12,959	1,786,021	248,376	2,034,397
Total	**12,959**	**1,786,021**	**248,376**	**2,034,397**
Study Region Total	**12,959**	**1,786,021**	**248,376**	**2,034,397**

Hazus: Hurricane Global Risk Report

Region Name: EastHampton

Hurricane Scenario: Probabilistic 10-year Return Period

Print Date: Tuesday, October 1, 2019

Disclaimer:
This version of Hazus utilizes 2010 Census Data.
Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific Hurricane. These results can be improved by using enhanced inventory data.

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The hurricane loss estimates provided in this report are based on a region that includes 1 county(ies) from the following state(s):

- Connecticut

Note:
Appendix A contains a complete listing of the counties contained in the region.

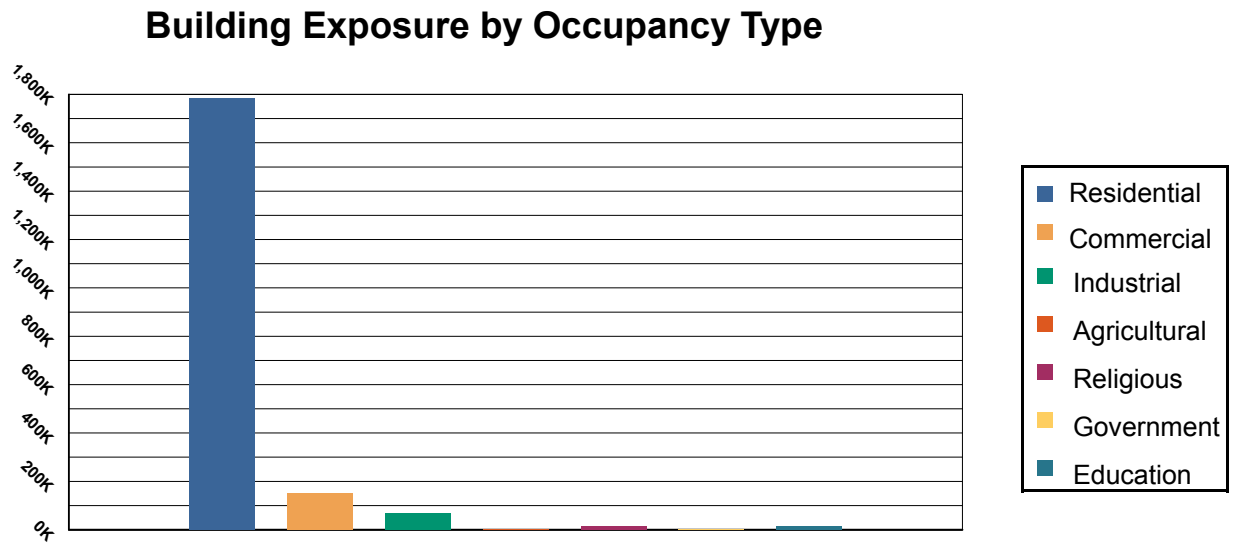
The geographical size of the region is 36.90 square miles and contains 3 census tracts. There are over 5 thousand households in the region and a total population of 12,959 people (2010 Census Bureau data). The distribution of population by State and County is provided in Appendix B.

There are an estimated 5 thousand buildings in the region with a total building replacement value (excluding contents) of 2,034 million dollars (2014 dollars). Approximately 93% of the buildings (and 88% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

Hazus estimates that there are 5,356 buildings in the region which have an aggregate total replacement value of 2,034 million (2014 dollars). Table 1 presents the relative distribution of the value with respect to the general occupancies. Appendix B provides a general distribution of the building value by State and County.



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Residential	1,786,021	87.79 %
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Agricultural	2,431	0.12%
Religious	12,880	0.63%
Government	475	0.02%
Education	13,086	0.64%
Total	**2,034,397**	**100.00%**

Essential Facility Inventory

For essential facilities, there are no hospitals in the region with a total bed capacity of no beds. There are 5 schools, 3 fire stations, 1 police stations and 1 emergency operation facilities.

Hurricane Scenario

Hazus used the following set of information to define the hurricane parameters for the hurricane loss estimate provided in this report.

Scenario Name:	Probabilistic
Type:	Probabilistic

Building Damage

General Building Stock Damage

Hazus estimates that about 0 buildings will be at least moderately damaged. This is over 0% of the total number of buildings in the region. There are an estimated 0 buildings that will be completely destroyed. The definition of the 'damage states' is provided in the Hazus Hurricane technical manual. Table 2 below summarizes the expected damage by general occupancy for the buildings in the region. Table 3 summarizes the expected damage by general building type.

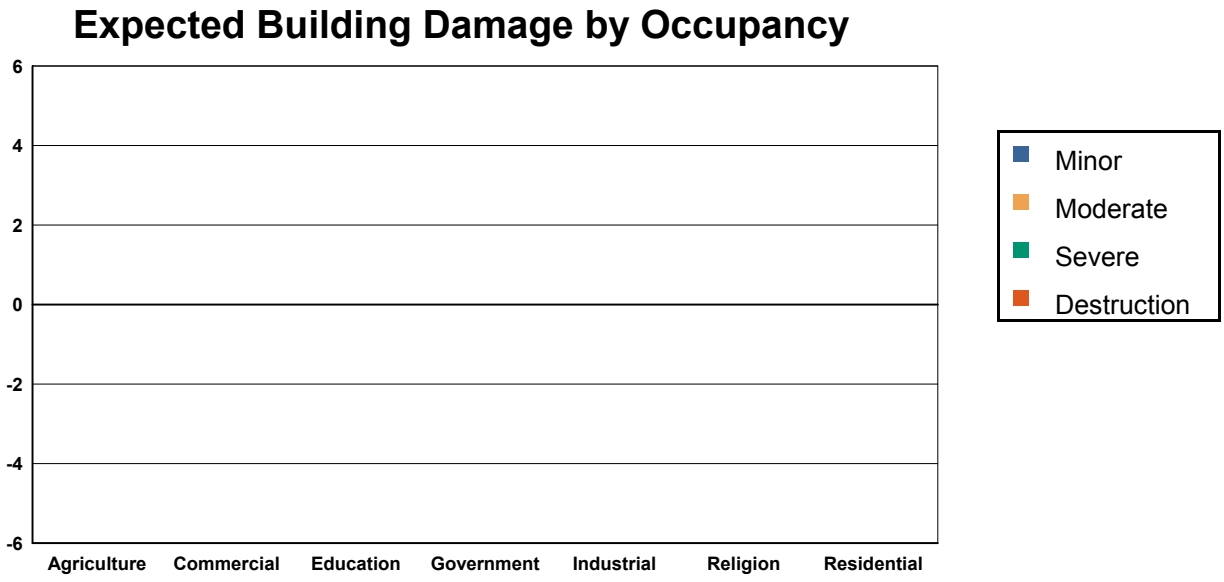


Table 2: Expected Building Damage by Occupancy : 10 - year Event

	None		Minor		Moderate		Severe		Destruction	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	11.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Commercial	241.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Education	18.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Government	2.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Industrial	98.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Religion	16.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Residential	4,970.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**5,356.00**		**0.00**		**0.00**		**0.00**		**0.00**	

Table 3: Expected Building Damage by Building Type : 10 - year Event

Building Type	None		Minor		Moderate		Severe		Destruction	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	20	100.00	0	0.00	0	0.00	0	0.00	0	0.00
Masonry	268	100.00	0	0.00	0	0.00	0	0.00	0	0.00
MH	94	100.00	0	0.00	0	0.00	0	0.00	0	0.00
Steel	171	100.00	0	0.00	0	0.00	0	0.00	0	0.00
Wood	4,653	100.00	0	0.00	0	0.00	0	0.00	0	0.00

Essential Facility Damage

Before the hurricane, the region had no hospital beds available for use. On the day of the hurricane, the model estimates that 0 hospital beds (0%) are available for use by patients already in the hospital and those injured by the hurricane. After one week, none of the beds will be in service. By 30 days, none will be operational.

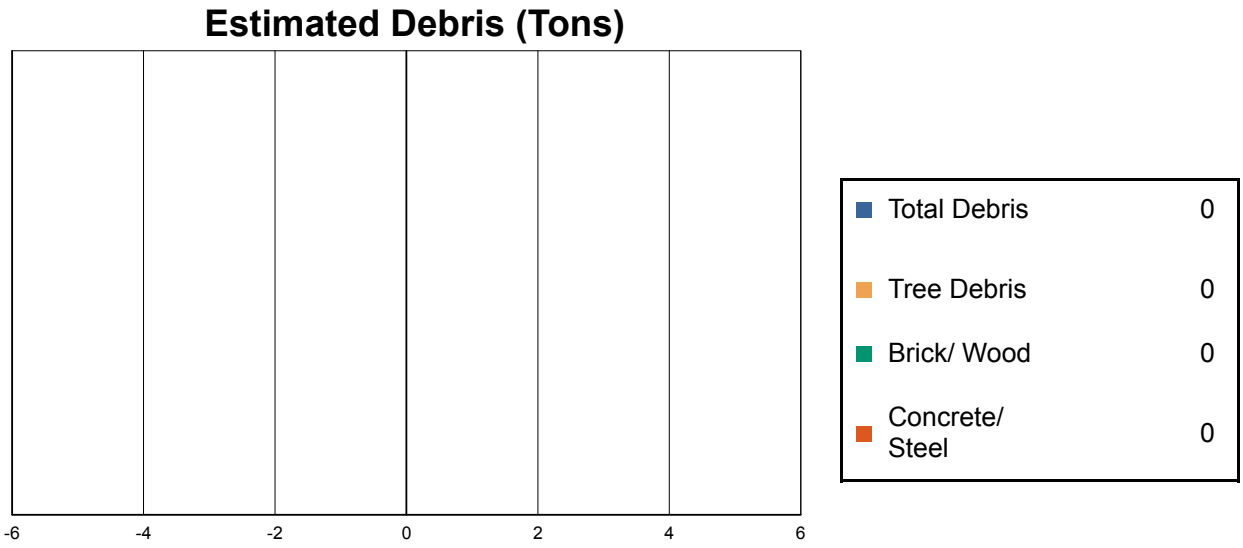
Thematic Map of Essential Facilities with greater than 50% moderate

Table 4: Expected Damage to Essential Facilities

		# Facilities		
Classification	**Total**	**Probability of at Least Moderate Damage > 50%**	**Probability of Complete Damage > 50%**	**Expected Loss of Use < 1 day**
EOCs	1	0	0	1
Fire Stations	3	0	0	3
Police Stations	1	0	0	1
Schools	5	0	0	5

Induced Hurricane Damage

Debris Generation

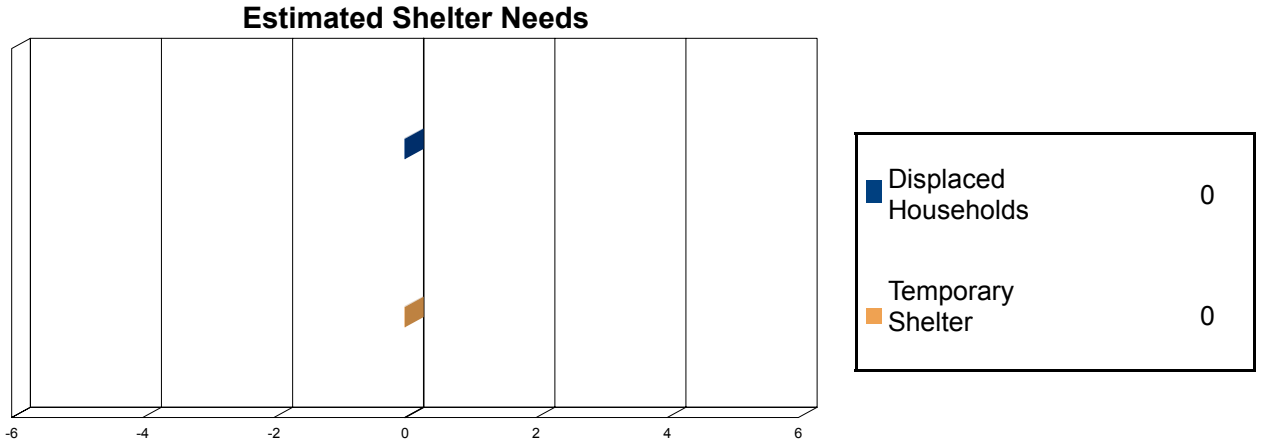


Hazus estimates the amount of debris that will be generated by the hurricane. The model breaks the debris into four general categories: a) Brick/Wood, b) Reinforced Concrete/Steel, c) Eligible Tree Debris, and d) Other Tree Debris. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 0 tons of debris will be generated. Of the total amount, 0 tons (0%) is Other Tree Debris. Of the remaining 0 tons, Brick/Wood comprises 0% of the total, Reinforced Concrete/Steel comprises of 0% of the total, with the remainder being Eligible Tree Debris. If the building debris tonnage is converted to an estimated number of truckloads, it will require 0 truckloads (@25 tons/truck) to remove the building debris generated by the hurricane. The number of Eligible Tree Debris truckloads will depend on how the 0 tons of Eligible Tree Debris are collected and processed. The volume of tree debris generally ranges from about 4 cubic yards per ton for chipped or compacted tree debris to about 10 cubic yards per ton for bulkier, uncompacted debris.

Social Impact

Shelter Requirement



Hazus estimates the number of households that are expected to be displaced from their homes due to the hurricane and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 0 households to be displaced due to the hurricane. Of these, 0 people (out of a total population of 12,959) will seek temporary shelter in public shelters.

Economic Loss

The total economic loss estimated for the hurricane is 0.0 million dollars, which represents 0.00 % of the total replacement value of the region's buildings.

Building-Related Losses

The building related losses are broken into two categories: direct property damage losses and business interruption losses. The direct property damage losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the hurricane. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the hurricane.

The total property damage losses were 0 million dollars. 0% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 0% of the total loss. Table 5 below provides a summary of the losses associated with the building damage.

Loss by Business Interruption Type (left) and Building Damage Type (right)

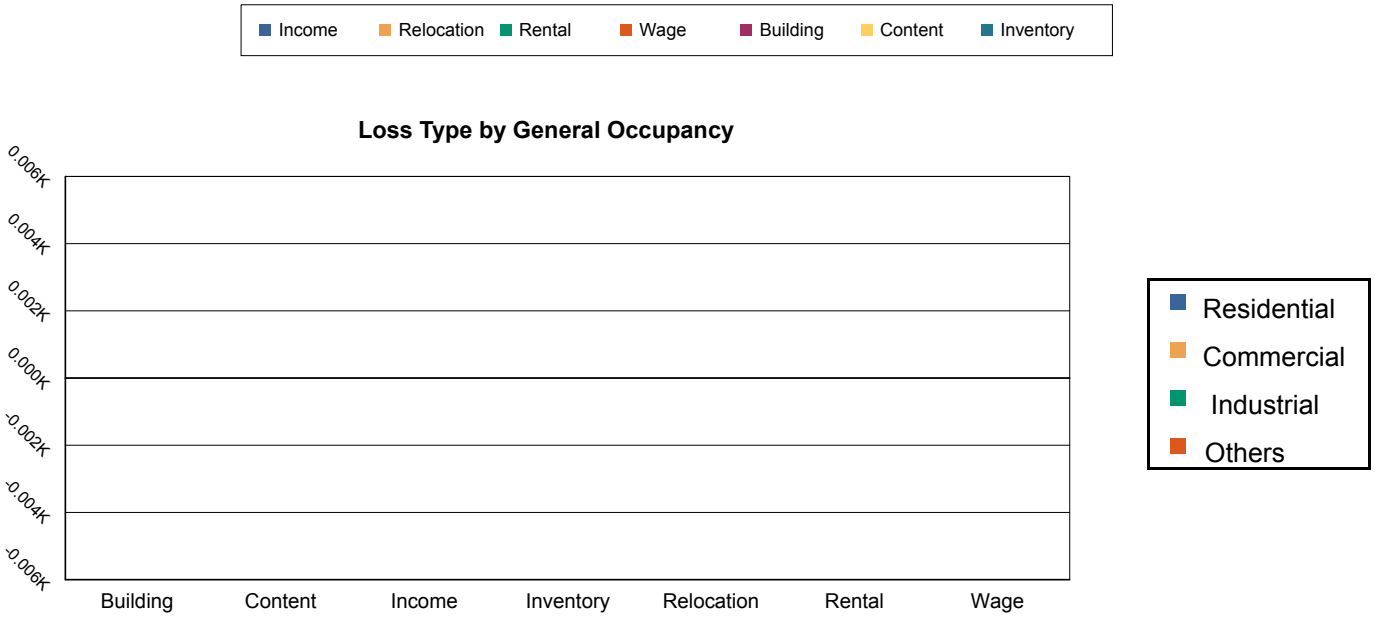


Table 5: Building-Related Economic Loss Estimates

(Thousands of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Property Damage						
	Building	0.00	0.00	0.00	0.00	0.00
	Content	0.00	0.00	0.00	0.00	0.00
	Inventory	0.00	0.00	0.00	0.00	0.00
	Subtotal	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Business Interruption Loss						
	Income	0.00	0.00	0.00	0.00	0.00
	Relocation	0.00	0.00	0.00	0.00	0.00
	Rental	0.00	0.00	0.00	0.00	0.00
	Wage	0.00	0.00	0.00	0.00	0.00
	Subtotal	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Total

Total	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Appendix A: County Listing for the Region

Connecticut
- Middlesex

Appendix B: Regional Population and Building Value Data

	Population	Building Value (thousands of dollars)		
		Residential	Non-Residential	Total
Connecticut				
Middlesex	12,959	1,786,021	248,376	2,034,397
Total	**12,959**	**1,786,021**	**248,376**	**2,034,397**
Study Region Total	**12,959**	**1,786,021**	**248,376**	**2,034,397**

Hazus: Hurricane Global Risk Report

Region Name: EastHampton

Hurricane Scenario: Probabilistic 20-year Return Period

Print Date: Tuesday, October 1, 2019

Disclaimer:
This version of Hazus utilizes 2010 Census Data.
Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific Hurricane. These results can be improved by using enhanced inventory data.

Table of Contents

General Description of the Region

Hazus is a regional multi-hazard loss estimation model that was developed by the Federal Emergency Management Agency and the National Institute of Building Sciences. The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The hurricane loss estimates provided in this report are based on a region that includes 1 county(ies) from the following state(s):

- Connecticut

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 36.90 square miles and contains 3 census tracts. There are over 5 thousand households in the region and a total population of 12,959 people (2010 Census Bureau data). The distribution of population by State and County is provided in Appendix B.

There are an estimated 5 thousand buildings in the region with a total building replacement value (excluding contents) of 2,034 million dollars (2014 dollars). Approximately 93% of the buildings (and 88% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

Hazus estimates that there are 5,356 buildings in the region which have an aggregate total replacement value of 2,034 million (2014 dollars). Table 1 presents the relative distribution of the value with respect to the general occupancies. Appendix B provides a general distribution of the building value by State and County.

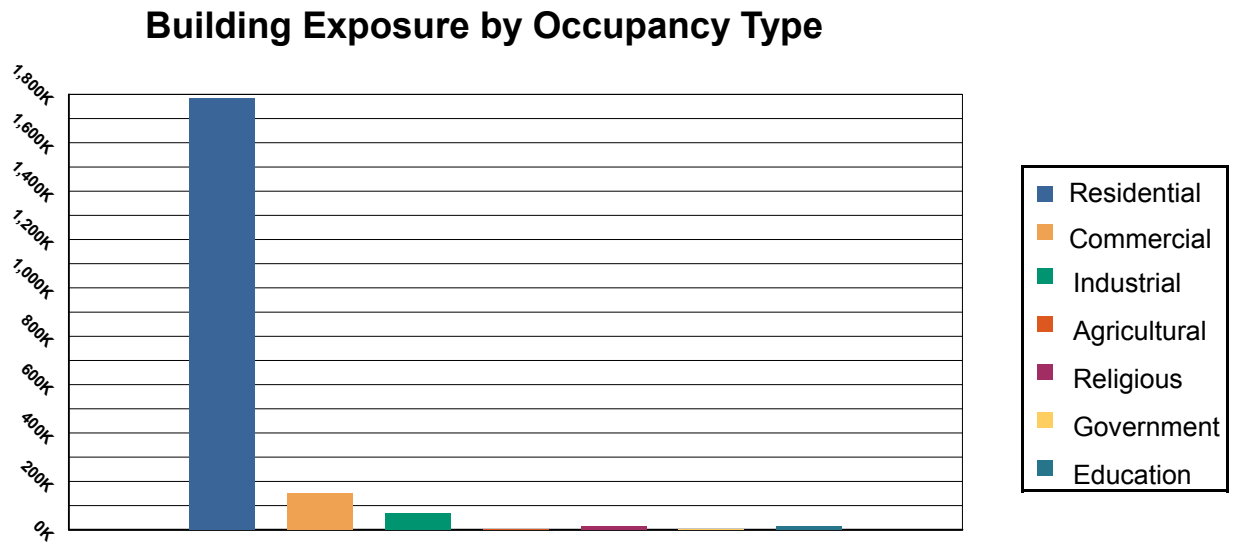


Table 1: Building Exposure by Occupancy Type

Occupancy	Exposure ($1000)	Percent of Tot
Residential	1,786,021	87.79 %
Commercial	152,725	7.51%
Industrial	66,779	3.28%
Agricultural	2,431	0.12%
Religious	12,880	0.63%
Government	475	0.02%
Education	13,086	0.64%
Total	**2,034,397**	**100.00%**

Essential Facility Inventory

For essential facilities, there are no hospitals in the region with a total bed capacity of no beds. There are 5 schools, 3 fire stations, 1 police stations and 1 emergency operation facilities.

Hurricane Scenario

Hazus used the following set of information to define the hurricane parameters for the hurricane loss estimate provided in this report.

Scenario Name:	Probabilistic
Type:	Probabilistic

Building Damage

General Building Stock Damage

Hazus estimates that about 0 buildings will be at least moderately damaged. This is over 0% of the total number of buildings in the region. There are an estimated 0 buildings that will be completely destroyed. The definition of the 'damage states' is provided in the Hazus Hurricane technical manual. Table 2 below summarizes the expected damage by general occupancy for the buildings in the region. Table 3 summarizes the expected damage by general building type.

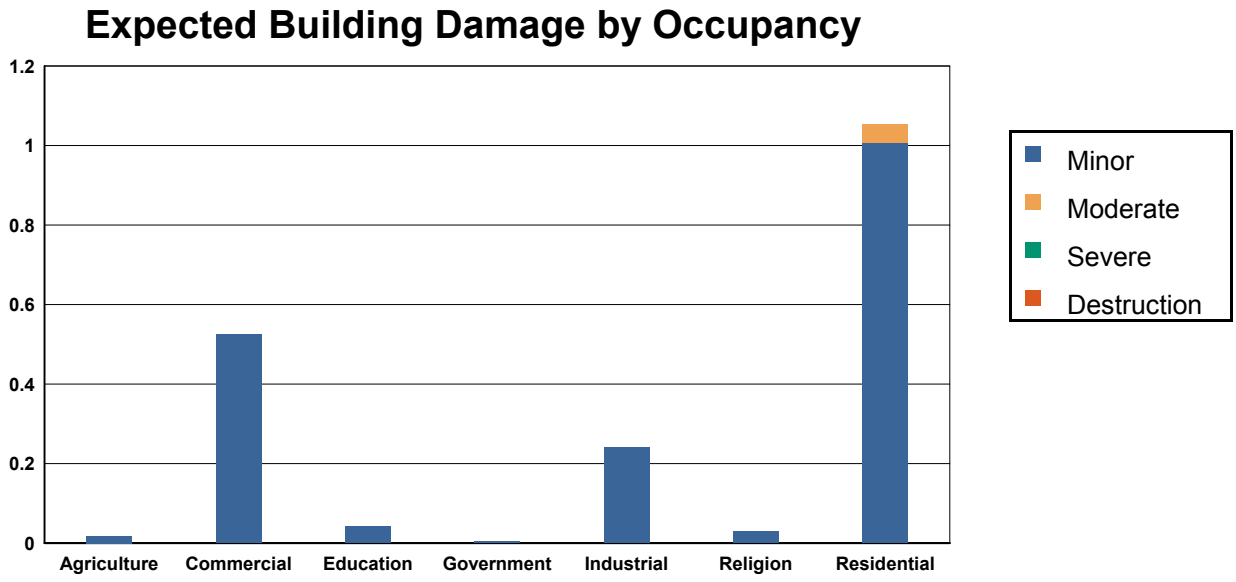


Table 2: Expected Building Damage by Occupancy : 20 - year Event

	None		Minor		Moderate		Severe		Destruction	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	10.98	99.84	0.02	0.16	0.00	0.00	0.00	0.00	0.00	0.00
Commercial	240.48	99.78	0.52	0.22	0.00	0.00	0.00	0.00	0.00	0.00
Education	17.96	99.77	0.04	0.23	0.00	0.00	0.00	0.00	0.00	0.00
Government	1.99	99.75	0.01	0.26	0.00	0.00	0.00	0.00	0.00	0.00
Industrial	97.76	99.75	0.24	0.25	0.00	0.00	0.00	0.00	0.00	0.00
Religion	15.97	99.82	0.03	0.18	0.00	0.00	0.00	0.00	0.00	0.00
Residential	4,968.95	99.98	1.01	0.02	0.05	0.00	0.00	0.00	0.00	0.00
Total	**5,354.09**		**1.86**		**0.05**		**0.00**		**0.00**	

Table 3: Expected Building Damage by Building Type : 20 - year Event

Building Type	None		Minor		Moderate		Severe		Destruction	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	20	99.71	0	0.29	0	0.00	0	0.00	0	0.00
Masonry	267	99.77	1	0.23	0	0.00	0	0.00	0	0.00
MH	94	100.00	0	0.00	0	0.00	0	0.00	0	0.00
Steel	171	99.75	0	0.25	0	0.00	0	0.00	0	0.00
Wood	4,653	99.99	0	0.01	0	0.00	0	0.00	0	0.00

Essential Facility Damage

Before the hurricane, the region had no hospital beds available for use. On the day of the hurricane, the model estimates that 0 hospital beds (0%) are available for use by patients already in the hospital and those injured by the hurricane. After one week, none of the beds will be in service. By 30 days, none will be operational.

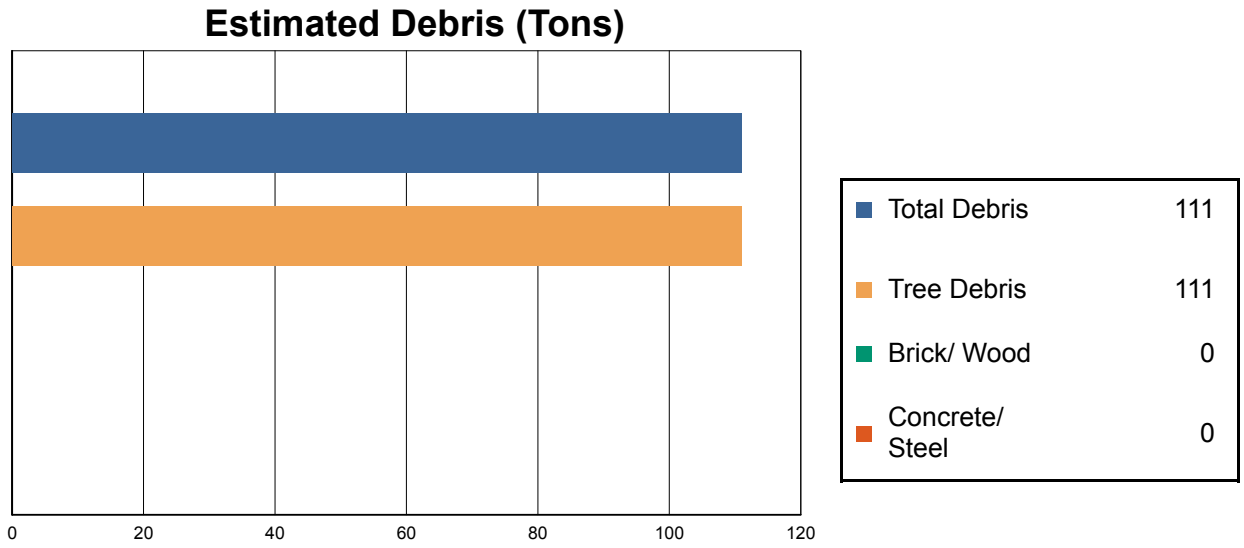
Thematic Map of Essential Facilities with greater than 50% moderate

Table 4: Expected Damage to Essential Facilities

		# Facilities		
Classification	**Total**	**Probability of at Least Moderate Damage > 50%**	**Probability of Complete Damage > 50%**	**Expected Loss of Use < 1 day**
EOCs	1	0	0	1
Fire Stations	3	0	0	3
Police Stations	1	0	0	1
Schools	5	0	0	5

Induced Hurricane Damage

Debris Generation

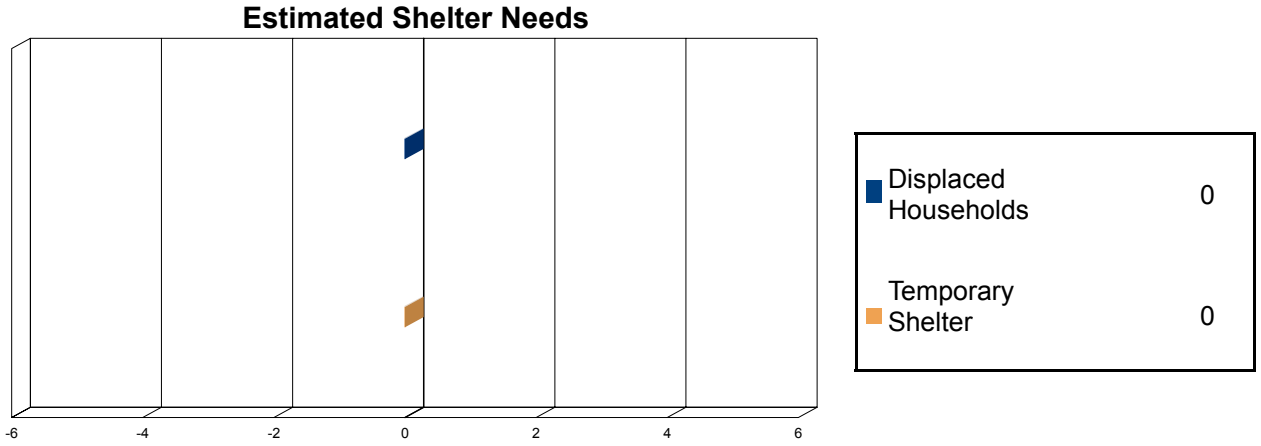


Hazus estimates the amount of debris that will be generated by the hurricane. The model breaks the debris into four general categories: a) Brick/Wood, b) Reinforced Concrete/Steel, c) Eligible Tree Debris, and d) Other Tree Debris. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 111 tons of debris will be generated. Of the total amount, 96 tons (86%) is Other Tree Debris. Of the remaining 15 tons, Brick/Wood comprises 0% of the total, Reinforced Concrete/Steel comprises of 0% of the total, with the remainder being Eligible Tree Debris. If the building debris tonnage is converted to an estimated number of truckloads, it will require 0 truckloads (@25 tons/truck) to remove the building debris generated by the hurricane. The number of Eligible Tree Debris truckloads will depend on how the 15 tons of Eligible Tree Debris are collected and processed. The volume of tree debris generally ranges from about 4 cubic yards per ton for chipped or compacted tree debris to about 10 cubic yards per ton for bulkier, uncompacted debris.

Social Impact

Shelter Requirement



Hazus estimates the number of households that are expected to be displaced from their homes due to the hurricane and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 0 households to be displaced due to the hurricane. Of these, 0 people (out of a total population of 12,959) will seek temporary shelter in public shelters.

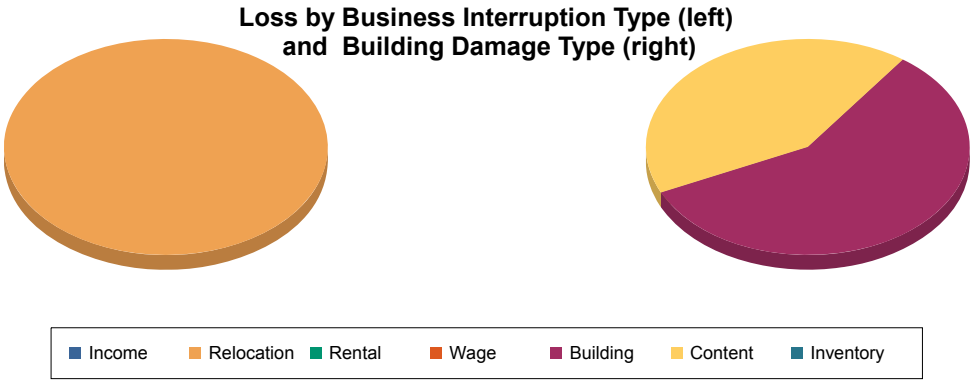
Economic Loss

The total economic loss estimated for the hurricane is 0.1 million dollars, which represents 0.00 % of the total replacement value of the region's buildings.

Building-Related Losses

The building related losses are broken into two categories: direct property damage losses and business interruption losses. The direct property damage losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the hurricane. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the hurricane.

The total property damage losses were 0 million dollars. 0% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 100% of the total loss. Table 5 below provides a summary of the losses associated with the building damage.



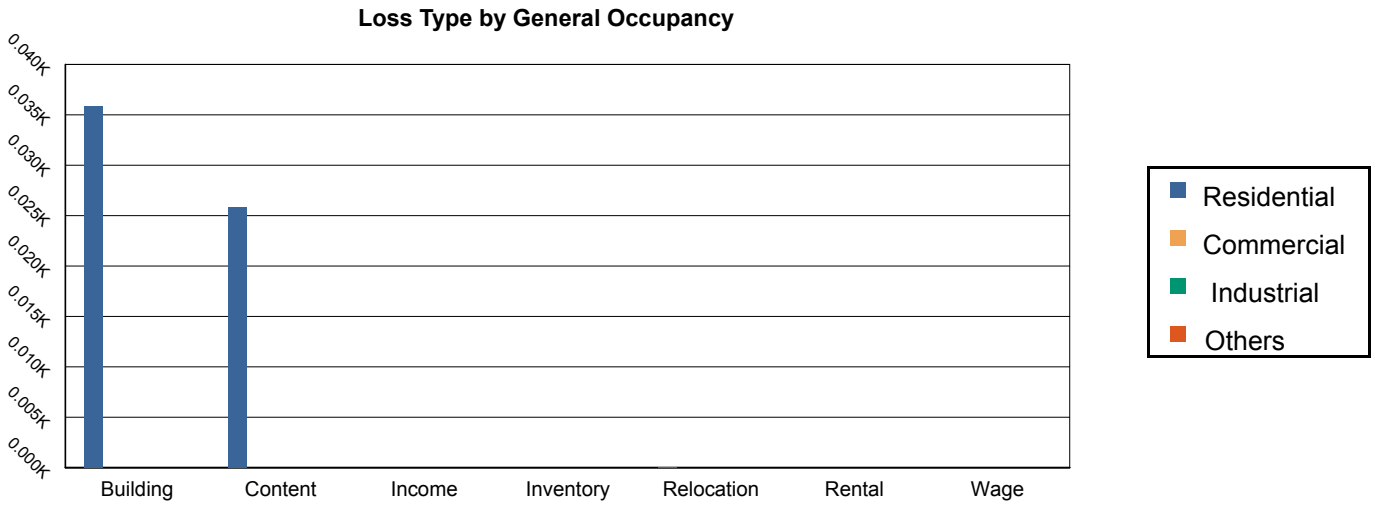


Table 5: Building-Related Economic Loss Estimates

(Thousands of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Property Damage						
	Building	35.90	0.00	0.00	0.00	35.90
	Content	25.86	0.00	0.00	0.00	25.86
	Inventory	0.00	0.00	0.00	0.00	0.00
	Subtotal	**61.75**	**0.00**	**0.00**	**0.00**	**61.75**
Business Interruption Loss						
	Income	0.00	0.00	0.00	0.00	0.00
	Relocation	0.08	0.00	0.00	0.00	0.08
	Rental	0.00	0.00	0.00	0.00	0.00
	Wage	0.00	0.00	0.00	0.00	0.00
	Subtotal	**0.08**	**0.00**	**0.00**	**0.00**	**0.08**

Total

Total	**61.84**	**0.00**	**0.00**	**0.00**	**61.84**

Appendix A: County Listing for the Region

Connecticut
- Middlesex

Appendix B: Regional Population and Building Value Data

	Population	Building Value (thousands of dollars)		
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Connecticut				
Middlesex	12,959	1,786,021	248,376	2,034,397
Total	**12,959**	**1,786,021**	**248,376**	**2,034,397**
Study Region Total	**12,959**	**1,786,021**	**248,376**	**2,034,397**

Hazus: Hurricane Global Risk Report

Region Name: EastHampton

Hurricane Scenario: Probabilistic 50-year Return Period

Print Date: Tuesday, October 1, 2019

Disclaimer:
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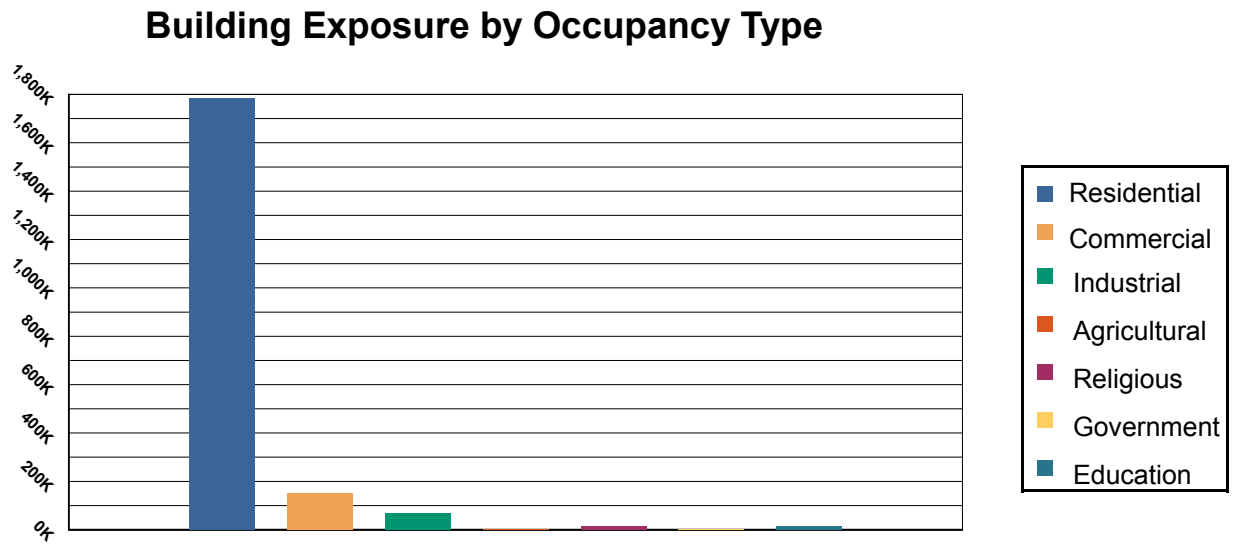
Building Inventory

General Building Stock

Hazus estimates that there are 5,356 buildings in the region which have an aggregate total replacement value of 2,034 million (2014 dollars). Table 1 presents the relative distribution of the value with respect to the general occupancies. Appendix B provides a general distribution of the building value by State and County.



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Education	13,086	0.64%
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Hurricane Scenario

Hazus used the following set of information to define the hurricane parameters for the hurricane loss estimate provided in this report.

Scenario Name:	Probabilistic
Type:	Probabilistic

Building Damage

General Building Stock Damage

Hazus estimates that about 1 buildings will be at least moderately damaged. This is over 0% of the total number of buildings in the region. There are an estimated 0 buildings that will be completely destroyed. The definition of the 'damage states' is provided in the Hazus Hurricane technical manual. Table 2 below summarizes the expected damage by general occupancy for the buildings in the region. Table 3 summarizes the expected damage by general building type.

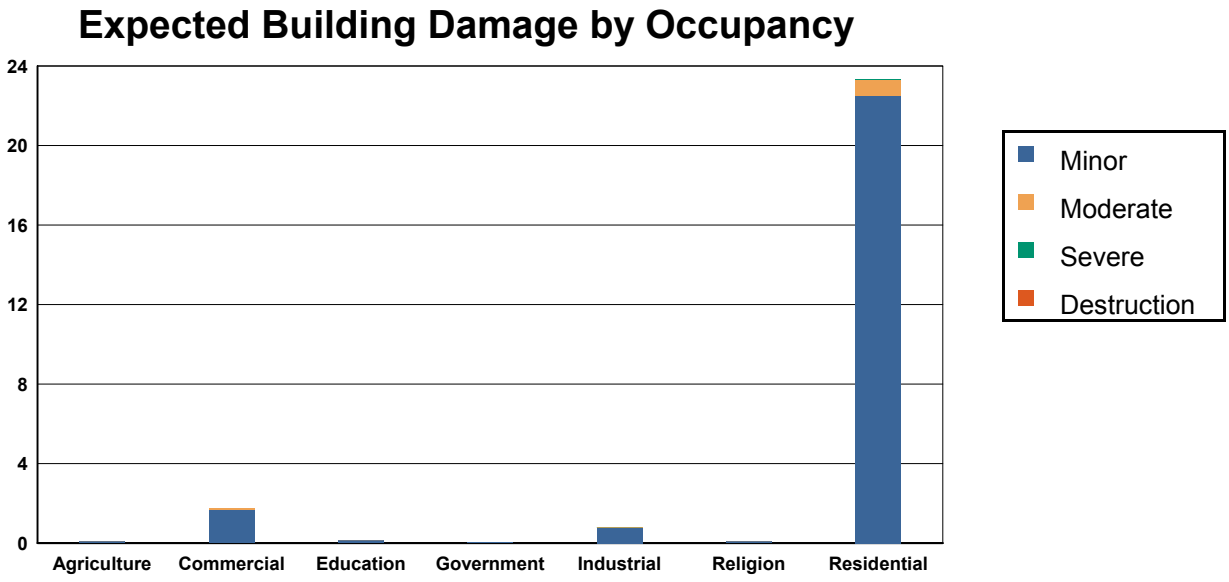


Table 2: Expected Building Damage by Occupancy : 50 - year Event

	None		Minor		Moderate		Severe		Destruction	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	10.93	99.38	0.07	0.60	0.00	0.03	0.00	0.00	0.00	0.00
Commercial	239.25	99.27	1.69	0.70	0.06	0.03	0.00	0.00	0.00	0.00
Education	17.87	99.27	0.13	0.73	0.00	0.00	0.00	0.00	0.00	0.00
Government	1.98	99.17	0.02	0.84	0.00	0.00	0.00	0.00	0.00	0.00
Industrial	97.22	99.21	0.77	0.78	0.01	0.01	0.00	0.00	0.00	0.00
Religion	15.91	99.43	0.09	0.56	0.00	0.01	0.00	0.00	0.00	0.00
Residential	4,946.67	99.53	22.50	0.45	0.80	0.02	0.02	0.00	0.00	0.00
Total	**5,329.84**		**25.26**		**0.88**		**0.03**		**0.00**	

Table 3: Expected Building Damage by Building Type : 50 - year Event

Building Type	None		Minor		Moderate		Severe		Destruction	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	20	99.04	0	0.95	0	0.00	0	0.00	0	0.00
Masonry	265	98.83	3	1.06	0	0.11	0	0.00	0	0.00
MH	94	99.99	0	0.01	0	0.01	0	0.00	0	0.00
Steel	170	99.22	1	0.76	0	0.02	0	0.00	0	0.00
Wood	4,634	99.59	19	0.40	0	0.01	0	0.00	0	0.00

Essential Facility Damage

Before the hurricane, the region had no hospital beds available for use. On the day of the hurricane, the model estimates that 0 hospital beds (0%) are available for use by patients already in the hospital and those injured by the hurricane. After one week, none of the beds will be in service. By 30 days, none will be operational.

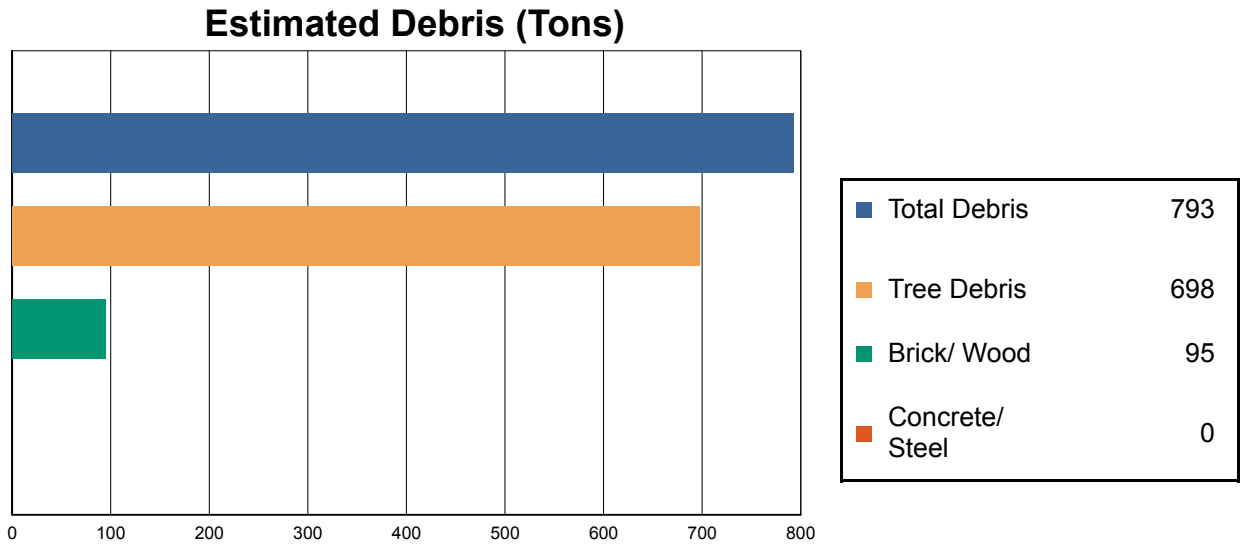
Thematic Map of Essential Facilities with greater than 50% moderate

Table 4: Expected Damage to Essential Facilities

		# Facilities		
Classification	**Total**	**Probability of at Least Moderate Damage > 50%**	**Probability of Complete Damage > 50%**	**Expected Loss of Use < 1 day**
EOCs	1	0	0	1
Fire Stations	3	0	0	3
Police Stations	1	0	0	1
Schools	5	0	0	5

Induced Hurricane Damage

Debris Generation

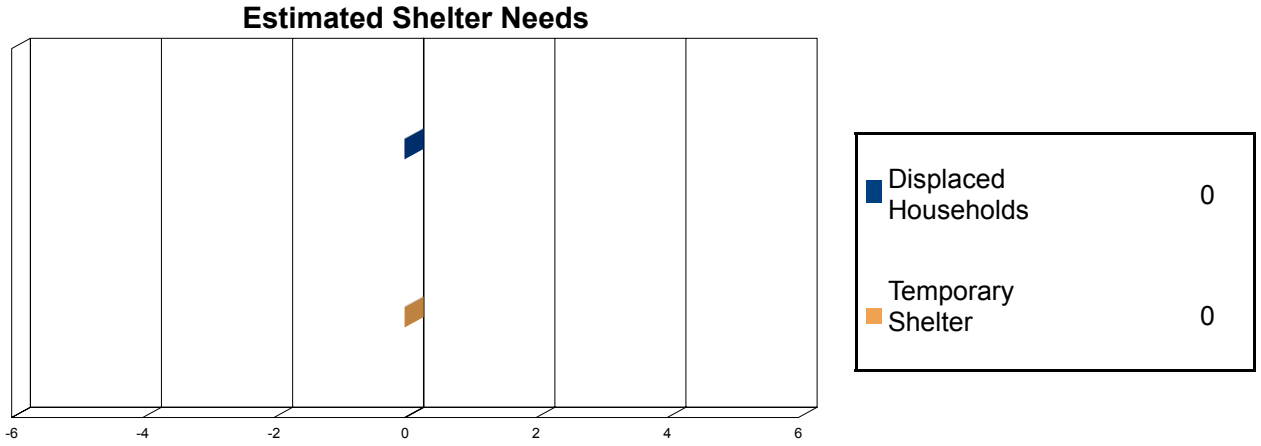


Hazus estimates the amount of debris that will be generated by the hurricane. The model breaks the debris into four general categories: a) Brick/Wood, b) Reinforced Concrete/Steel, c) Eligible Tree Debris, and d) Other Tree Debris. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 793 tons of debris will be generated. Of the total amount, 606 tons (76%) is Other Tree Debris. Of the remaining 187 tons, Brick/Wood comprises 51% of the total, Reinforced Concrete/Steel comprises of 0% of the total, with the remainder being Eligible Tree Debris. If the building debris tonnage is converted to an estimated number of truckloads, it will require 4 truckloads (@25 tons/truck) to remove the building debris generated by the hurricane. The number of Eligible Tree Debris truckloads will depend on how the 92 tons of Eligible Tree Debris are collected and processed. The volume of tree debris generally ranges from about 4 cubic yards per ton for chipped or compacted tree debris to about 10 cubic yards per ton for bulkier, uncompacted debris.

Social Impact

Shelter Requirement



Hazus estimates the number of households that are expected to be displaced from their homes due to the hurricane and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 0 households to be displaced due to the hurricane. Of these, 0 people (out of a total population of 12,959) will seek temporary shelter in public shelters.

Economic Loss

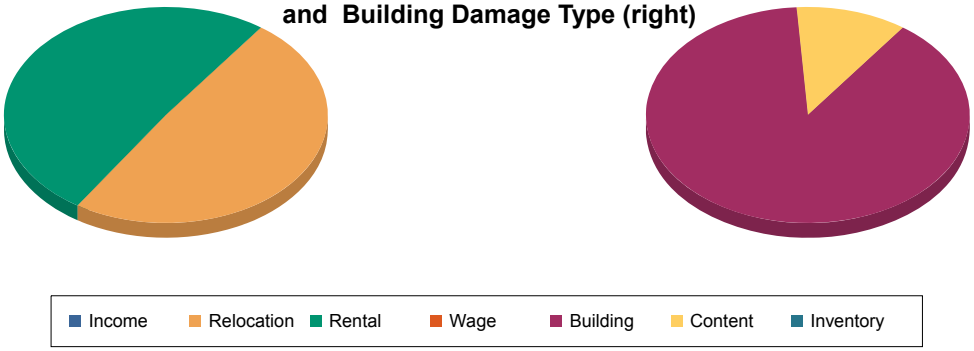
The total economic loss estimated for the hurricane is 2.7 million dollars, which represents 0.13 % of the total replacement value of the region's buildings.

Building-Related Losses

The building related losses are broken into two categories: direct property damage losses and business interruption losses. The direct property damage losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the hurricane. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the hurricane.

The total property damage losses were 3 million dollars. 0% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 98% of the total loss. Table 5 below provides a summary of the losses associated with the building damage.

Loss by Business Interruption Type (left) and Building Damage Type (right)



Loss Type by General Occupancy

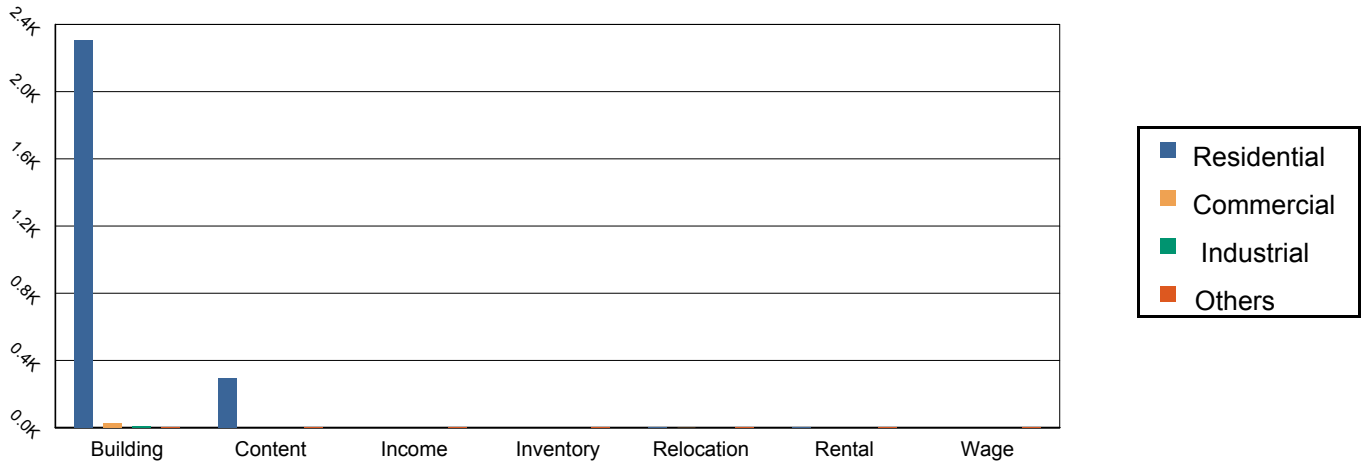


Table 5: Building-Related Economic Loss Estimates

(Thousands of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Property Damage						
	Building	2,305.84	29.80	11.13	4.65	2,351.43
	Content	297.23	0.00	0.00	0.00	297.23
	Inventory	0.00	0.00	0.00	0.00	0.00
	Subtotal	**2,603.07**	**29.80**	**11.13**	**4.65**	**2,648.66**
Business Interruption Loss						
	Income	0.00	0.00	0.00	0.00	0.00
	Relocation	4.96	0.30	0.01	0.01	5.28
	Rental	5.45	0.00	0.00	0.00	5.45
	Wage	0.00	0.00	0.00	0.00	0.00
	Subtotal	**10.41**	**0.30**	**0.01**	**0.01**	**10.73**

Total

Total	**2,613.48**	**30.10**	**11.14**	**4.66**	**2,659.39**

Appendix A: County Listing for the Region

Connecticut
- Middlesex

Appendix B: Regional Population and Building Value Data

	Population	Building Value (thousands of dollars)		
		Residential	Non-Residential	Total
Connecticut				
Middlesex	12,959	1,786,021	248,376	2,034,397
Total	**12,959**	**1,786,021**	**248,376**	**2,034,397**
Study Region Total	**12,959**	**1,786,021**	**248,376**	**2,034,397**

Hazus: Hurricane Global Risk Report

Region Name: EastHampton

Hurricane Scenario: Probabilistic 100-year Return Period

Print Date: Tuesday, October 1, 2019

Disclaimer:
This version of Hazus utilizes 2010 Census Data.
Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific Hurricane. These results can be improved by using enhanced inventory data.

Table of Contents

General Description of the Region

Hazus is a regional multi-hazard loss estimation model that was developed by the Federal Emergency Management Agency and the National Institute of Building Sciences. The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The hurricane loss estimates provided in this report are based on a region that includes 1 county(ies) from the following state(s):

- Connecticut

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 36.90 square miles and contains 3 census tracts. There are over 5 thousand households in the region and a total population of 12,959 people (2010 Census Bureau data). The distribution of population by State and County is provided in Appendix B.

There are an estimated 5 thousand buildings in the region with a total building replacement value (excluding contents) of 2,034 million dollars (2014 dollars). Approximately 93% of the buildings (and 88% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

Hazus estimates that there are 5,356 buildings in the region which have an aggregate total replacement value of 2,034 million (2014 dollars). Table 1 presents the relative distribution of the value with respect to the general occupancies. Appendix B provides a general distribution of the building value by State and County.

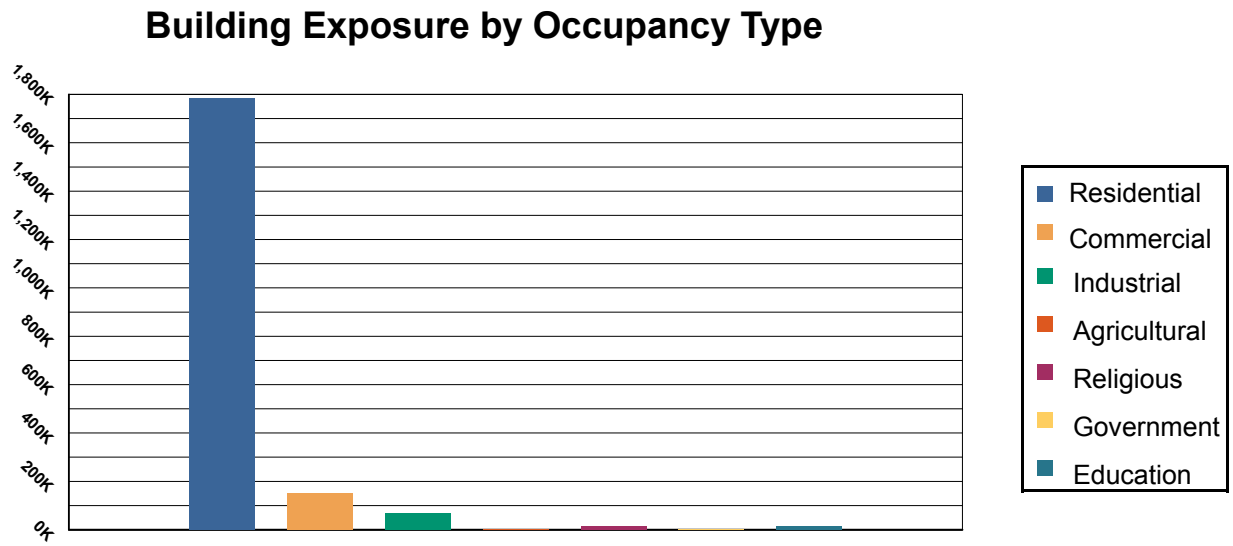


Table 1: Building Exposure by Occupancy Type

Occupancy	Exposure ($1000)	Percent of Tot
Residential	1,786,021	87.79 %
Commercial	152,725	7.51%
Industrial	66,779	3.28%
Agricultural	2,431	0.12%
Religious	12,880	0.63%
Government	475	0.02%
Education	13,086	0.64%
Total	**2,034,397**	**100.00%**

Essential Facility Inventory

For essential facilities, there are no hospitals in the region with a total bed capacity of no beds. There are 5 schools, 3 fire stations, 1 police stations and 1 emergency operation facilities.

Hurricane Scenario

Hazus used the following set of information to define the hurricane parameters for the hurricane loss estimate provided in this report.

Scenario Name:	Probabilistic
Type:	Probabilistic

Building Damage

General Building Stock Damage

Hazus estimates that about 9 buildings will be at least moderately damaged. This is over 0% of the total number of buildings in the region. There are an estimated 0 buildings that will be completely destroyed. The definition of the 'damage states' is provided in the Hazus Hurricane technical manual. Table 2 below summarizes the expected damage by general occupancy for the buildings in the region. Table 3 summarizes the expected damage by general building type.

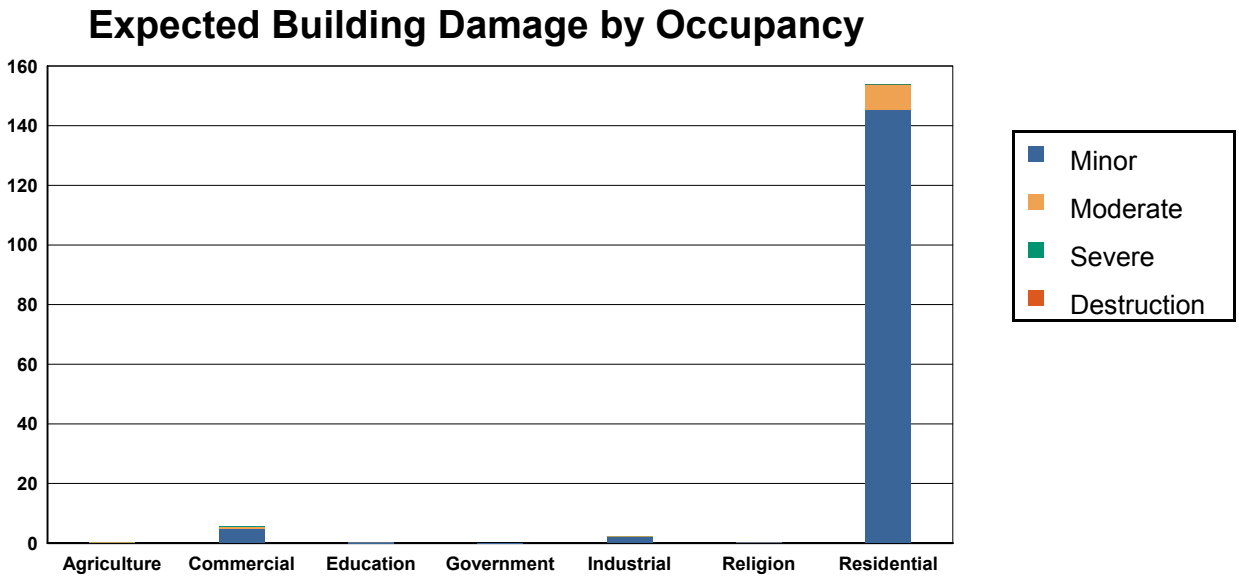


Table 2: Expected Building Damage by Occupancy : 100 - year Event

	None		Minor		Moderate		Severe		Destruction	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	10.71	97.40	0.25	2.23	0.03	0.28	0.01	0.09	0.00	0.00
Commercial	235.48	97.71	5.01	2.08	0.48	0.20	0.02	0.01	0.00	0.00
Education	17.62	97.88	0.37	2.06	0.01	0.06	0.00	0.00	0.00	0.00
Government	1.95	97.40	0.05	2.52	0.00	0.08	0.00	0.00	0.00	0.00
Industrial	95.76	97.72	2.09	2.13	0.12	0.12	0.03	0.03	0.00	0.00
Religion	15.67	97.92	0.32	2.01	0.01	0.07	0.00	0.00	0.00	0.00
Residential	4,816.07	96.90	145.15	2.92	8.66	0.17	0.10	0.00	0.02	0.00
Total	**5,193.26**		**153.25**		**9.31**		**0.17**		**0.02**	

Table 3: Expected Building Damage by Building Type : 100 - year Event

Building Type	None		Minor		Moderate		Severe		Destruction	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	19	97.41	1	2.51	0	0.08	0	0.00	0	0.00
Masonry	257	95.80	9	3.40	2	0.78	0	0.02	0	0.00
MH	94	99.55	0	0.35	0	0.08	0	0.00	0	0.03
Steel	167	97.86	3	1.99	0	0.15	0	0.01	0	0.00
Wood	4,517	97.07	132	2.83	5	0.10	0	0.00	0	0.00

Essential Facility Damage

Before the hurricane, the region had no hospital beds available for use. On the day of the hurricane, the model estimates that 0 hospital beds (0%) are available for use by patients already in the hospital and those injured by the hurricane. After one week, none of the beds will be in service. By 30 days, none will be operational.

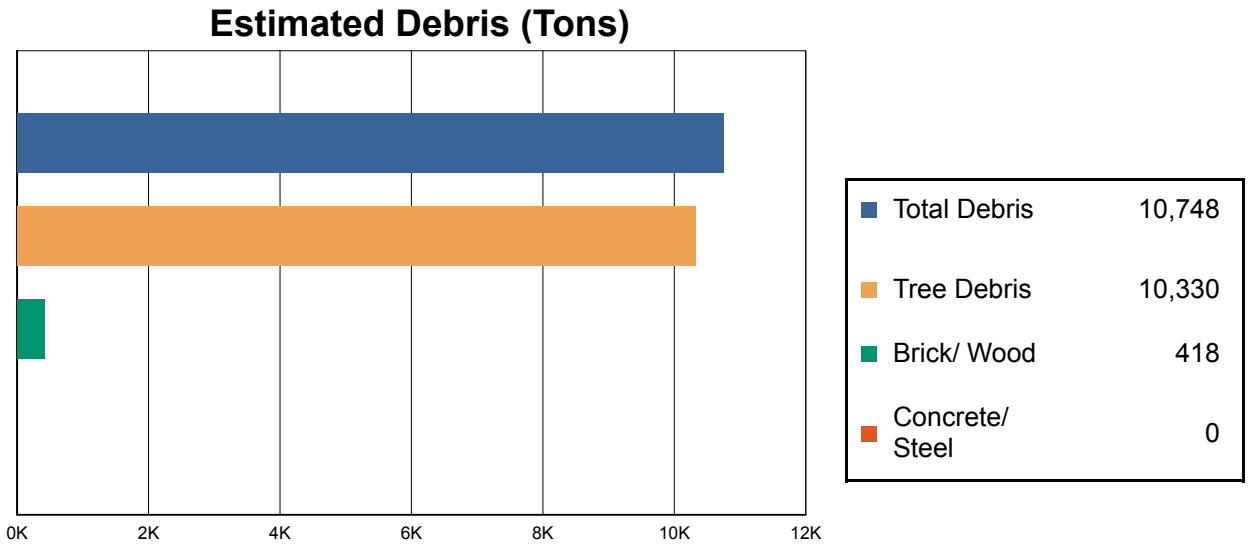
Thematic Map of Essential Facilities with greater than 50% moderate

Table 4: Expected Damage to Essential Facilities

		# Facilities		
Classification	**Total**	**Probability of at Least Moderate Damage > 50%**	**Probability of Complete Damage > 50%**	**Expected Loss of Use < 1 day**
EOCs	1	0	0	1
Fire Stations	3	0	0	3
Police Stations	1	0	0	1
Schools	5	0	0	5

Induced Hurricane Damage

Debris Generation

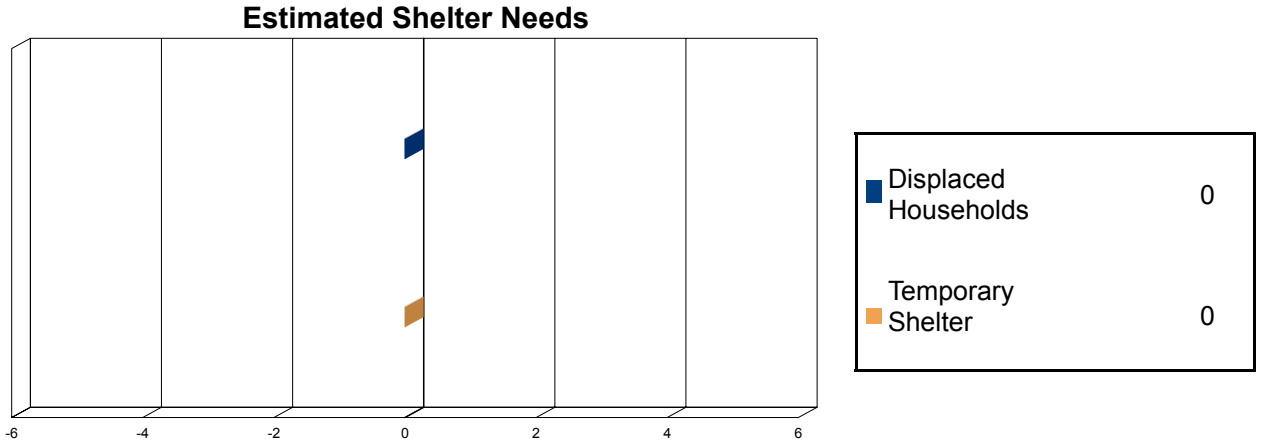


Hazus estimates the amount of debris that will be generated by the hurricane. The model breaks the debris into four general categories: a) Brick/Wood, b) Reinforced Concrete/Steel, c) Eligible Tree Debris, and d) Other Tree Debris. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 10,748 tons of debris will be generated. Of the total amount, 8,761 tons (82%) is Other Tree Debris. Of the remaining 1,987 tons, Brick/Wood comprises 21% of the total, Reinforced Concrete/Steel comprises of 0% of the total, with the remainder being Eligible Tree Debris. If the building debris tonnage is converted to an estimated number of truckloads, it will require 17 truckloads (@25 tons/truck) to remove the building debris generated by the hurricane. The number of Eligible Tree Debris truckloads will depend on how the 1,569 tons of Eligible Tree Debris are collected and processed. The volume of tree debris generally ranges from about 4 cubic yards per ton for chipped or compacted tree debris to about 10 cubic yards per ton for bulkier, uncompacted debris.

Social Impact

Shelter Requirement



Hazus estimates the number of households that are expected to be displaced from their homes due to the hurricane and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 0 households to be displaced due to the hurricane. Of these, 0 people (out of a total population of 12,959) will seek temporary shelter in public shelters.

Economic Loss

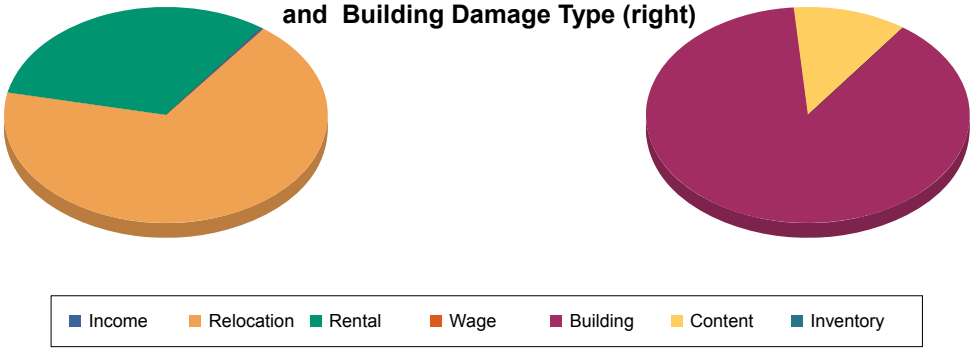
The total economic loss estimated for the hurricane is 8.2 million dollars, which represents 0.40 % of the total replacement value of the region's buildings.

Building-Related Losses

The building related losses are broken into two categories: direct property damage losses and business interruption losses. The direct property damage losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the hurricane. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the hurricane.

The total property damage losses were 8 million dollars. 4% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 98% of the total loss. Table 5 below provides a summary of the losses associated with the building damage.

Loss by Business Interruption Type (left) and Building Damage Type (right)



Loss Type by General Occupancy

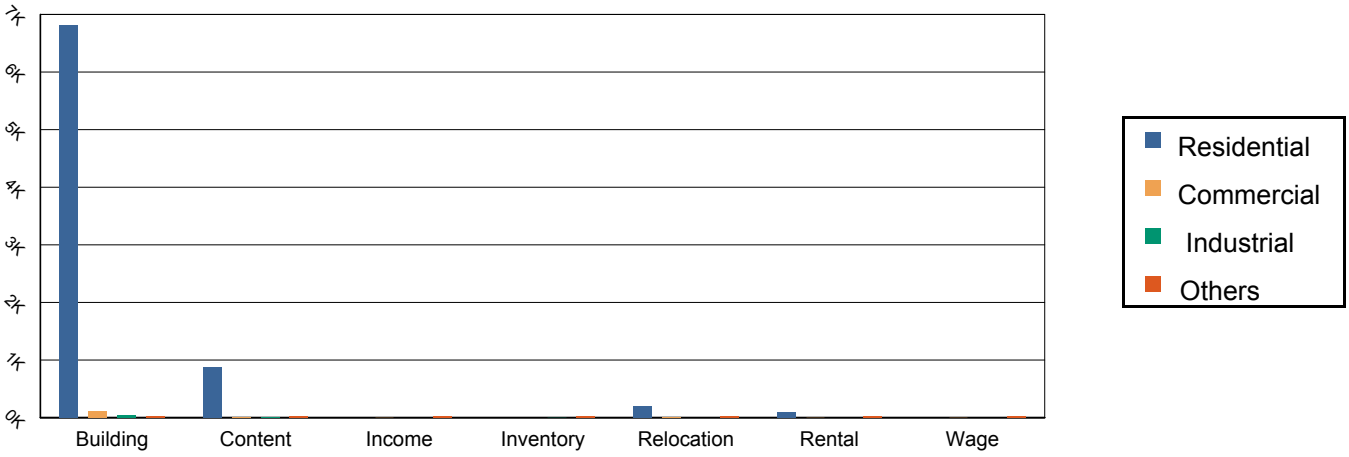


Table 5: Building-Related Economic Loss Estimates

(Thousands of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Property Damage						
	Building	6,821.67	114.20	45.33	19.45	7,000.64
	Content	873.05	7.55	9.08	0.55	890.24
	Inventory	0.00	0.14	1.61	0.05	1.79
	Subtotal	**7,694.71**	**121.89**	**56.02**	**20.05**	**7,892.67**
Business Interruption Loss						
	Income	0.00	1.08	0.00	0.00	1.08
	Relocation	205.27	3.11	0.24	0.15	208.78
	Rental	95.92	0.49	0.00	0.00	96.42
	Wage	0.00	0.38	0.00	0.00	0.38
	Subtotal	**301.20**	**5.07**	**0.24**	**0.15**	**306.66**

Total

Total	**7,995.91**	**126.96**	**56.26**	**20.20**	**8,199.33**

Appendix A: County Listing for the Region

Connecticut
- Middlesex

Appendix B: Regional Population and Building Value Data

	Population	Building Value (thousands of dollars)		
		Residential	Non-Residential	Total
Connecticut				
Middlesex	12,959	1,786,021	248,376	2,034,397
Total	**12,959**	**1,786,021**	**248,376**	**2,034,397**
Study Region Total	**12,959**	**1,786,021**	**248,376**	**2,034,397**

Hazus: Hurricane Global Risk Report

Region Name: EastHampton

Hurricane Scenario: Probabilistic 200-year Return Period

Print Date: Tuesday, October 1, 2019

Disclaimer:
This version of Hazus utilizes 2010 Census Data.
Totals only reflect data for those census tracts/blocks included in the user's study region.

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The hurricane loss estimates provided in this report are based on a region that includes 1 county(ies) from the following state(s):

- Connecticut

Note:
Appendix A contains a complete listing of the counties contained in the region.

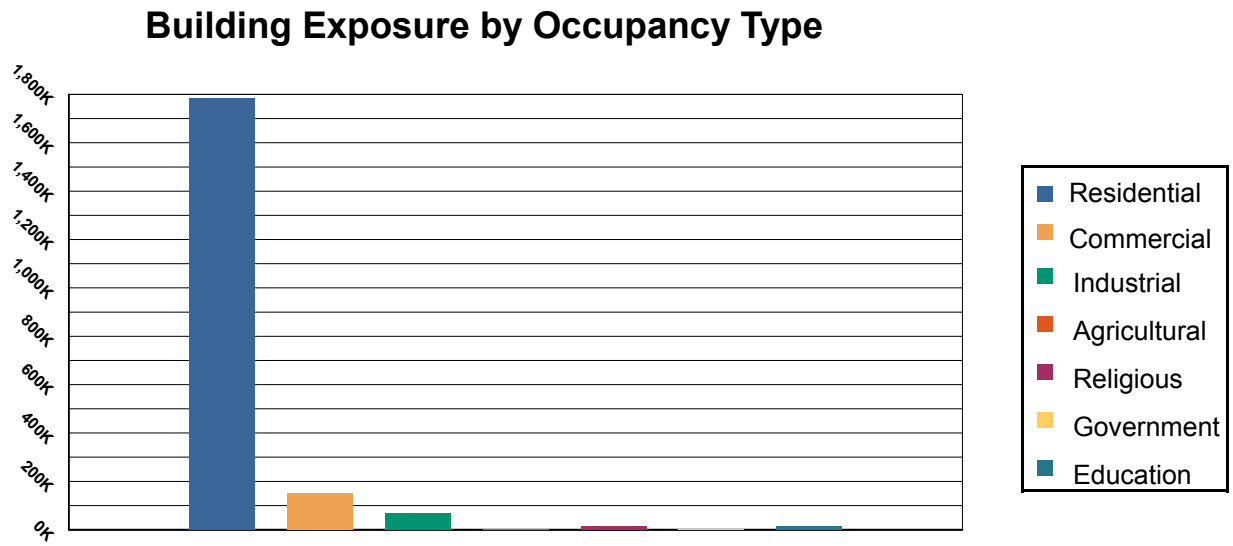
The geographical size of the region is 36.90 square miles and contains 3 census tracts. There are over 5 thousand households in the region and a total population of 12,959 people (2010 Census Bureau data). The distribution of population by State and County is provided in Appendix B.

There are an estimated 5 thousand buildings in the region with a total building replacement value (excluding contents) of 2,034 million dollars (2014 dollars). Approximately 93% of the buildings (and 88% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

Hazus estimates that there are 5,356 buildings in the region which have an aggregate total replacement value of 2,034 million (2014 dollars). Table 1 presents the relative distribution of the value with respect to the general occupancies. Appendix B provides a general distribution of the building value by State and County.



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Occupancy	Exposure ($1000)	Percent of Tot
Residential	1,786,021	87.79 %
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Agricultural	2,431	0.12%
Religious	12,880	0.63%
Government	475	0.02%
Education	13,086	0.64%
Total	**2,034,397**	**100.00%**

Essential Facility Inventory

For essential facilities, there are no hospitals in the region with a total bed capacity of no beds. There are 5 schools, 3 fire stations, 1 police stations and 1 emergency operation facilities.

Hurricane Scenario

Hazus used the following set of information to define the hurricane parameters for the hurricane loss estimate provided in this report.

Scenario Name:	Probabilistic
Type:	Probabilistic

Building Damage

General Building Stock Damage

Hazus estimates that about 44 buildings will be at least moderately damaged. This is over 1% of the total number of buildings in the region. There are an estimated 0 buildings that will be completely destroyed. The definition of the 'damage states' is provided in the Hazus Hurricane technical manual. Table 2 below summarizes the expected damage by general occupancy for the buildings in the region. Table 3 summarizes the expected damage by general building type.

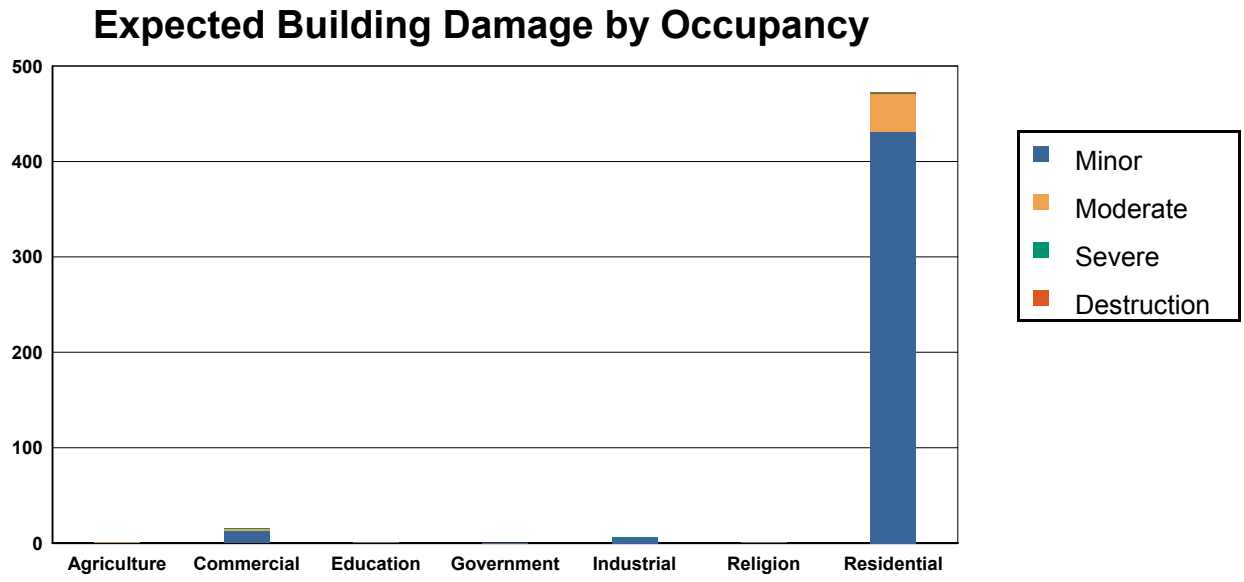


Table 2: Expected Building Damage by Occupancy : 200 - year Event

	None		Minor		Moderate		Severe		Destruction	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	10.11	91.88	0.70	6.38	0.13	1.18	0.06	0.52	0.00	0.03
Commercial	225.58	93.60	13.31	5.52	1.90	0.79	0.21	0.09	0.00	0.00
Education	16.94	94.11	0.98	5.46	0.08	0.43	0.00	0.01	0.00	0.00
Government	1.86	93.13	0.12	6.20	0.01	0.66	0.00	0.02	0.00	0.00
Industrial	91.70	93.57	5.39	5.50	0.70	0.72	0.19	0.19	0.01	0.01
Religion	15.05	94.07	0.89	5.56	0.06	0.36	0.00	0.02	0.00	0.00
Residential	4,497.84	90.50	431.05	8.67	40.14	0.81	0.50	0.01	0.46	0.01
Total	**4,859.08**		**452.46**		**43.02**		**0.96**		**0.48**	

Table 3: Expected Building Damage by Building Type : 200 - year Event

Building Type	None		Minor		Moderate		Severe		Destruction	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	19	93.10	1	6.26	0	0.63	0	0.01	0	0.00
Masonry	240	89.47	22	8.02	6	2.37	0	0.13	0	0.01
MH	92	97.78	1	1.53	0	0.49	0	0.01	0	0.18
Steel	161	94.30	8	4.93	1	0.68	0	0.10	0	0.00
Wood	4,220	90.70	403	8.66	29	0.62	1	0.01	0	0.01

Essential Facility Damage

Before the hurricane, the region had no hospital beds available for use. On the day of the hurricane, the model estimates that 0 hospital beds (0%) are available for use by patients already in the hospital and those injured by the hurricane. After one week, none of the beds will be in service. By 30 days, none will be operational.

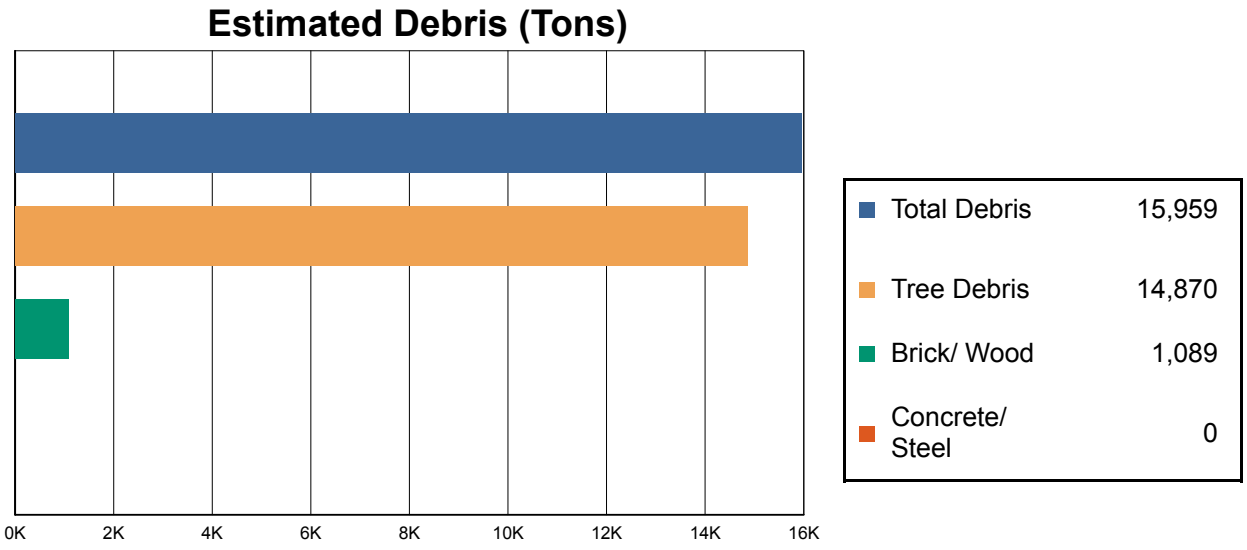
Thematic Map of Essential Facilities with greater than 50% moderate

Table 4: Expected Damage to Essential Facilities

		# Facilities		
Classification	**Total**	**Probability of at Least Moderate Damage > 50%**	**Probability of Complete Damage > 50%**	**Expected Loss of Use < 1 day**
EOCs	1	0	0	1
Fire Stations	3	0	0	3
Police Stations	1	0	0	1
Schools	5	0	0	5

Induced Hurricane Damage

Debris Generation

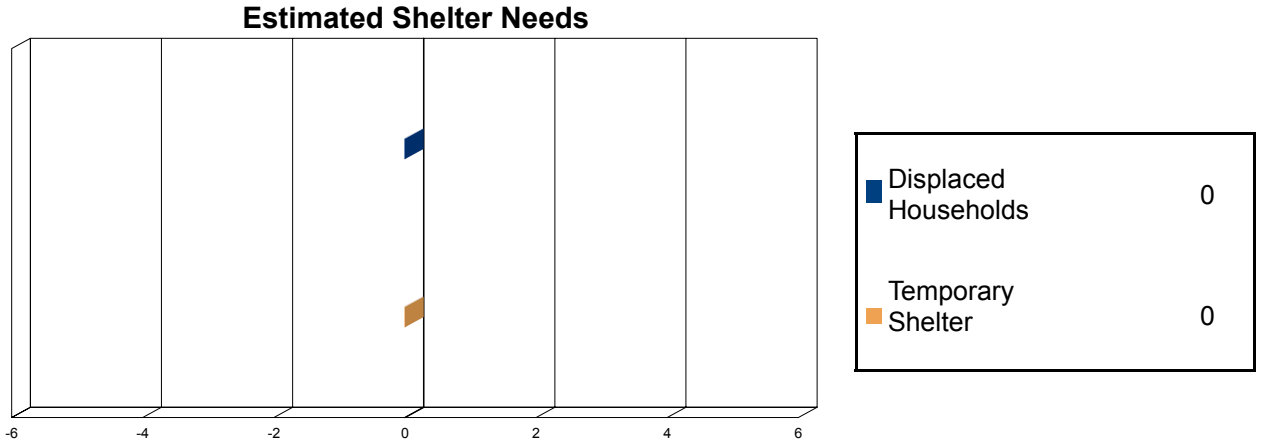


Hazus estimates the amount of debris that will be generated by the hurricane. The model breaks the debris into four general categories: a) Brick/Wood, b) Reinforced Concrete/Steel, c) Eligible Tree Debris, and d) Other Tree Debris. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 15,959 tons of debris will be generated. Of the total amount, 12,627 tons (79%) is Other Tree Debris. Of the remaining 3,332 tons, Brick/Wood comprises 33% of the total, Reinforced Concrete/Steel comprises of 0% of the total, with the remainder being Eligible Tree Debris. If the building debris tonnage is converted to an estimated number of truckloads, it will require 44 truckloads (@25 tons/truck) to remove the building debris generated by the hurricane. The number of Eligible Tree Debris truckloads will depend on how the 2,243 tons of Eligible Tree Debris are collected and processed. The volume of tree debris generally ranges from about 4 cubic yards per ton for chipped or compacted tree debris to about 10 cubic yards per ton for bulkier, uncompacted debris.

Social Impact

Shelter Requirement



Hazus estimates the number of households that are expected to be displaced from their homes due to the hurricane and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 0 households to be displaced due to the hurricane. Of these, 0 people (out of a total population of 12,959) will seek temporary shelter in public shelters.

Economic Loss

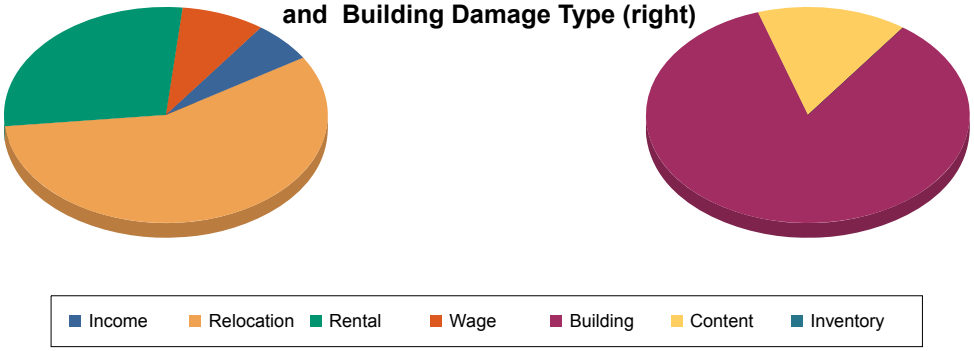
The total economic loss estimated for the hurricane is 17.6 million dollars, which represents 0.87 % of the total replacement value of the region's buildings.

Building-Related Losses

The building related losses are broken into two categories: direct property damage losses and business interruption losses. The direct property damage losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the hurricane. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the hurricane.

The total property damage losses were 18 million dollars. 4% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 95% of the total loss. Table 5 below provides a summary of the losses associated with the building damage.

Loss by Business Interruption Type (left) and Building Damage Type (right)



Loss Type by General Occupancy

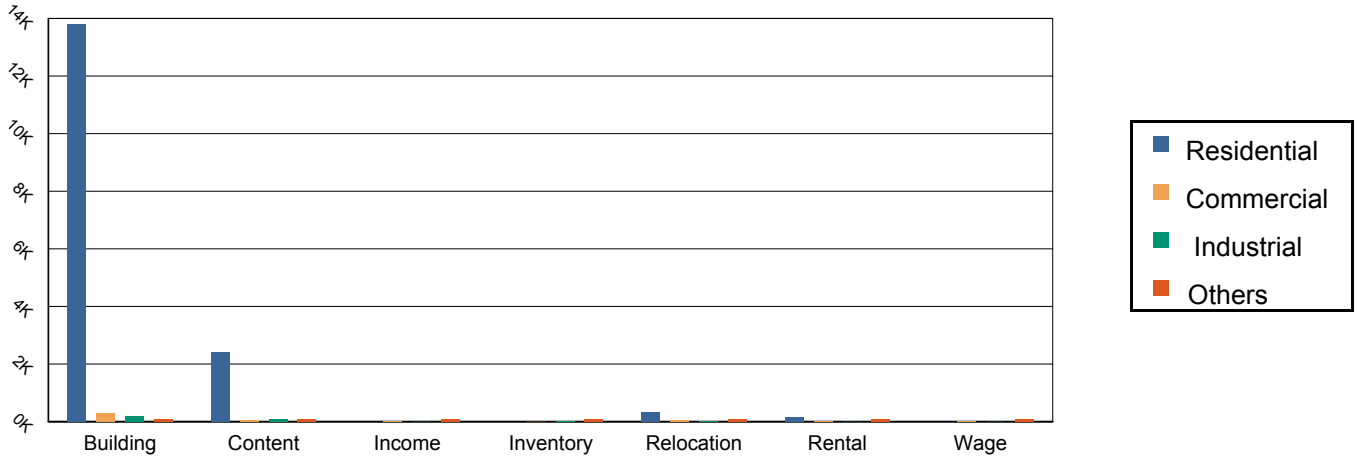


Table 5: Building-Related Economic Loss Estimates

(Thousands of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Property Damage						
	Building	13,812.60	315.38	184.43	56.63	14,369.04
	Content	2,399.67	42.87	82.05	7.36	2,531.95
	Inventory	0.00	1.02	13.84	0.24	15.10
	Subtotal	**16,212.26**	**359.26**	**280.33**	**64.24**	**16,916.09**
Business Interruption Loss						
	Income	0.00	33.91	1.60	7.84	43.36
	Relocation	348.71	39.35	5.84	6.71	400.61
	Rental	175.52	23.48	1.25	0.57	200.82
	Wage	0.00	36.65	2.67	18.40	57.72
	Subtotal	**524.23**	**133.40**	**11.37**	**33.51**	**702.51**

Total

Total	**16,736.49**	**492.66**	**291.69**	**97.75**	**17,618.60**

Appendix A: County Listing for the Region

Connecticut
- Middlesex

Appendix B: Regional Population and Building Value Data

	Population	Building Value (thousands of dollars)		
		Residential	Non-Residential	Total
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Middlesex	12,959	1,786,021	248,376	2,034,397
Total	**12,959**	**1,786,021**	**248,376**	**2,034,397**
Study Region Total	**12,959**	**1,786,021**	**248,376**	**2,034,397**

Hazus: Hurricane Global Risk Report

Region Name: EastHampton

Hurricane Scenario: Probabilistic 500-year Return Period

Print Date: Tuesday, October 1, 2019

Disclaimer:
This version of Hazus utilizes 2010 Census Data.
Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific Hurricane. These results can be improved by using enhanced inventory data.

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General Description of the Region

Hazus is a regional multi-hazard loss estimation model that was developed by the Federal Emergency Management Agency and the National Institute of Building Sciences. The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The hurricane loss estimates provided in this report are based on a region that includes 1 county(ies) from the following state(s):

- Connecticut

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 36.90 square miles and contains 3 census tracts. There are over 5 thousand households in the region and a total population of 12,959 people (2010 Census Bureau data). The distribution of population by State and County is provided in Appendix B.

There are an estimated 5 thousand buildings in the region with a total building replacement value (excluding contents) of 2,034 million dollars (2014 dollars). Approximately 93% of the buildings (and 88% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

Hazus estimates that there are 5,356 buildings in the region which have an aggregate total replacement value of 2,034 million (2014 dollars). Table 1 presents the relative distribution of the value with respect to the general occupancies. Appendix B provides a general distribution of the building value by State and County.

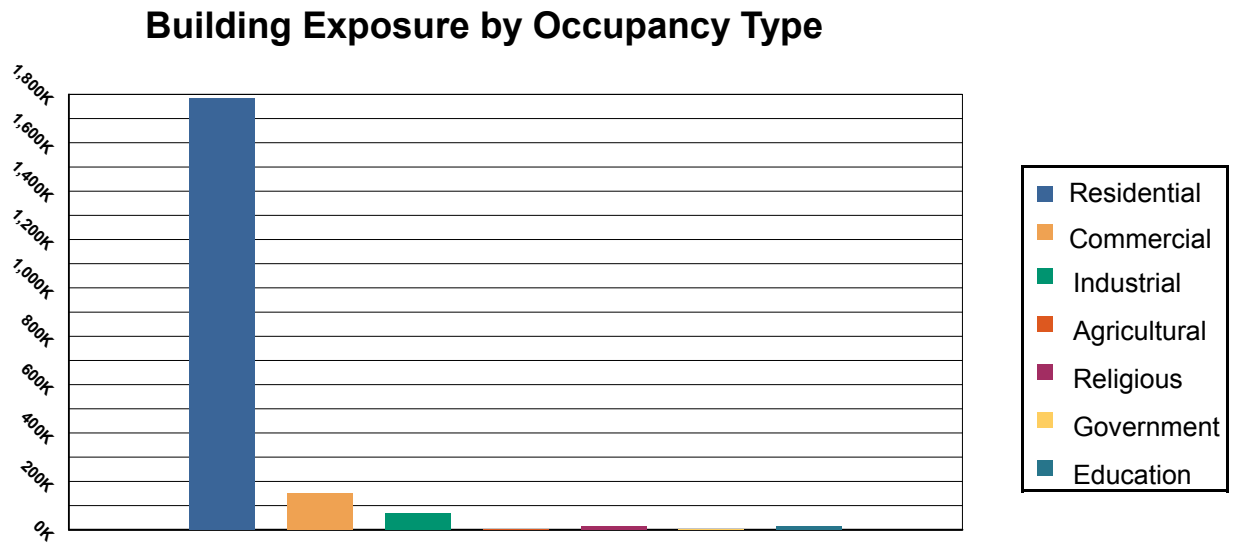


Table 1: Building Exposure by Occupancy Type

Occupancy	Exposure ($1000)	Percent of Tot
Residential	1,786,021	87.79 %
Commercial	152,725	7.51%
Industrial	66,779	3.28%
Agricultural	2,431	0.12%
Religious	12,880	0.63%
Government	475	0.02%
Education	13,086	0.64%
Total	**2,034,397**	**100.00%**

Essential Facility Inventory

For essential facilities, there are no hospitals in the region with a total bed capacity of no beds. There are 5 schools, 3 fire stations, 1 police stations and 1 emergency operation facilities.

Hurricane Scenario

Hazus used the following set of information to define the hurricane parameters for the hurricane loss estimate provided in this report.

Scenario Name:	Probabilistic
Type:	Probabilistic

Building Damage

General Building Stock Damage

Hazus estimates that about 182 buildings will be at least moderately damaged. This is over 3% of the total number of buildings in the region. There are an estimated 6 buildings that will be completely destroyed. The definition of the 'damage states' is provided in the Hazus Hurricane technical manual. Table 2 below summarizes the expected damage by general occupancy for the buildings in the region. Table 3 summarizes the expected damage by general building type.

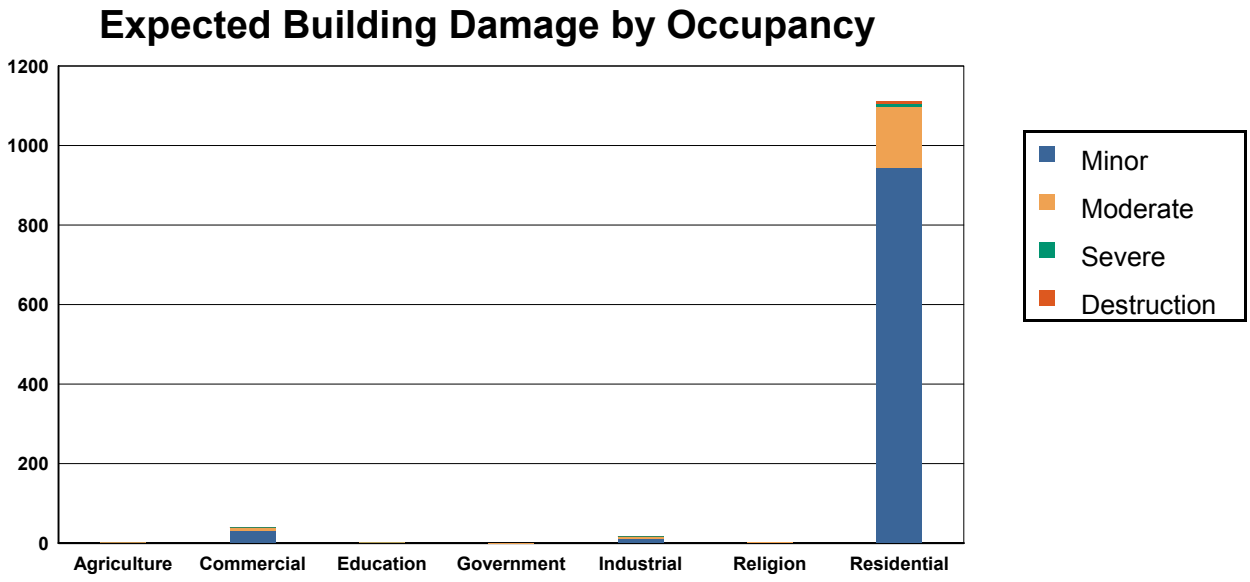


Table 2: Expected Building Damage by Occupancy : 500 - year Event

	None		Minor		Moderate		Severe		Destruction	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	8.76	79.62	1.61	14.63	0.41	3.74	0.20	1.82	0.02	0.20
Commercial	200.63	83.25	31.47	13.06	7.82	3.25	1.08	0.45	0.01	0.00
Education	15.19	84.42	2.30	12.79	0.47	2.62	0.03	0.17	0.00	0.00
Government	1.65	82.41	0.28	13.75	0.07	3.59	0.01	0.26	0.00	0.00
Industrial	81.75	83.42	12.27	12.52	3.18	3.25	0.73	0.75	0.07	0.07
Religion	13.36	83.50	2.25	14.06	0.37	2.29	0.02	0.14	0.00	0.00
Residential	3,857.82	77.62	944.89	19.01	153.74	3.09	7.99	0.16	5.55	0.11
Total	**4,179.16**		**995.07**		**166.07**		**10.06**		**5.65**	

Table 3: Expected Building Damage by Building Type : 500 - year Event

Building Type	None		Minor		Moderate		Severe		Destruction	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	16	82.48	3	13.81	1	3.57	0	0.14	0	0.00
Masonry	207	77.06	43	15.97	17	6.42	1	0.48	0	0.07
MH	85	90.20	5	5.44	3	3.07	0	0.13	1	1.16
Steel	145	84.75	20	11.56	5	3.16	1	0.52	0	0.00
Wood	3,623	77.87	894	19.21	124	2.67	7	0.15	5	0.10

Essential Facility Damage

Before the hurricane, the region had no hospital beds available for use. On the day of the hurricane, the model estimates that 0 hospital beds (0%) are available for use by patients already in the hospital and those injured by the hurricane. After one week, none of the beds will be in service. By 30 days, none will be operational.

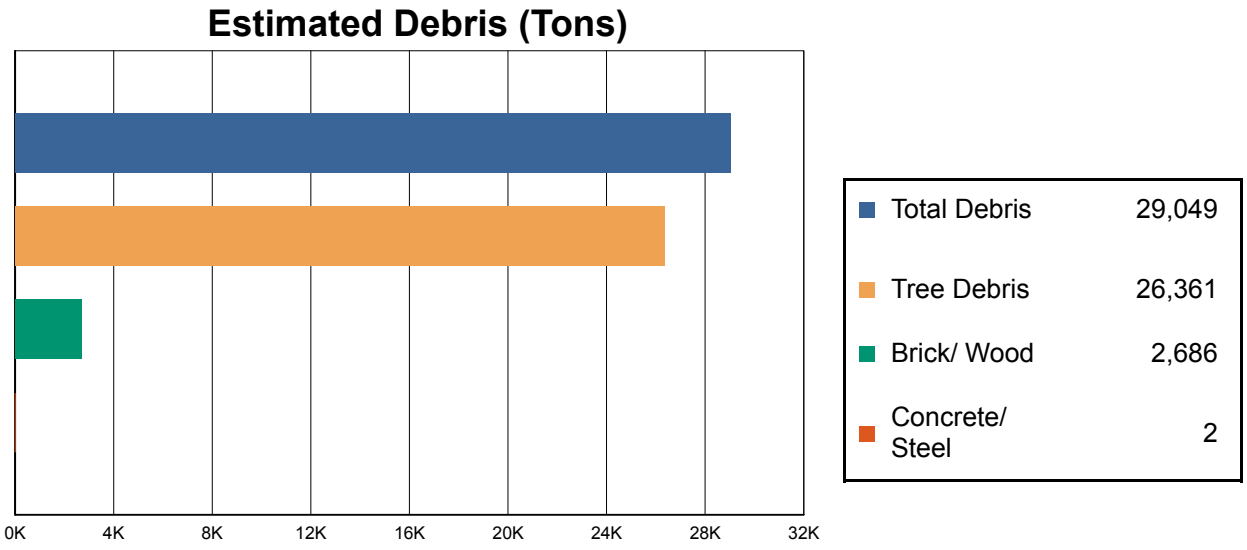
Thematic Map of Essential Facilities with greater than 50% moderate

Table 4: Expected Damage to Essential Facilities

		# Facilities		
Classification	**Total**	**Probability of at Least Moderate Damage > 50%**	**Probability of Complete Damage > 50%**	**Expected Loss of Use < 1 day**
EOCs	1	0	0	1
Fire Stations	3	0	0	3
Police Stations	1	0	0	1
Schools	5	0	0	5

Induced Hurricane Damage

Debris Generation

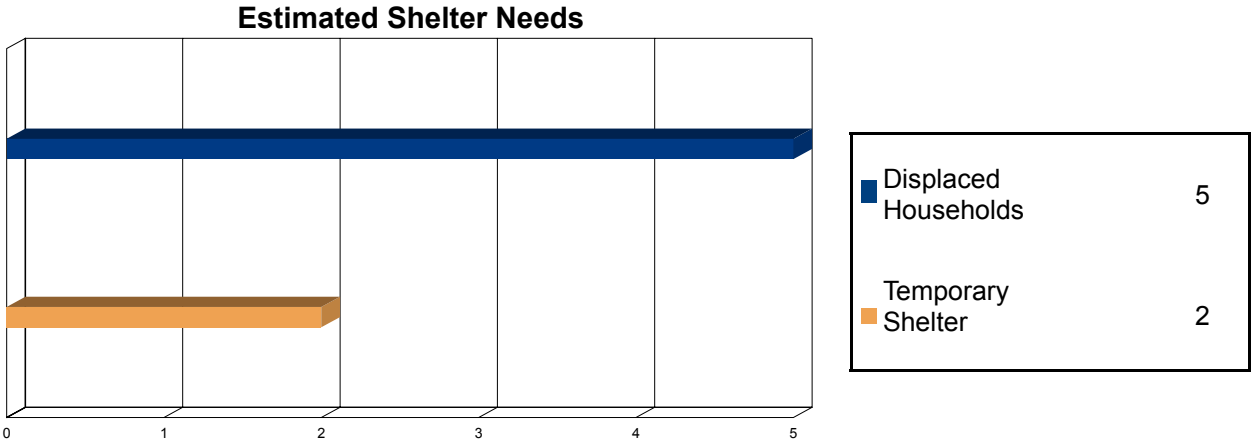


Hazus estimates the amount of debris that will be generated by the hurricane. The model breaks the debris into four general categories: a) Brick/Wood, b) Reinforced Concrete/Steel, c) Eligible Tree Debris, and d) Other Tree Debris. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 29,049 tons of debris will be generated. Of the total amount, 22,376 tons (77%) is Other Tree Debris. Of the remaining 6,673 tons, Brick/Wood comprises 40% of the total, Reinforced Concrete/Steel comprises of 0% of the total, with the remainder being Eligible Tree Debris. If the building debris tonnage is converted to an estimated number of truckloads, it will require 108 truckloads (@25 tons/truck) to remove the building debris generated by the hurricane. The number of Eligible Tree Debris truckloads will depend on how the 3,985 tons of Eligible Tree Debris are collected and processed. The volume of tree debris generally ranges from about 4 cubic yards per ton for chipped or compacted tree debris to about 10 cubic yards per ton for bulkier, uncompacted debris.

Social Impact

Shelter Requirement



Hazus estimates the number of households that are expected to be displaced from their homes due to the hurricane and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 5 households to be displaced due to the hurricane. Of these, 2 people (out of a total population of 12,959) will seek temporary shelter in public shelters.

Economic Loss

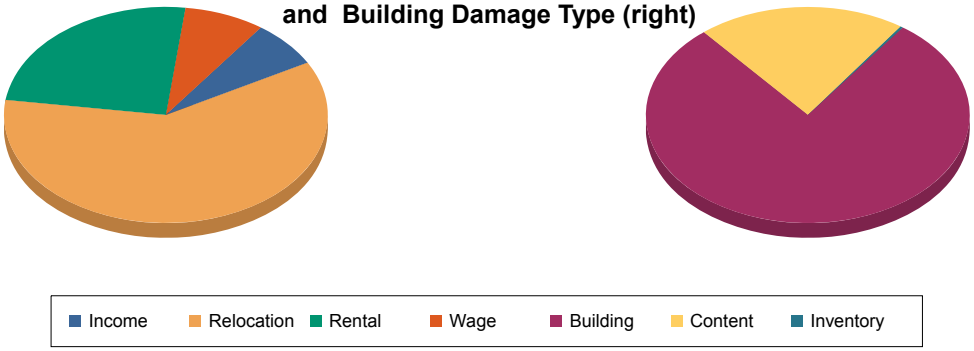
The total economic loss estimated for the hurricane is 43.3 million dollars, which represents 2.13 % of the total replacement value of the region's buildings.

Building-Related Losses

The building related losses are broken into two categories: direct property damage losses and business interruption losses. The direct property damage losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the hurricane. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the hurricane.

The total property damage losses were 43 million dollars. 6% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 93% of the total loss. Table 5 below provides a summary of the losses associated with the building damage.

Loss by Business Interruption Type (left) and Building Damage Type (right)



Loss Type by General Occupancy

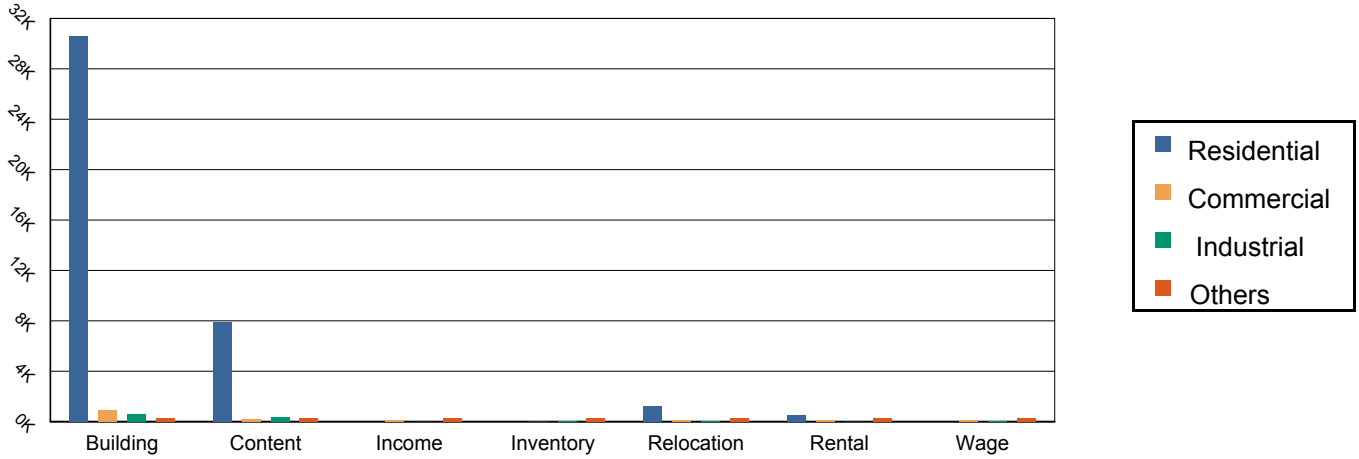


Table 5: Building-Related Economic Loss Estimates

(Thousands of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Property Damage						
	Building	30,573.21	920.54	621.68	167.85	32,283.29
	Content	7,923.76	220.37	373.46	34.69	8,552.28
	Inventory	0.00	5.37	60.21	1.10	66.68
	Subtotal	**38,496.98**	**1,146.27**	**1,055.35**	**203.65**	**40,902.25**
Business Interruption Loss						
	Income	0.00	141.01	7.75	20.55	169.30
	Relocation	1,251.60	152.57	33.15	26.91	1,464.24
	Rental	498.59	91.05	6.38	1.91	597.93
	Wage	0.00	131.85	12.97	50.70	195.52
	Subtotal	**1,750.19**	**516.48**	**60.25**	**100.07**	**2,426.99**

Total

Total	**40,247.17**	**1,662.75**	**1,115.60**	**303.72**	**43,329.24**

Appendix A: County Listing for the Region

Connecticut
- Middlesex

Appendix B: Regional Population and Building Value Data

	Population	Building Value (thousands of dollars)		
		Residential	Non-Residential	Total
Connecticut				
Middlesex	12,959	1,786,021	248,376	2,034,397
Total	**12,959**	**1,786,021**	**248,376**	**2,034,397**
Study Region Total	**12,959**	**1,786,021**	**248,376**	**2,034,397**

Hazus: Hurricane Global Risk Report

Region Name: EastHampton

Hurricane Scenario: Probabilistic 1000-year Return Period

Print Date: Tuesday, October 1, 2019

Disclaimer:
This version of Hazus utilizes 2010 Census Data.
Totals only reflect data for those census tracts/blocks included in the user's study region.

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The hurricane loss estimates provided in this report are based on a region that includes 1 county(ies) from the following state(s):

- Connecticut

Note:
Appendix A contains a complete listing of the counties contained in the region.

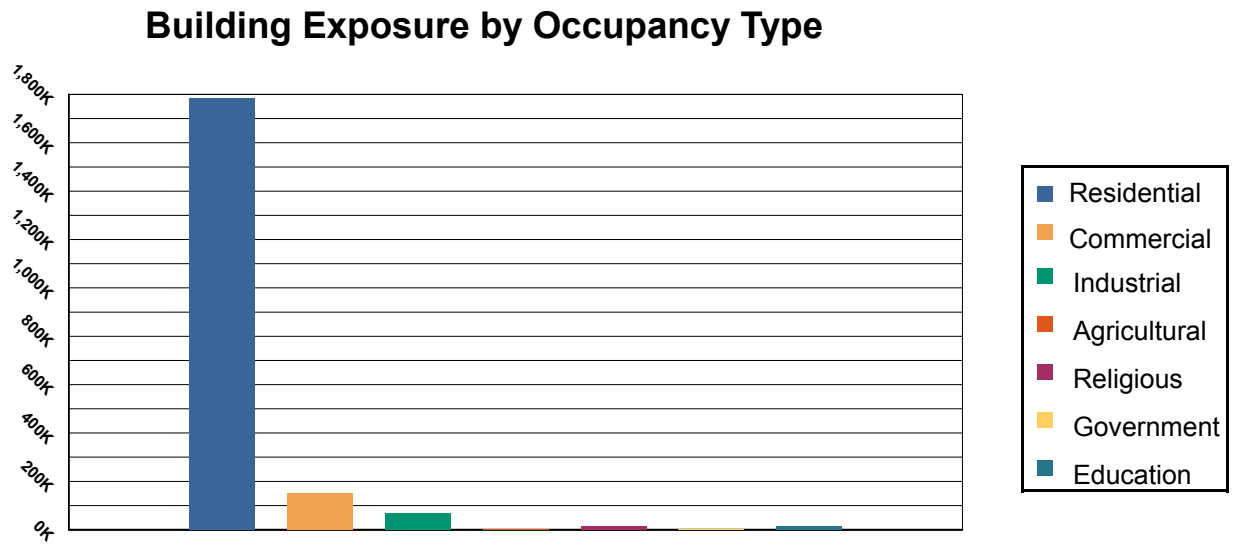
The geographical size of the region is 36.90 square miles and contains 3 census tracts. There are over 5 thousand households in the region and a total population of 12,959 people (2010 Census Bureau data). The distribution of population by State and County is provided in Appendix B.

There are an estimated 5 thousand buildings in the region with a total building replacement value (excluding contents) of 2,034 million dollars (2014 dollars). Approximately 93% of the buildings (and 88% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

Hazus estimates that there are 5,356 buildings in the region which have an aggregate total replacement value of 2,034 million (2014 dollars). Table 1 presents the relative distribution of the value with respect to the general occupancies. Appendix B provides a general distribution of the building value by State and County.



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Agricultural	2,431	0.12%
Religious	12,880	0.63%
Government	475	0.02%
Education	13,086	0.64%
Total	**2,034,397**	**100.00%**

Essential Facility Inventory

For essential facilities, there are no hospitals in the region with a total bed capacity of no beds. There are 5 schools, 3 fire stations, 1 police stations and 1 emergency operation facilities.

Hurricane Scenario

Hazus used the following set of information to define the hurricane parameters for the hurricane loss estimate provided in this report.

Scenario Name:	Probabilistic
Type:	Probabilistic

Building Damage

General Building Stock Damage

Hazus estimates that about 354 buildings will be at least moderately damaged. This is over 7% of the total number of buildings in the region. There are an estimated 18 buildings that will be completely destroyed. The definition of the 'damage states' is provided in the Hazus Hurricane technical manual. Table 2 below summarizes the expected damage by general occupancy for the buildings in the region. Table 3 summarizes the expected damage by general building type.

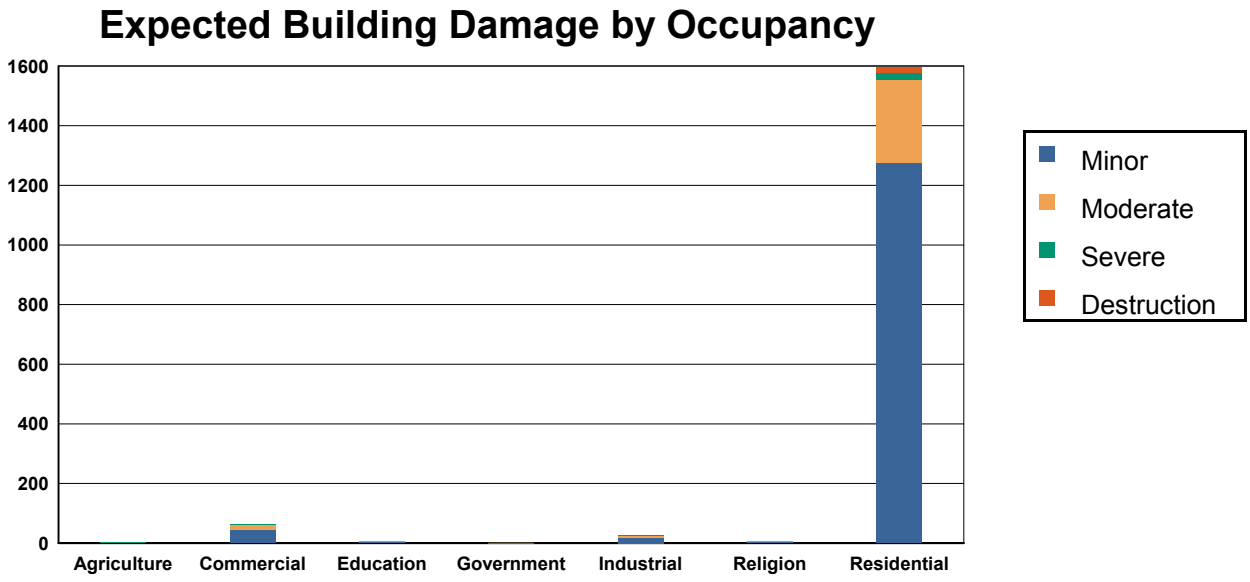


Table 2: Expected Building Damage by Occupancy : 1000 - year Event

	None		Minor		Moderate		Severe		Destruction	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	7.65	69.51	2.26	20.53	0.71	6.44	0.34	3.10	0.05	0.43
Commercial	177.26	73.55	44.93	18.64	16.16	6.70	2.63	1.09	0.02	0.01
Education	13.48	74.87	3.30	18.31	1.10	6.14	0.12	0.69	0.00	0.00
Government	1.40	69.75	0.40	20.07	0.18	8.93	0.03	1.26	0.00	0.00
Industrial	72.97	74.46	17.05	17.40	6.40	6.53	1.45	1.48	0.13	0.13
Religion	11.55	72.20	3.41	21.29	0.95	5.93	0.09	0.59	0.00	0.00
Residential	3,373.07	67.87	1,273.75	25.63	280.91	5.65	24.83	0.50	17.44	0.35
Total	**3,657.36**		**1,345.10**		**306.41**		**29.51**		**17.63**	

Table 3: Expected Building Damage by Building Type : 1000 - year Event

Building Type	None		Minor		Moderate		Severe		Destruction	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	15	73.06	4	18.57	2	7.83	0	0.54	0	0.00
Masonry	181	67.56	56	20.86	28	10.43	3	0.98	0	0.17
MH	76	81.07	8	8.92	6	6.72	0	0.47	3	2.83
Steel	129	75.36	28	16.53	12	6.80	2	1.30	0	0.01
Wood	3,171	68.14	1,212	26.04	233	5.01	23	0.49	15	0.32

Essential Facility Damage

Before the hurricane, the region had no hospital beds available for use. On the day of the hurricane, the model estimates that 0 hospital beds (0%) are available for use by patients already in the hospital and those injured by the hurricane. After one week, none of the beds will be in service. By 30 days, none will be operational.

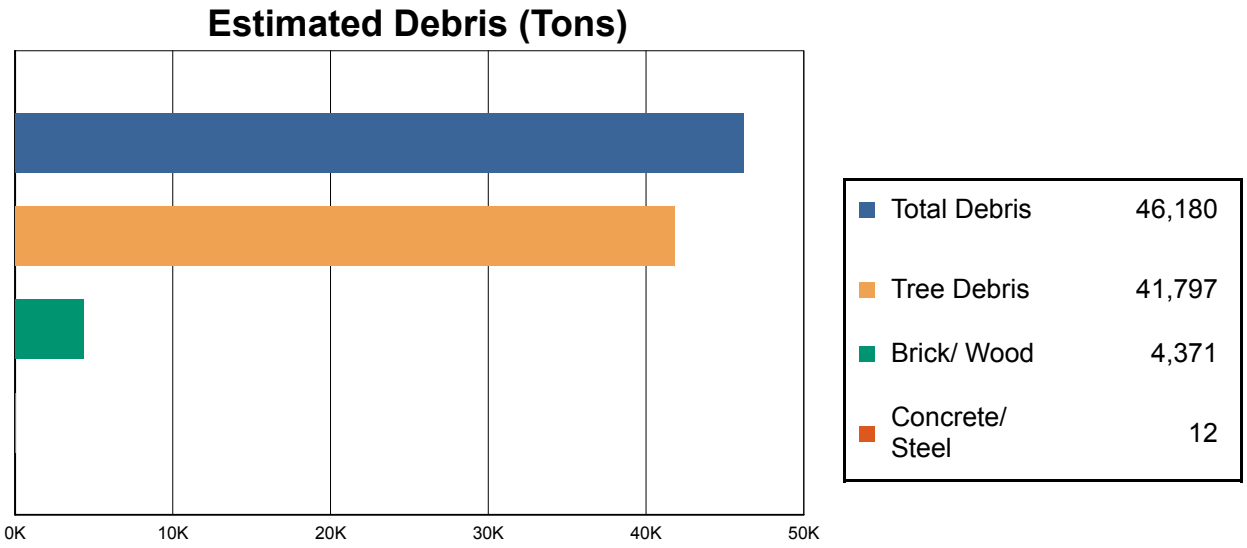
Thematic Map of Essential Facilities with greater than 50% moderate

Table 4: Expected Damage to Essential Facilities

		# Facilities		
Classification	**Total**	**Probability of at Least Moderate Damage > 50%**	**Probability of Complete Damage > 50%**	**Expected Loss of Use < 1 day**
EOCs	1	0	0	1
Fire Stations	3	0	0	3
Police Stations	1	0	0	1
Schools	5	0	0	1

Induced Hurricane Damage

Debris Generation

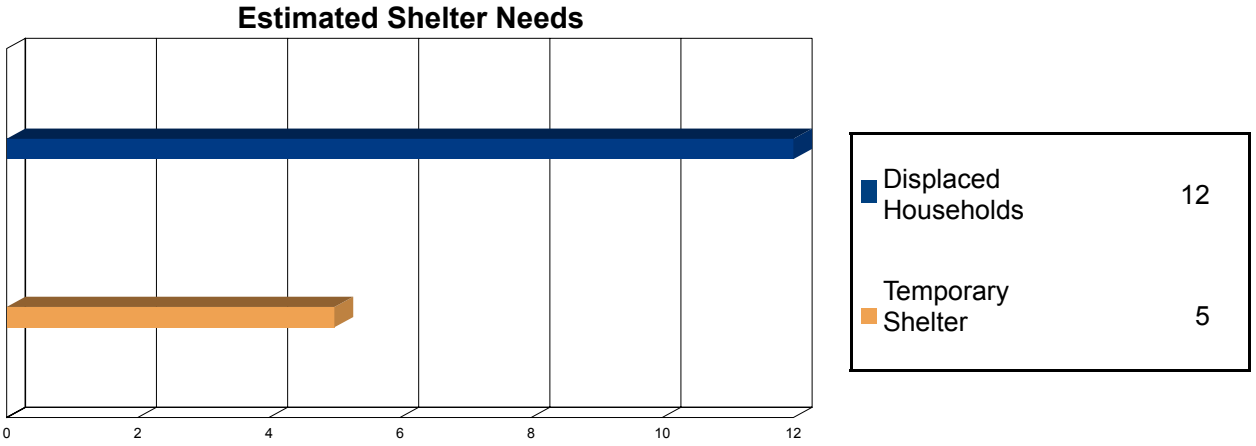


Hazus estimates the amount of debris that will be generated by the hurricane. The model breaks the debris into four general categories: a) Brick/Wood, b) Reinforced Concrete/Steel, c) Eligible Tree Debris, and d) Other Tree Debris. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 46,180 tons of debris will be generated. Of the total amount, 35,301 tons (76%) is Other Tree Debris. Of the remaining 10,879 tons, Brick/Wood comprises 40% of the total, Reinforced Concrete/Steel comprises of 0% of the total, with the remainder being Eligible Tree Debris. If the building debris tonnage is converted to an estimated number of truckloads, it will require 175 truckloads (@25 tons/truck) to remove the building debris generated by the hurricane. The number of Eligible Tree Debris truckloads will depend on how the 6,496 tons of Eligible Tree Debris are collected and processed. The volume of tree debris generally ranges from about 4 cubic yards per ton for chipped or compacted tree debris to about 10 cubic yards per ton for bulkier, uncompacted debris.

Social Impact

Shelter Requirement



Hazus estimates the number of households that are expected to be displaced from their homes due to the hurricane and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 12 households to be displaced due to the hurricane. Of these, 5 people (out of a total population of 12,959) will seek temporary shelter in public shelters.

Economic Loss

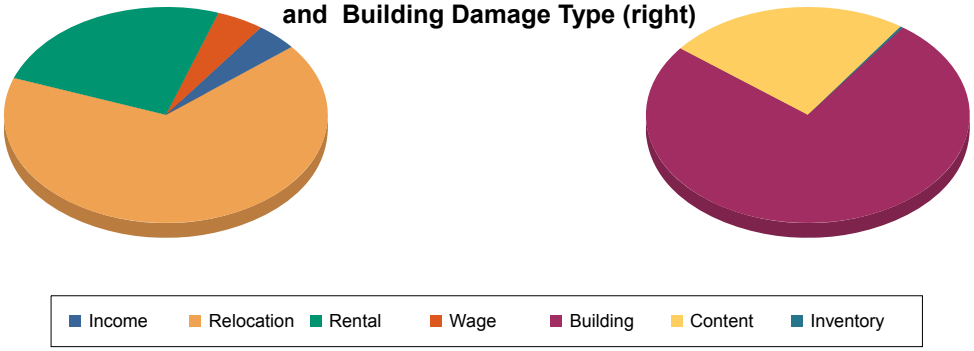
The total economic loss estimated for the hurricane is 76.2 million dollars, which represents 3.75 % of the total replacement value of the region's buildings.

Building-Related Losses

The building related losses are broken into two categories: direct property damage losses and business interruption losses. The direct property damage losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the hurricane. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the hurricane.

The total property damage losses were 76 million dollars. 7% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 93% of the total loss. Table 5 below provides a summary of the losses associated with the building damage.

Loss by Business Interruption Type (left) and Building Damage Type (right)



Loss Type by General Occupancy

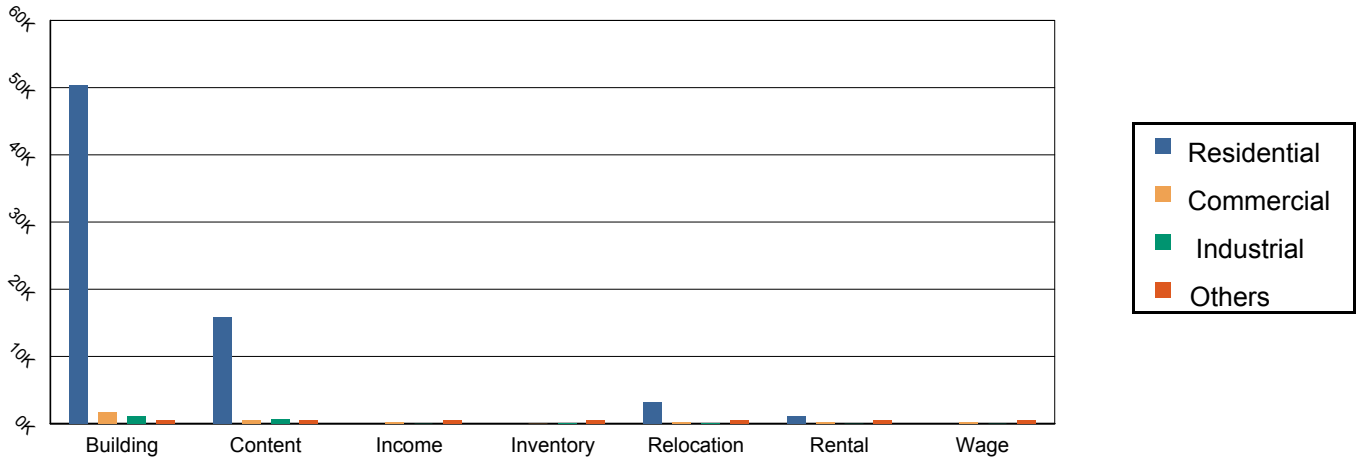


Table 5: Building-Related Economic Loss Estimates

(Thousands of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Property Damage						
	Building	50,432.45	1,717.71	1,072.85	320.27	53,543.28
	Content	15,824.87	530.58	697.65	87.99	17,141.10
	Inventory	0.00	12.35	107.42	2.17	121.95
	Subtotal	**66,257.32**	**2,260.64**	**1,877.93**	**410.44**	**70,806.33**
Business Interruption Loss						
	Income	0.00	182.82	10.91	27.07	220.80
	Relocation	3,196.67	287.52	63.27	52.44	3,599.91
	Rental	1,141.31	166.95	10.50	3.68	1,322.43
	Wage	0.00	176.38	18.29	67.62	262.28
	Subtotal	**4,337.98**	**813.68**	**102.97**	**150.80**	**5,405.42**

Total

Total	**70,595.31**	**3,074.32**	**1,980.90**	**561.23**	**76,211.76**

Appendix A: County Listing for the Region

Connecticut
- Middlesex

Appendix B: Regional Population and Building Value Data

	Population	Building Value (thousands of dollars)		
		Residential	Non-Residential	Total
Connecticut				
Middlesex	12,959	1,786,021	248,376	2,034,397
Total	**12,959**	**1,786,021**	**248,376**	**2,034,397**
Study Region Total	**12,959**	**1,786,021**	**248,376**	**2,034,397**

Hazus: Earthquake Global Risk Report

Region Name: EastHampton

Earthquake Scenario: EastHaddam

Print Date: October 16, 2019

Disclaimer:

This version of Hazus utilizes 2010 Census Data.

Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific earthquake. These results can be improved by using enhanced inventory, geotechnical, and observed ground motion data.

Table of Contents

General Description of the Region

Hazus-MH is a regional earthquake loss estimation model that was developed by the Federal Emergency Management Agency (FEMA) and the National Institute of Building Sciences. The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The earthquake loss estimates provided in this report was based on a region that includes 1 county(ies) from the following state(s):

Connecticut

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 36.89 square miles and contains 3 census tracts. There are over 5 thousand households in the region which has a total population of 12,959 people (2010 Census Bureau data). The distribution of population by Total Region and County is provided in Appendix B.

There are an estimated 5 thousand buildings in the region with a total building replacement value (excluding contents) of 2,034 (millions of dollars). Approximately 93.00 % of the buildings (and 88.00% of the building value) are associated with residential housing.

The replacement value of the transportation and utility lifeline systems is estimated to be 249 and 96 (millions of dollars) , respectively.

Building and Lifeline Inventory

Building Inventory

Hazus estimates that there are 5 thousand buildings in the region which have an aggregate total replacement value of 2,034 (millions of dollars) . Appendix B provides a general distribution of the building value by Total Region and County.

In terms of building construction types found in the region, wood frame construction makes up 87% of the building inventory. The remaining percentage is distributed between the other general building types.

Critical Facility Inventory

Hazus breaks critical facilities into two (2) groups: essential facilities and high potential loss facilities (HPL). Essential facilities include hospitals, medical clinics, schools, fire stations, police stations and emergency operations facilities. High potential loss facilities include dams, levees, military installations, nuclear power plants and hazardous material sites.

For essential facilities, there are 0 hospitals in the region with a total bed capacity of beds. There are 5 schools, 3 fire stations, 1 police stations and 1 emergency operation facilities. With respect to high potential loss facilities (HPL), there are no dams identified within the inventory. The inventory also includes no hazardous material sites, no military installations and no nuclear power plants.

Transportation and Utility Lifeline Inventory

Within Hazus, the lifeline inventory is divided between transportation and utility lifeline systems. There are seven (7) transportation systems that include highways, railways, light rail, bus, ports, ferry and airports. There are six (6) utility systems that include potable water, wastewater, natural gas, crude & refined oil, electric power and communications. The lifeline inventory data are provided in Tables 1 and 2.

The total value of the lifeline inventory is over 345.00 (millions of dollars). This inventory includes over 27.34 miles of highways, 5 bridges, 606.46 miles of pipes.

Table 1: Transportation System Lifeline Inventory

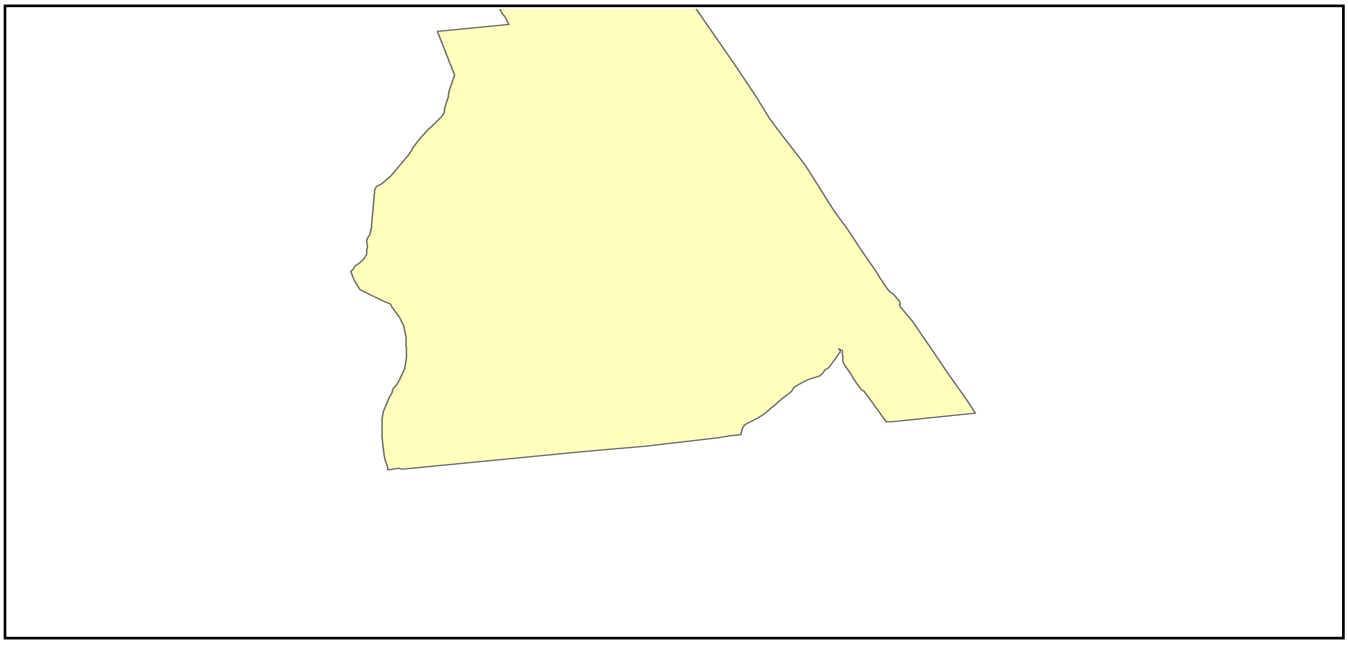
System	Component	# Locations/ # Segments	Replacement value (millions of dollars)
Highway	Bridges	5	10.1431
	Segments	9	239.1284
	Tunnels	0	0.0000
		Subtotal	**249.2715**
Railways	Bridges	0	0.0000
	Facilities	0	0.0000
	Segments	0	0.0000
	Tunnels	0	0.0000
		Subtotal	**0.0000**
Light Rail	Bridges	0	0.0000
	Facilities	0	0.0000
	Segments	0	0.0000
	Tunnels	0	0.0000
		Subtotal	**0.0000**
Bus	Facilities	0	0.0000
		Subtotal	**0.0000**
Ferry	Facilities	0	0.0000
		Subtotal	**0.0000**
Port	Facilities	0	0.0000
		Subtotal	**0.0000**
Airport	Facilities	0	0.0000
	Runways	0	0.0000
		Subtotal	**0.0000**
		Total	**249.30**

Table 2: Utility System Lifeline Inventory

System	Component	# Locations / Segments	Replacement value (millions of dollars)
Potable Water	Distribution Lines	NA	9.7664
	Facilities	0	0.0000
	Pipelines	0	0.0000
		Subtotal	**9.7664**
Waste Water	Distribution Lines	NA	5.8599
	Facilities	1	76.5900
	Pipelines	0	0.0000
		Subtotal	**82.4499**
Natural Gas	Distribution Lines	NA	3.9066
	Facilities	0	0.0000
	Pipelines	0	0.0000
		Subtotal	**3.9066**
Oil Systems	Facilities	0	0.0000
	Pipelines	0	0.0000
		Subtotal	**0.0000**
Electrical Power	Facilities	0	0.0000
		Subtotal	**0.0000**
Communication	Facilities	0	0.0000
		Subtotal	**0.0000**
		Total	**96.10**

Earthquake Scenario

Hazus uses the following set of information to define the earthquake parameters used for the earthquake loss estimate provided in this report.



Scenario Name	EastHaddam
Type of Earthquake	Arbitrary
Fault Name	NA
Historical Epicenter ID #	NA
Probabilistic Return Period	NA
Longitude of Epicenter	-72.40
Latitude of Epicenter	41.50
Earthquake Magnitude	6.40
Depth (km)	10.00
Rupture Length (Km)	NA
Rupture Orientation (degrees)	NA
Attenuation Function	Central & East US (CEUS 2008)

Direct Earthquake Damage

Building Damage

Hazus estimates that about 2,853 buildings will be at least moderately damaged. This is over 53.00 % of the buildings in the region. There are an estimated 601 buildings that will be damaged beyond repair. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the Hazus technical manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 below summarizes the expected damage by general building type.

Damage Categories by General Occupancy Type

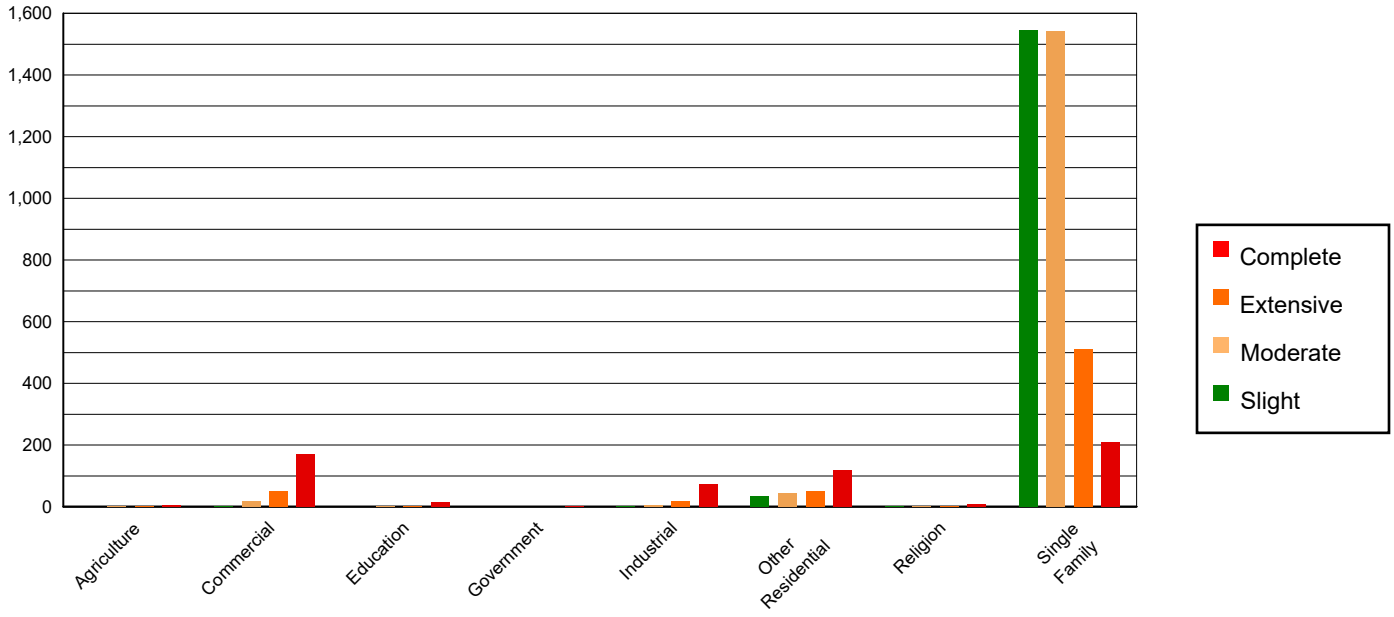


Table 3: Expected Building Damage by Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	0.04	0.00	0.18	0.01	1.25	0.08	2.68	0.42	6.84	1.14
Commercial	0.87	0.10	3.09	0.20	19.23	1.19	49.08	7.73	168.73	28.04
Education	0.05	0.01	0.17	0.01	1.13	0.07	3.38	0.53	13.27	2.21
Government	0.00	0.00	0.01	0.00	0.08	0.00	0.32	0.05	1.60	0.27
Industrial	0.26	0.03	0.82	0.05	5.40	0.33	17.37	2.74	74.15	12.32
Other Residential	17.43	1.90	33.01	2.08	44.97	2.78	49.06	7.73	119.53	19.87
Religion	1.28	0.14	2.20	0.14	2.78	0.17	2.56	0.40	7.17	1.19
Single Family	897.94	97.83	1545.04	97.51	1542.15	95.37	510.47	80.40	210.40	34.97
Total	**918**		**1,585**		**1,617**		**635**		**602**	

Table 4: Expected Building Damage by Building Type (All Design Levels)

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Wood	914.86	99.67	1573.87	99.33	1567.11	96.91	506.79	79.82	117.36	19.50
Steel	0.32	0.03	0.69	0.04	6.10	0.38	30.51	4.80	146.38	24.33
Concrete	0.05	0.01	0.13	0.01	1.15	0.07	5.00	0.79	24.94	4.15
Precast	0.03	0.00	0.06	0.00	0.53	0.03	1.56	0.25	10.64	1.77
RM	0.27	0.03	0.41	0.03	3.08	0.19	7.69	1.21	31.38	5.22
URM	2.21	0.24	8.20	0.52	30.83	1.91	56.16	8.85	199.72	33.19
MH	0.14	0.02	1.18	0.07	8.20	0.51	27.22	4.29	71.26	11.84
Total	**918**		**1,585**		**1,617**		**635**		**602**	

*Note:

RM Reinforced Masonry
URM Unreinforced Masonry
MH Manufactured Housing

Essential Facility Damage

Before the earthquake, the region had hospital beds available for use. On the day of the earthquake, the model estimates that only hospital beds (%) are available for use by patients already in the hospital and those injured by the earthquake. After one week, % of the beds will be back in service. By 30 days, % will be operational.

Table 5: Expected Damage to Essential Facilities

Classification	Total	# Facilities		
		At Least Moderate Damage > 50%	Complete Damage > 50%	With Functionality > 50% on day 1
Hospitals	0	0	0	0
Schools	5	5	5	0
EOCs	1	1	1	0
PoliceStations	1	1	1	0
FireStations	3	3	1	0

Transportation Lifeline Damage

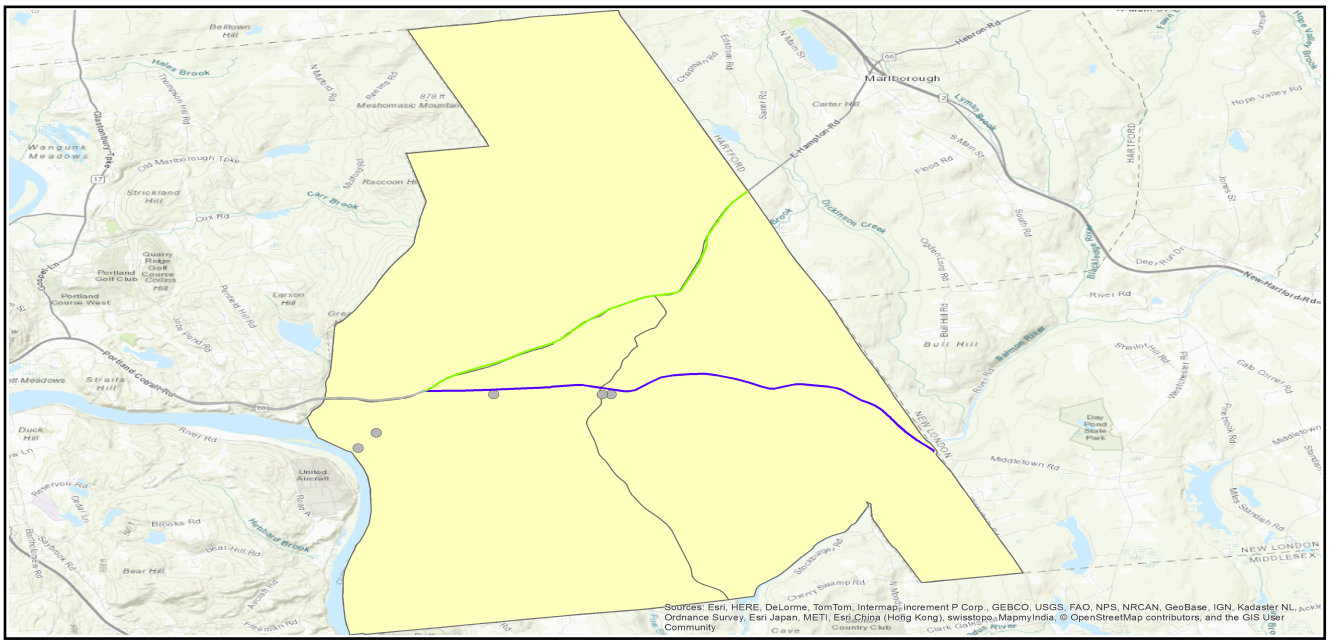


Table 6: Expected Damage to the Transportation Systems

System	Component		Number of Locations			
		Locations/ Segments	With at Least Mod. Damage	With Complete Damage	With Functionality > 50 %	
					After Day 1	After Day 7
Highway	Segments	9	0	0	6	6
	Bridges	5	1	0	5	5
	Tunnels	0	0	0	0	0
Railways	Segments	0	0	0	0	0
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	0	0	0	0	0
Light Rail	Segments	0	0	0	0	0
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	0	0	0	0	0
Bus	Facilities	0	0	0	0	0
Ferry	Facilities	0	0	0	0	0
Port	Facilities	0	0	0	0	0
Airport	Facilities	0	0	0	0	0
	Runways	0	0	0	0	0

Table 6 provides damage estimates for the transportation system.

Note: Roadway segments, railroad tracks and light rail tracks are assumed to be damaged by ground failure only. If ground failure maps are not provided, damage estimates to these components will not be computed.

Tables 7-9 provide information on the damage to the utility lifeline systems. Table 7 provides damage to the utility system facilities. Table 8 provides estimates on the number of leaks and breaks by the pipelines of the utility systems. For electric power and potable water, Hazus performs a simplified system performance analysis. Table 9 provides a summary of the system performance information.

Table 7 : Expected Utility System Facility Damage

System	# of Locations				
	Total #	With at Least Moderate Damage	With Complete Damage	with Functionality > 50 %	
				After Day 1	After Day 7
Potable Water	0	0	0	0	0
Waste Water	1	0	0	0	0
Natural Gas	0	0	0	0	0
Oil Systems	0	0	0	0	0
Electrical Power	0	0	0	0	0
Communication	0	0	0	0	0

Table 8 : Expected Utility System Pipeline Damage (Site Specific)

System	Total Pipelines Length (miles)	Number of Leaks	Number of Breaks
Potable Water	303	0	0
Waste Water	182	0	0
Natural Gas	121	0	0
Oil	0	0	0

Table 9: Expected Potable Water and Electric Power System Performance

	Total # of Households	Number of Households without Service				
		At Day 1	At Day 3	At Day 7	At Day 30	At Day 90
Potable Water						
Electric Power						

Induced Earthquake Damage

Fire Following Earthquake

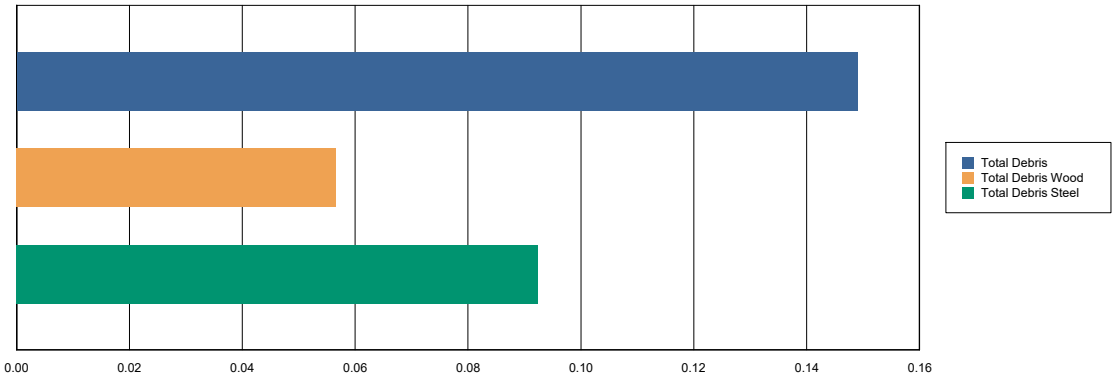
Fires often occur after an earthquake. Because of the number of fires and the lack of water to fight the fires, they can often burn out of control. Hazus uses a Monte Carlo simulation model to estimate the number of ignitions and the amount of burnt area. For this scenario, the model estimates that there will be 0 ignitions that will burn about 0.00 sq. mi 0.00 % of the region's total area.) The model also estimates that the fires will displace about 0 people and burn about 0 (millions of dollars) of building value.

Debris Generation

Hazus estimates the amount of debris that will be generated by the earthquake. The model breaks the debris into two general categories: a) Brick/Wood and b) Reinforced Concrete/Steel. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 149,000 tons of debris will be generated. Of the total amount, Brick/Wood comprises 38.00% of the total, with the remainder being Reinforced Concrete/Steel. If the debris tonnage is converted to an estimated number of truckloads, it will require 5,960 truckloads (@25 tons/truck) to remove the debris generated by the earthquake.

Earthquake Debris (millions of tons)



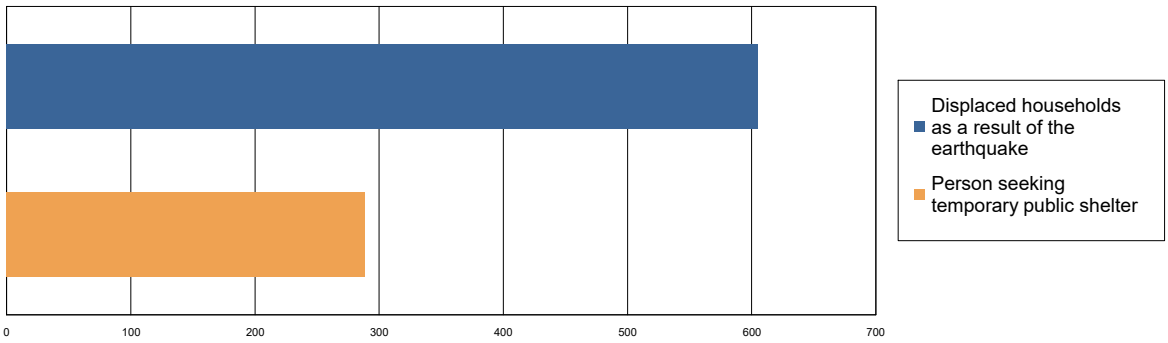
Brick/ Wood	Reinforced Concrete/Steel	Total Debris	Truck Load
0.06	0.09	0.15	5,960 (@25 tons/truck)

Social Impact

Shelter Requirement

Hazus estimates the number of households that are expected to be displaced from their homes due to the earthquake and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 605 households to be displaced due to the earthquake. Of these, 289 people (out of a total population of 12,959) will seek temporary shelter in public shelters.

Displaced Households/ Persons Seeking Short Term Public Shelter



Displaced households as a result of the earthquake	Persons seeking temporary public shelter
605	289

Casualties

Hazus estimates the number of people that will be injured and killed by the earthquake. The casualties are broken down into four (4) severity levels that describe the extent of the injuries. The levels are described as follows;

- Severity Level 1: Injuries will require medical attention but hospitalization is not needed.
- Severity Level 2: Injuries will require hospitalization but are not considered life-threatening
- Severity Level 3: Injuries will require hospitalization and can become life threatening if not promptly treated.
- Severity Level 4: Victims are killed by the earthquake.

The casualty estimates are provided for three (3) times of day: 2:00 AM, 2:00 PM and 5:00 PM. These times represent the periods of the day that different sectors of the community are at their peak occupancy loads. The 2:00 AM estimate considers that the residential occupancy load is maximum, the 2:00 PM estimate considers that the educational, commercial and industrial sector loads are maximum and 5:00 PM represents peak commute time.

Table 10 provides a summary of the casualties estimated for this earthquake

Table 10: Casualty Estimates

		Level 1	Level 2	Level 3	Level 4
2 AM	Commercial	6.06	1.90	0.30	0.59
	Commuting	0.01	0.01	0.01	0.00
	Educational	0.00	0.00	0.00	0.00
	Hotels	0.00	0.00	0.00	0.00
	Industrial	11.20	3.59	0.59	1.16
	Other-Residential	49.24	15.36	2.41	4.73
	Single Family	79.98	19.71	2.51	4.87
	Total	**146**	**41**	**6**	**11**
2 PM	Commercial	341.83	107.02	16.98	33.25
	Commuting	0.05	0.13	0.13	0.03
	Educational	199.44	64.27	10.77	20.91
	Hotels	0.00	0.00	0.00	0.00
	Industrial	83.13	26.65	4.38	8.54
	Other-Residential	9.09	2.86	0.46	0.87
	Single Family	14.35	3.63	0.49	0.90
	Total	**648**	**205**	**33**	**65**
5 PM	Commercial	248.31	77.83	12.48	24.01
	Commuting	0.89	2.36	2.57	0.57
	Educational	51.87	16.74	2.80	5.47
	Hotels	0.00	0.00	0.00	0.00
	Industrial	51.96	16.65	2.74	5.34
	Other-Residential	19.30	6.07	0.98	1.85
	Single Family	32.07	8.12	1.10	2.01
	Total	**404**	**128**	**23**	**39**

Economic Loss

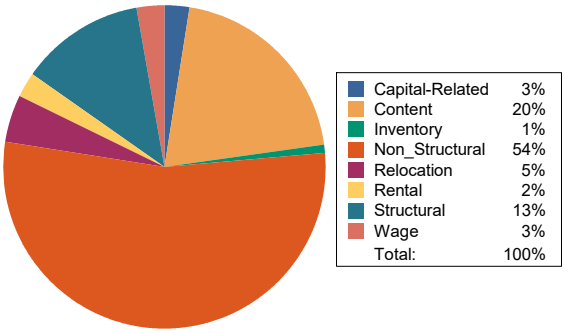
The total economic loss estimated for the earthquake is 787.61 (millions of dollars), which includes building and lifeline related losses based on the region's available inventory. The following three sections provide more detailed information about these losses.

Building-Related Losses

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the earthquake. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the earthquake.

The total building-related losses were 785.23 (millions of dollars); 12 % of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 60 % of the total loss. Table 11 below provides a summary of the losses associated with the building damage.

Earthquake Losses by Loss Type ($ millions)



Earthquake Losses by Occupancy Type ($ millions)

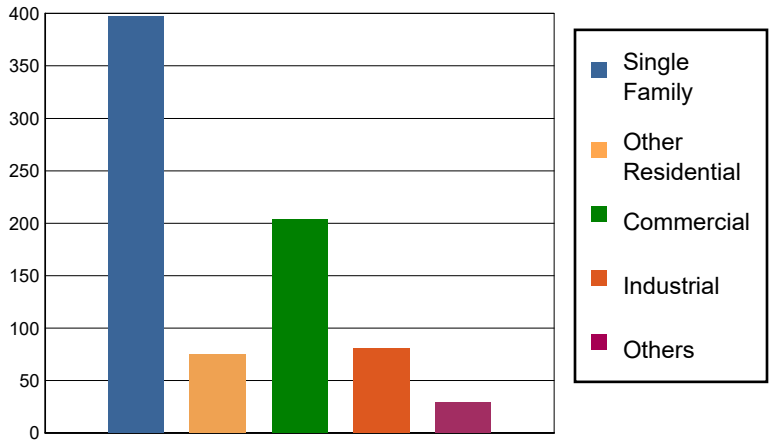


Table 11: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses							
	Wage	0.0000	1.3939	18.1470	1.2476	0.4390	21.2275
	Capital-Related	0.0000	0.5920	18.5002	0.7318	0.1933	20.0173
	Rental	6.2192	4.0635	7.3687	0.3187	0.2156	18.1857
	Relocation	21.9047	2.5152	10.1584	1.3795	2.4729	38.4307
	Subtotal	**28.1239**	**8.5646**	**54.1743**	**3.6776**	**3.3208**	**97.8612**
Capital Stock Losses							
	Structural	52.8464	9.0291	24.4179	8.9111	4.3882	99.5927
	Non_Structural	237.4190	46.3321	85.1183	39.0568	14.3410	422.2672
	Content	78.7668	10.6505	39.1140	24.5225	6.5922	159.6460
	Inventory	0.0000	0.0000	0.9216	4.8656	0.0711	5.8583
	Subtotal	**369.0322**	**66.0117**	**149.5718**	**77.3560**	**25.3925**	**687.3642**
	Total	**397.16**	**74.58**	**203.75**	**81.03**	**28.71**	**785.23**

Transportation and Utility Lifeline Losses

For the transportation and utility lifeline systems, Hazus computes the direct repair cost for each component only. There are no losses computed by Hazus for business interruption due to lifeline outages. Tables 12 & 13 provide a detailed breakdown in the expected lifeline losses.

Table 12: Transportation System Economic Losses
(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Highway	Segments	239.1284	0.0000	0.00
	Bridges	10.1431	2.3813	23.48
	Tunnels	0.0000	0.0000	0.00
	Subtotal	**249.2715**	**2.3813**	
Railways	Segments	0.0000	0.0000	0.00
	Bridges	0.0000	0.0000	0.00
	Tunnels	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Light Rail	Segments	0.0000	0.0000	0.00
	Bridges	0.0000	0.0000	0.00
	Tunnels	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Bus	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Ferry	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Port	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Airport	Facilities	0.0000	0.0000	0.00
	Runways	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
	Total	**249.27**	**2.38**	

Table 13: Utility System Economic Losses

(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Potable Water	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Distribution Lines	9.7664	0.0000	0.00
	Subtotal	**9.7664**	**0.0000**	
Waste Water	Pipelines	0.0000	0.0000	0.00
	Facilities	76.5900	0.0000	0.00
	Distribution Lines	5.8599	0.0000	0.00
	Subtotal	**82.4499**	**0.0000**	
Natural Gas	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Distribution Lines	3.9066	0.0000	0.00
	Subtotal	**3.9066**	**0.0000**	
Oil Systems	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Electrical Power	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Communication	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
	Total	**96.12**	**0.00**	

Appendix A: County Listing for the Region

Middlesex,CT

Appendix B: Regional Population and Building Value Data

State	County Name	Population	Building Value (millions of dollars)		
			Residential	Non-Residential	Total
Connecticut					
	Middlesex	12,959	1,786	248	2,034
Total Region		**12,959**	**1,786**	**248**	**2,034**

Hazus: Earthquake Global Risk Report

Region Name: EastHampton

Earthquake Scenario: Haddam

Print Date: October 16, 2019

Disclaimer:

This version of Hazus utilizes 2010 Census Data.

Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific earthquake. These results can be improved by using enhanced inventory, geotechnical, and observed ground motion data.

Table of Contents

General Description of the Region

Hazus-MH is a regional earthquake loss estimation model that was developed by the Federal Emergency Management Agency (FEMA) and the National Institute of Building Sciences. The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The earthquake loss estimates provided in this report was based on a region that includes 1 county(ies) from the following state(s):

Connecticut

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 36.89 square miles and contains 3 census tracts. There are over 5 thousand households in the region which has a total population of 12,959 people (2010 Census Bureau data). The distribution of population by Total Region and County is provided in Appendix B.

There are an estimated 5 thousand buildings in the region with a total building replacement value (excluding contents) of 2,034 (millions of dollars). Approximately 93.00 % of the buildings (and 88.00% of the building value) are associated with residential housing.

The replacement value of the transportation and utility lifeline systems is estimated to be 249 and 96 (millions of dollars) , respectively.

Building and Lifeline Inventory

Building Inventory

Hazus estimates that there are 5 thousand buildings in the region which have an aggregate total replacement value of 2,034 (millions of dollars) . Appendix B provides a general distribution of the building value by Total Region and County.

In terms of building construction types found in the region, wood frame construction makes up 87% of the building inventory. The remaining percentage is distributed between the other general building types.

Critical Facility Inventory

Hazus breaks critical facilities into two (2) groups: essential facilities and high potential loss facilities (HPL). Essential facilities include hospitals, medical clinics, schools, fire stations, police stations and emergency operations facilities. High potential loss facilities include dams, levees, military installations, nuclear power plants and hazardous material sites.

For essential facilities, there are 0 hospitals in the region with a total bed capacity of beds. There are 5 schools, 3 fire stations, 1 police stations and 1 emergency operation facilities. With respect to high potential loss facilities (HPL), there are no dams identified within the inventory. The inventory also includes no hazardous material sites, no military installations and no nuclear power plants.

Transportation and Utility Lifeline Inventory

Within Hazus, the lifeline inventory is divided between transportation and utility lifeline systems. There are seven (7) transportation systems that include highways, railways, light rail, bus, ports, ferry and airports. There are six (6) utility systems that include potable water, wastewater, natural gas, crude & refined oil, electric power and communications. The lifeline inventory data are provided in Tables 1 and 2.

The total value of the lifeline inventory is over 345.00 (millions of dollars). This inventory includes over 27.34 miles of highways, 5 bridges, 606.46 miles of pipes.

Table 1: Transportation System Lifeline Inventory

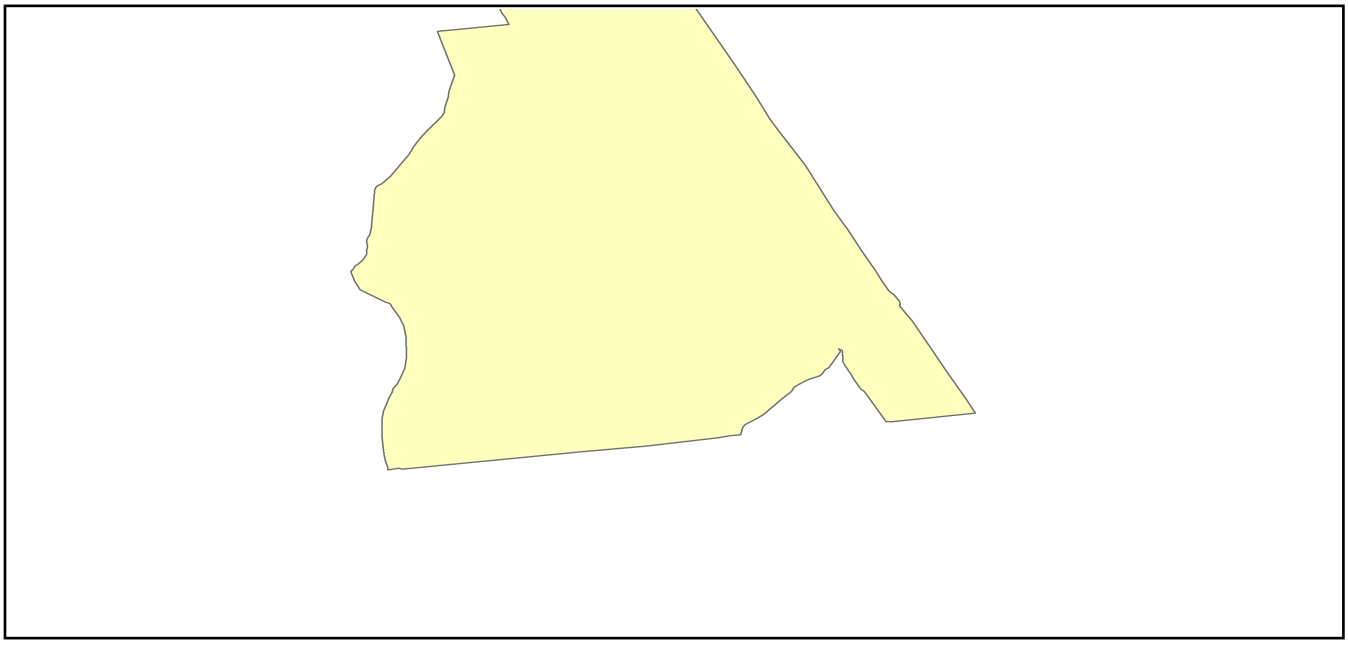
System	Component	# Locations/ # Segments	Replacement value (millions of dollars)
Highway	Bridges	5	10.1431
	Segments	9	239.1284
	Tunnels	0	0.0000
		Subtotal	**249.2715**
Railways	Bridges	0	0.0000
	Facilities	0	0.0000
	Segments	0	0.0000
	Tunnels	0	0.0000
		Subtotal	**0.0000**
Light Rail	Bridges	0	0.0000
	Facilities	0	0.0000
	Segments	0	0.0000
	Tunnels	0	0.0000
		Subtotal	**0.0000**
Bus	Facilities	0	0.0000
		Subtotal	**0.0000**
Ferry	Facilities	0	0.0000
		Subtotal	**0.0000**
Port	Facilities	0	0.0000
		Subtotal	**0.0000**
Airport	Facilities	0	0.0000
	Runways	0	0.0000
		Subtotal	**0.0000**
		Total	**249.30**

Table 2: Utility System Lifeline Inventory

System	Component	# Locations / Segments	Replacement value (millions of dollars)
Potable Water	Distribution Lines	NA	9.7664
	Facilities	0	0.0000
	Pipelines	0	0.0000
		Subtotal	**9.7664**
Waste Water	Distribution Lines	NA	5.8599
	Facilities	1	76.5900
	Pipelines	0	0.0000
		Subtotal	**82.4499**
Natural Gas	Distribution Lines	NA	3.9066
	Facilities	0	0.0000
	Pipelines	0	0.0000
		Subtotal	**3.9066**
Oil Systems	Facilities	0	0.0000
	Pipelines	0	0.0000
		Subtotal	**0.0000**
Electrical Power	Facilities	0	0.0000
		Subtotal	**0.0000**
Communication	Facilities	0	0.0000
		Subtotal	**0.0000**
		Total	**96.10**

Earthquake Scenario

Hazus uses the following set of information to define the earthquake parameters used for the earthquake loss estimate provided in this report.



Scenario Name	Haddam
Type of Earthquake	Arbitrary
Fault Name	NA
Historical Epicenter ID #	NA
Probabilistic Return Period	NA
Longitude of Epicenter	-72.50
Latitude of Epicenter	41.50
Earthquake Magnitude	5.70
Depth (km)	10.00
Rupture Length (Km)	NA
Rupture Orientation (degrees)	NA
Attenuation Function	Central & East US (CEUS 2008)

Direct Earthquake Damage

Building Damage

Hazus estimates that about 2,194 buildings will be at least moderately damaged. This is over 41.00 % of the buildings in the region. There are an estimated 366 buildings that will be damaged beyond repair. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the Hazus technical manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 below summarizes the expected damage by general building type.

Damage Categories by General Occupancy Type

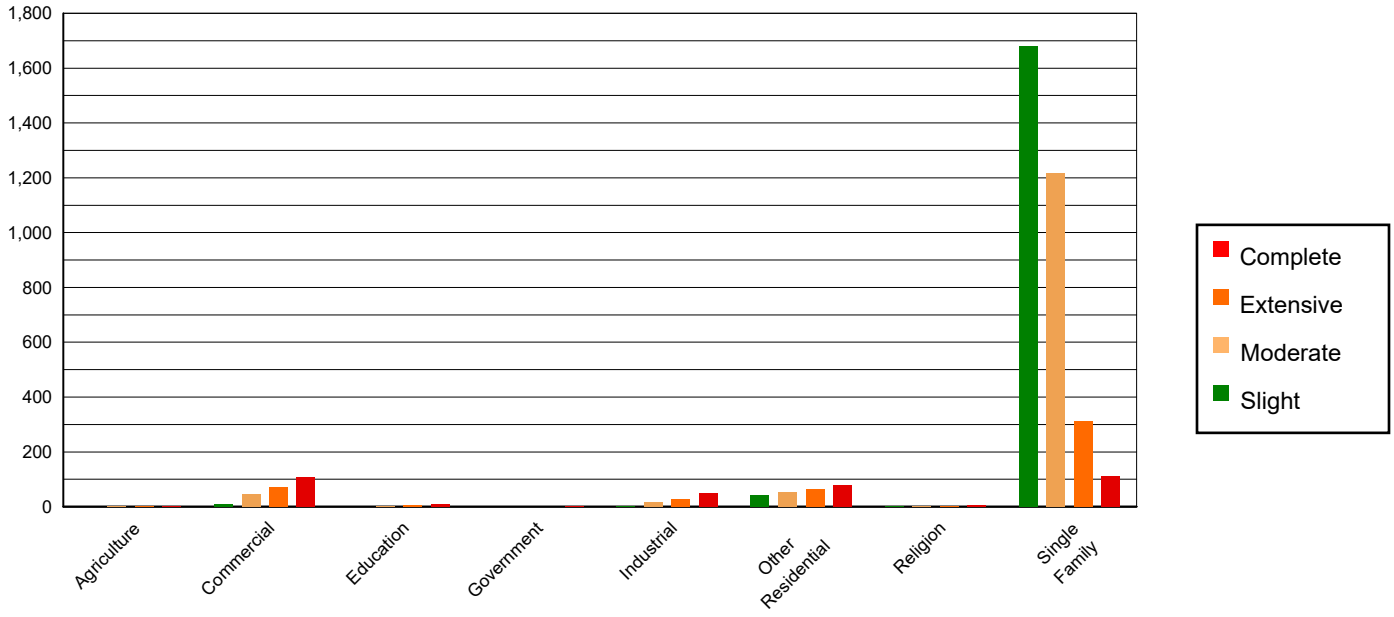


Table 3: Expected Building Damage by Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	0.19	0.01	0.63	0.04	2.66	0.20	3.31	0.67	4.20	1.15
Commercial	3.96	0.28	10.66	0.61	44.74	3.34	72.61	14.80	109.03	29.77
Education	0.27	0.02	0.69	0.04	3.03	0.23	5.53	1.13	8.48	2.32
Government	0.02	0.00	0.05	0.00	0.26	0.02	0.59	0.12	1.08	0.30
Industrial	1.33	0.09	3.19	0.18	14.82	1.11	29.82	6.08	48.85	13.34
Other Residential	29.54	2.08	40.65	2.34	52.03	3.89	63.06	12.85	78.72	21.49
Religion	1.99	0.14	2.64	0.15	3.27	0.24	3.30	0.67	4.80	1.31
Single Family	1385.70	97.38	1679.63	96.63	1217.10	90.97	312.43	63.68	111.14	30.34
Total	**1,423**		**1,738**		**1,338**		**491**		**366**	

Table 4: Expected Building Damage by Building Type (All Design Levels)

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Wood	1410.87	99.15	1706.84	98.20	1227.72	91.76	289.94	59.09	44.61	12.18
Steel	1.79	0.13	3.52	0.20	21.45	1.60	57.50	11.72	99.74	27.23
Concrete	0.29	0.02	0.59	0.03	3.76	0.28	9.80	2.00	16.83	4.59
Precast	0.14	0.01	0.22	0.01	1.43	0.11	3.33	0.68	7.71	2.10
RM	1.12	0.08	1.35	0.08	7.08	0.53	13.85	2.82	19.43	5.31
URM	8.12	0.57	22.05	1.27	59.99	4.48	77.37	15.77	129.58	35.37
MH	0.68	0.05	3.56	0.21	16.49	1.23	38.85	7.92	48.41	13.22
Total	**1,423**		**1,738**		**1,338**		**491**		**366**	

*Note:

RM Reinforced Masonry
URM Unreinforced Masonry
MH Manufactured Housing

Essential Facility Damage

Before the earthquake, the region had hospital beds available for use. On the day of the earthquake, the model estimates that only hospital beds (%) are available for use by patients already in the hospital and those injured by the earthquake. After one week, % of the beds will be back in service. By 30 days, % will be operational.

Table 5: Expected Damage to Essential Facilities

Classification	Total	# Facilities		
		At Least Moderate Damage > 50%	Complete Damage > 50%	With Functionality > 50% on day 1
Hospitals	0	0	0	0
Schools	5	5	3	0
EOCs	1	1	1	0
PoliceStations	1	1	1	0
FireStations	3	3	1	0

Transportation Lifeline Damage

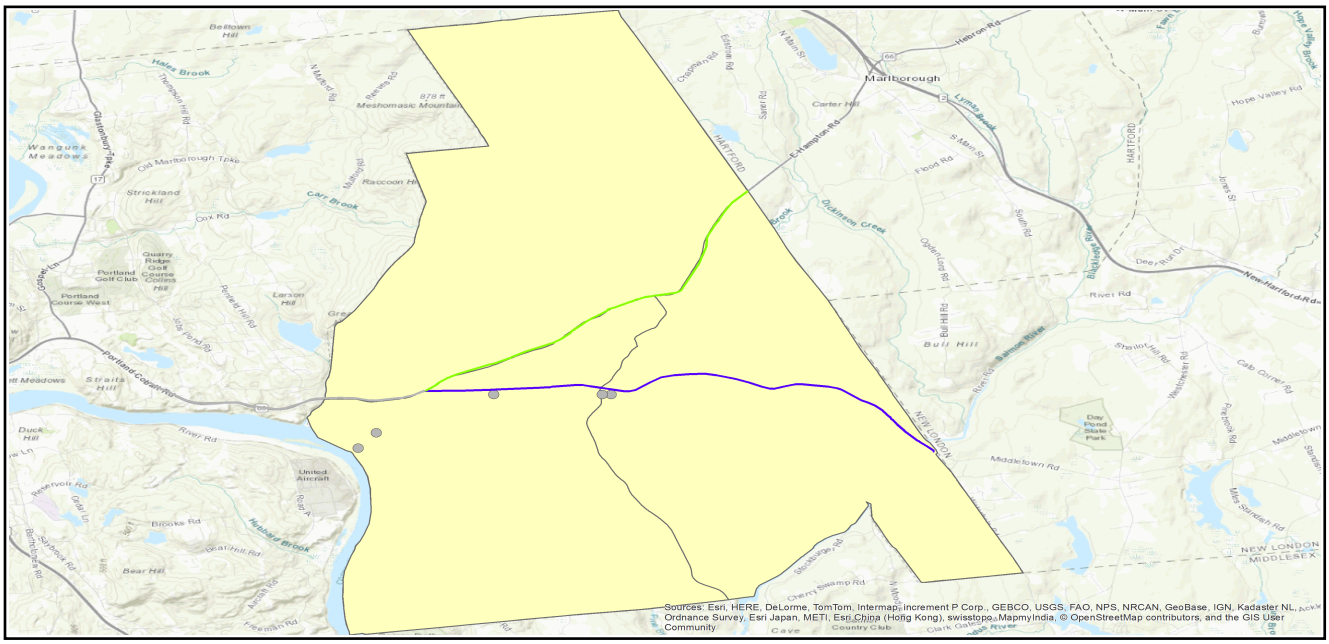


Table 6: Expected Damage to the Transportation Systems

System	Component		Number of Locations			
		Locations/ Segments	With at Least Mod. Damage	With Complete Damage	With Functionality > 50 %	
					After Day 1	After Day 7
Highway	Segments	9	0	0	6	6
	Bridges	5	0	0	5	5
	Tunnels	0	0	0	0	0
Railways	Segments	0	0	0	0	0
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	0	0	0	0	0
Light Rail	Segments	0	0	0	0	0
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	0	0	0	0	0
Bus	Facilities	0	0	0	0	0
Ferry	Facilities	0	0	0	0	0
Port	Facilities	0	0	0	0	0
Airport	Facilities	0	0	0	0	0
	Runways	0	0	0	0	0

Table 6 provides damage estimates for the transportation system.

Note: Roadway segments, railroad tracks and light rail tracks are assumed to be damaged by ground failure only. If ground failure maps are not provided, damage estimates to these components will not be computed.

Tables 7-9 provide information on the damage to the utility lifeline systems. Table 7 provides damage to the utility system facilities. Table 8 provides estimates on the number of leaks and breaks by the pipelines of the utility systems. For electric power and potable water, Hazus performs a simplified system performance analysis. Table 9 provides a summary of the system performance information.

Table 7 : Expected Utility System Facility Damage

System	# of Locations				
	Total #	With at Least Moderate Damage	With Complete Damage	with Functionality > 50 %	
				After Day 1	After Day 7
Potable Water	0	0	0	0	0
Waste Water	1	0	0	0	0
Natural Gas	0	0	0	0	0
Oil Systems	0	0	0	0	0
Electrical Power	0	0	0	0	0
Communication	0	0	0	0	0

Table 8 : Expected Utility System Pipeline Damage (Site Specific)

System	Total Pipelines Length (miles)	Number of Leaks	Number of Breaks
Potable Water	303	0	0
Waste Water	182	0	0
Natural Gas	121	0	0
Oil	0	0	0

Table 9: Expected Potable Water and Electric Power System Performance

	Total # of Households	Number of Households without Service				
		At Day 1	At Day 3	At Day 7	At Day 30	At Day 90
Potable Water						
Electric Power						

Induced Earthquake Damage

Fire Following Earthquake

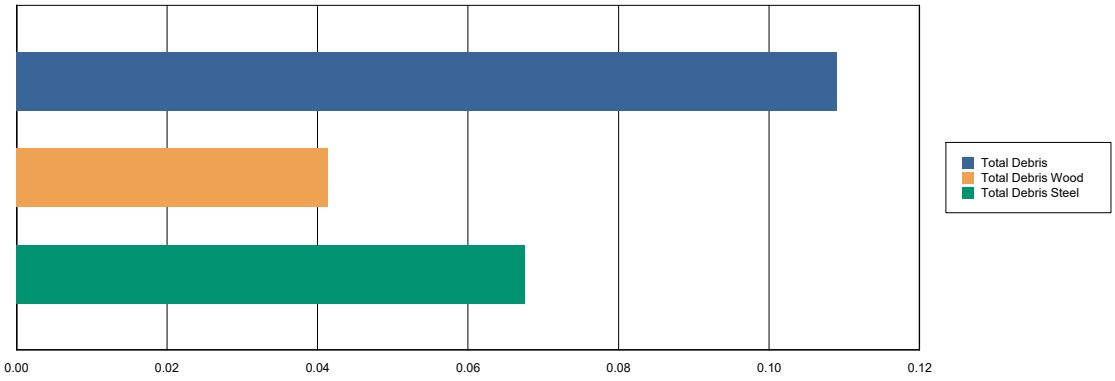
Fires often occur after an earthquake. Because of the number of fires and the lack of water to fight the fires, they can often burn out of control. Hazus uses a Monte Carlo simulation model to estimate the number of ignitions and the amount of burnt area. For this scenario, the model estimates that there will be 0 ignitions that will burn about 0.00 sq. mi 0.00 % of the region's total area.) The model also estimates that the fires will displace about 0 people and burn about 0 (millions of dollars) of building value.

Debris Generation

Hazus estimates the amount of debris that will be generated by the earthquake. The model breaks the debris into two general categories: a) Brick/Wood and b) Reinforced Concrete/Steel. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 109,000 tons of debris will be generated. Of the total amount, Brick/Wood comprises 38.00% of the total, with the remainder being Reinforced Concrete/Steel. If the debris tonnage is converted to an estimated number of truckloads, it will require 4,360 truckloads (@25 tons/truck) to remove the debris generated by the earthquake.

Earthquake Debris (millions of tons)



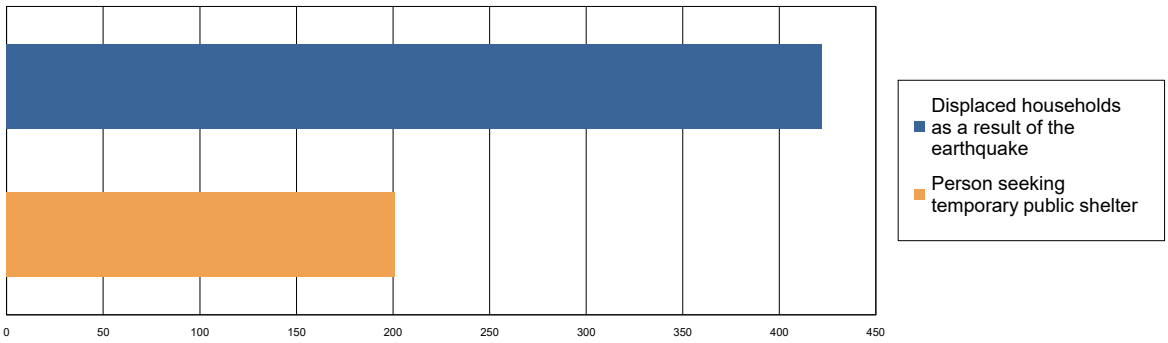
Brick/ Wood	Reinforced Concrete/Steel	Total Debris	Truck Load
0.04	0.07	0.11	4,360 (@25 tons/truck)

Social Impact

Shelter Requirement

Hazus estimates the number of households that are expected to be displaced from their homes due to the earthquake and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 422 households to be displaced due to the earthquake. Of these, 201 people (out of a total population of 12,959) will seek temporary shelter in public shelters.

Displaced Households/ Persons Seeking Short Term Public Shelter



Displaced households as a result of the earthquake	Persons seeking temporary public shelter
422	201

Casualties

Hazus estimates the number of people that will be injured and killed by the earthquake. The casualties are broken down into four (4) severity levels that describe the extent of the injuries. The levels are described as follows;

- Severity Level 1: Injuries will require medical attention but hospitalization is not needed.
- Severity Level 2: Injuries will require hospitalization but are not considered life-threatening
- Severity Level 3: Injuries will require hospitalization and can become life threatening if not promptly treated.
- Severity Level 4: Victims are killed by the earthquake.

The casualty estimates are provided for three (3) times of day: 2:00 AM, 2:00 PM and 5:00 PM. These times represent the periods of the day that different sectors of the community are at their peak occupancy loads. The 2:00 AM estimate considers that the residential occupancy load is maximum, the 2:00 PM estimate considers that the educational, commercial and industrial sector loads are maximum and 5:00 PM represents peak commute time.

Table 10 provides a summary of the casualties estimated for this earthquake

Table 10: Casualty Estimates

		Level 1	Level 2	Level 3	Level 4
2 AM	Commercial	4.14	1.25	0.20	0.38
	Commuting	0.00	0.01	0.01	0.00
	Educational	0.00	0.00	0.00	0.00
	Hotels	0.00	0.00	0.00	0.00
	Industrial	7.75	2.40	0.39	0.76
	Other-Residential	33.97	10.25	1.59	3.11
	Single Family	50.20	11.94	1.56	3.06
	Total	**96**	**26**	**4**	**7**
2 PM	Commercial	233.38	70.74	11.07	21.66
	Commuting	0.02	0.05	0.06	0.01
	Educational	137.03	42.85	7.11	13.80
	Hotels	0.00	0.00	0.00	0.00
	Industrial	57.45	17.81	2.88	5.62
	Other-Residential	6.28	1.92	0.31	0.58
	Single Family	9.07	2.23	0.31	0.57
	Total	**443**	**136**	**22**	**42**
5 PM	Commercial	169.21	51.38	8.12	15.63
	Commuting	0.40	0.96	1.11	0.24
	Educational	36.01	11.29	1.87	3.65
	Hotels	0.00	0.00	0.00	0.00
	Industrial	35.90	11.13	1.80	3.51
	Other-Residential	13.29	4.05	0.64	1.22
	Single Family	20.06	4.93	0.68	1.26
	Total	**275**	**84**	**14**	**26**

Economic Loss

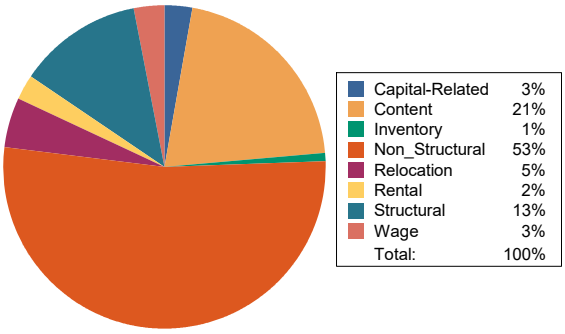
The total economic loss estimated for the earthquake is 564.86 (millions of dollars), which includes building and lifeline related losses based on the region's available inventory. The following three sections provide more detailed information about these losses.

Building-Related Losses

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the earthquake. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the earthquake.

The total building-related losses were 563.65 (millions of dollars); 13 % of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 59 % of the total loss. Table 11 below provides a summary of the losses associated with the building damage.

Earthquake Losses by Loss Type ($ millions)



Earthquake Losses by Occupancy Type ($ millions)

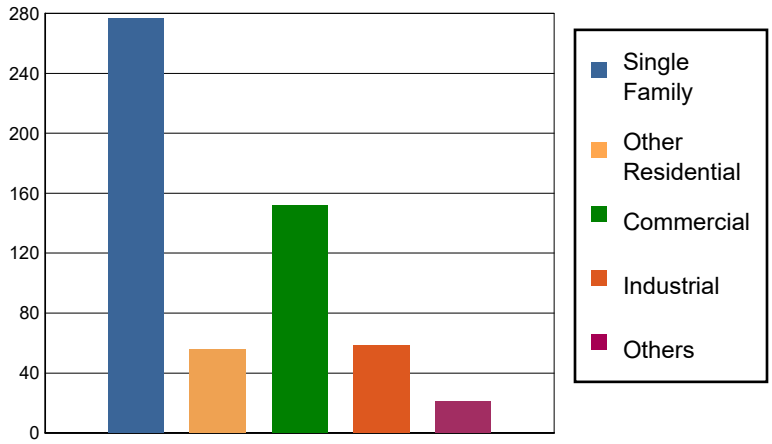


Table 11: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses							
	Wage	0.0000	1.1146	14.3509	1.0000	0.3527	16.8182
	Capital-Related	0.0000	0.4734	14.5752	0.5875	0.1527	15.7888
	Rental	4.0960	3.1290	6.0267	0.2625	0.1720	13.6862
	Relocation	14.5475	1.9754	8.4159	1.1708	1.9963	28.1059
	Subtotal	**18.6435**	**6.6924**	**43.3687**	**3.0208**	**2.6737**	**74.3991**
Capital Stock Losses							
	Structural	34.5584	6.9131	18.8155	6.9571	3.3625	70.6066
	Non_Structural	163.3739	34.0644	61.2701	27.5665	10.4409	296.7158
	Content	60.0220	7.9266	27.7660	17.3386	4.7456	117.7988
	Inventory	0.0000	0.0000	0.6575	3.4251	0.0491	4.1317
	Subtotal	**257.9543**	**48.9041**	**108.5091**	**55.2873**	**18.5981**	**489.2529**
	Total	**276.60**	**55.60**	**151.88**	**58.31**	**21.27**	**563.65**

Transportation and Utility Lifeline Losses

For the transportation and utility lifeline systems, Hazus computes the direct repair cost for each component only. There are no losses computed by Hazus for business interruption due to lifeline outages. Tables 12 & 13 provide a detailed breakdown in the expected lifeline losses.

Table 12: Transportation System Economic Losses
(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Highway	Segments	239.1284	0.0000	0.00
	Bridges	10.1431	1.2096	11.93
	Tunnels	0.0000	0.0000	0.00
	Subtotal	**249.2715**	**1.2096**	
Railways	Segments	0.0000	0.0000	0.00
	Bridges	0.0000	0.0000	0.00
	Tunnels	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Light Rail	Segments	0.0000	0.0000	0.00
	Bridges	0.0000	0.0000	0.00
	Tunnels	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Bus	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Ferry	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Port	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Airport	Facilities	0.0000	0.0000	0.00
	Runways	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
	Total	**249.27**	**1.21**	

Table 13: Utility System Economic Losses

(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Potable Water	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Distribution Lines	9.7664	0.0000	0.00
	Subtotal	**9.7664**	**0.0000**	
Waste Water	Pipelines	0.0000	0.0000	0.00
	Facilities	76.5900	0.0000	0.00
	Distribution Lines	5.8599	0.0000	0.00
	Subtotal	**82.4499**	**0.0000**	
Natural Gas	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Distribution Lines	3.9066	0.0000	0.00
	Subtotal	**3.9066**	**0.0000**	
Oil Systems	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Electrical Power	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Communication	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
	Total	**96.12**	**0.00**	

Appendix A: County Listing for the Region

Middlesex,CT

Appendix B: Regional Population and Building Value Data

State	County Name	Population	Building Value (millions of dollars)		
			Residential	Non-Residential	Total
Connecticut					
	Middlesex	12,959	1,786	248	2,034
Total Region		**12,959**	**1,786**	**248**	**2,034**

Hazus: Earthquake Global Risk Report

Region Name: EastHampton

Earthquake Scenario: Portland

Print Date: October 16, 2019

Disclaimer:

This version of Hazus utilizes 2010 Census Data.

Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific earthquake. These results can be improved by using enhanced inventory, geotechnical, and observed ground motion data.

Table of Contents

General Description of the Region

Hazus-MH is a regional earthquake loss estimation model that was developed by the Federal Emergency Management Agency (FEMA) and the National Institute of Building Sciences. The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The earthquake loss estimates provided in this report was based on a region that includes 1 county(ies) from the following state(s):

Connecticut

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 36.89 square miles and contains 3 census tracts. There are over 5 thousand households in the region which has a total population of 12,959 people (2010 Census Bureau data). The distribution of population by Total Region and County is provided in Appendix B.

There are an estimated 5 thousand buildings in the region with a total building replacement value (excluding contents) of 2,034 (millions of dollars). Approximately 93.00 % of the buildings (and 88.00% of the building value) are associated with residential housing.

The replacement value of the transportation and utility lifeline systems is estimated to be 249 and 96 (millions of dollars) , respectively.

Building and Lifeline Inventory

Building Inventory

Hazus estimates that there are 5 thousand buildings in the region which have an aggregate total replacement value of 2,034 (millions of dollars) . Appendix B provides a general distribution of the building value by Total Region and County.

In terms of building construction types found in the region, wood frame construction makes up 87% of the building inventory. The remaining percentage is distributed between the other general building types.

Critical Facility Inventory

Hazus breaks critical facilities into two (2) groups: essential facilities and high potential loss facilities (HPL). Essential facilities include hospitals, medical clinics, schools, fire stations, police stations and emergency operations facilities. High potential loss facilities include dams, levees, military installations, nuclear power plants and hazardous material sites.

For essential facilities, there are 0 hospitals in the region with a total bed capacity of beds. There are 5 schools, 3 fire stations, 1 police stations and 1 emergency operation facilities. With respect to high potential loss facilities (HPL), there are no dams identified within the inventory. The inventory also includes no hazardous material sites, no military installations and no nuclear power plants.

Transportation and Utility Lifeline Inventory

Within Hazus, the lifeline inventory is divided between transportation and utility lifeline systems. There are seven (7) transportation systems that include highways, railways, light rail, bus, ports, ferry and airports. There are six (6) utility systems that include potable water, wastewater, natural gas, crude & refined oil, electric power and communications. The lifeline inventory data are provided in Tables 1 and 2.

The total value of the lifeline inventory is over 345.00 (millions of dollars). This inventory includes over 27.34 miles of highways, 5 bridges, 606.46 miles of pipes.

Table 1: Transportation System Lifeline Inventory

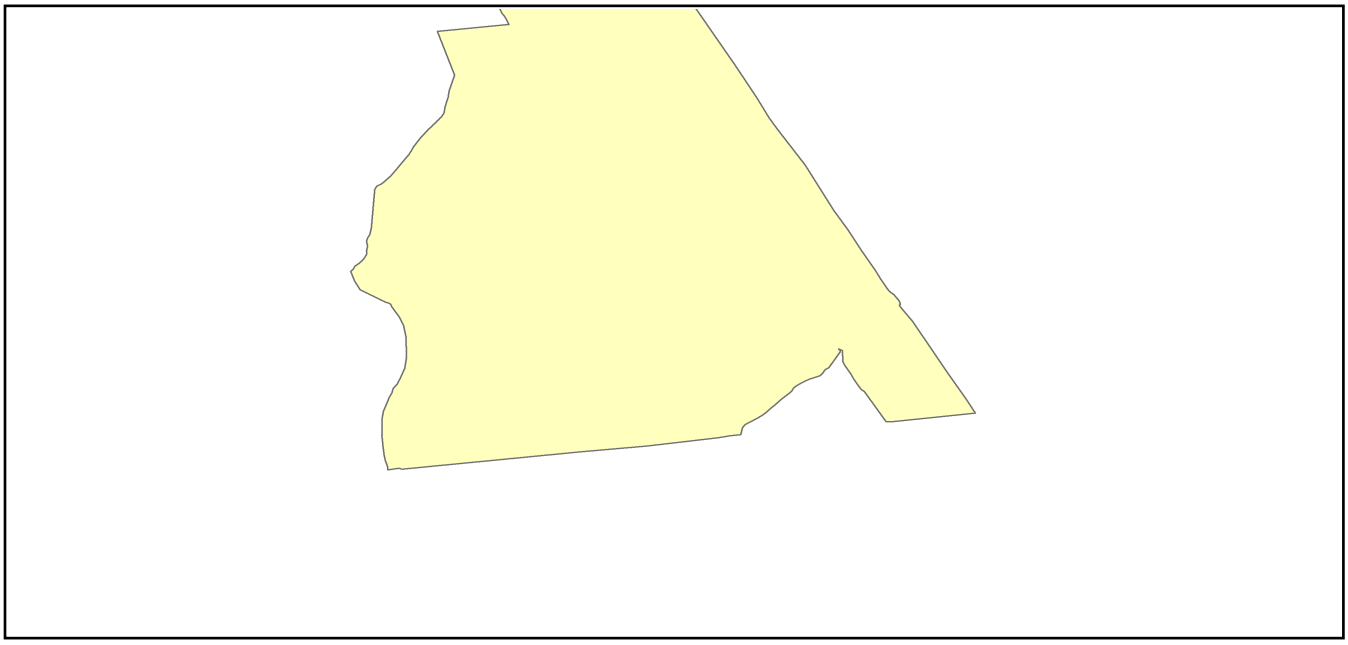
System	Component	# Locations/ # Segments	Replacement value (millions of dollars)
Highway	Bridges	5	10.1431
	Segments	9	239.1284
	Tunnels	0	0.0000
		Subtotal	**249.2715**
Railways	Bridges	0	0.0000
	Facilities	0	0.0000
	Segments	0	0.0000
	Tunnels	0	0.0000
		Subtotal	**0.0000**
Light Rail	Bridges	0	0.0000
	Facilities	0	0.0000
	Segments	0	0.0000
	Tunnels	0	0.0000
		Subtotal	**0.0000**
Bus	Facilities	0	0.0000
		Subtotal	**0.0000**
Ferry	Facilities	0	0.0000
		Subtotal	**0.0000**
Port	Facilities	0	0.0000
		Subtotal	**0.0000**
Airport	Facilities	0	0.0000
	Runways	0	0.0000
		Subtotal	**0.0000**
		Total	**249.30**

Table 2: Utility System Lifeline Inventory

System	Component	# Locations / Segments	Replacement value (millions of dollars)
Potable Water	Distribution Lines	NA	9.7664
	Facilities	0	0.0000
	Pipelines	0	0.0000
		Subtotal	**9.7664**
Waste Water	Distribution Lines	NA	5.8599
	Facilities	1	76.5900
	Pipelines	0	0.0000
		Subtotal	**82.4499**
Natural Gas	Distribution Lines	NA	3.9066
	Facilities	0	0.0000
	Pipelines	0	0.0000
		Subtotal	**3.9066**
Oil Systems	Facilities	0	0.0000
	Pipelines	0	0.0000
		Subtotal	**0.0000**
Electrical Power	Facilities	0	0.0000
		Subtotal	**0.0000**
Communication	Facilities	0	0.0000
		Subtotal	**0.0000**
		Total	**96.10**

Earthquake Scenario

Hazus uses the following set of information to define the earthquake parameters used for the earthquake loss estimate provided in this report.



Scenario Name	Portland
Type of Earthquake	Arbitrary
Fault Name	NA
Historical Epicenter ID #	NA
Probabilistic Return Period	NA
Longitude of Epicenter	-72.60
Latitude of Epicenter	41.60
Earthquake Magnitude	5.70
Depth (km)	10.00
Rupture Length (Km)	NA
Rupture Orientation (degrees)	NA
Attenuation Function	Central & East US (CEUS 2008)

Direct Earthquake Damage

Building Damage

Hazus estimates that about 2,212 buildings will be at least moderately damaged. This is over 41.00 % of the buildings in the region. There are an estimated 374 buildings that will be damaged beyond repair. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the Hazus technical manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 below summarizes the expected damage by general building type.

Damage Categories by General Occupancy Type

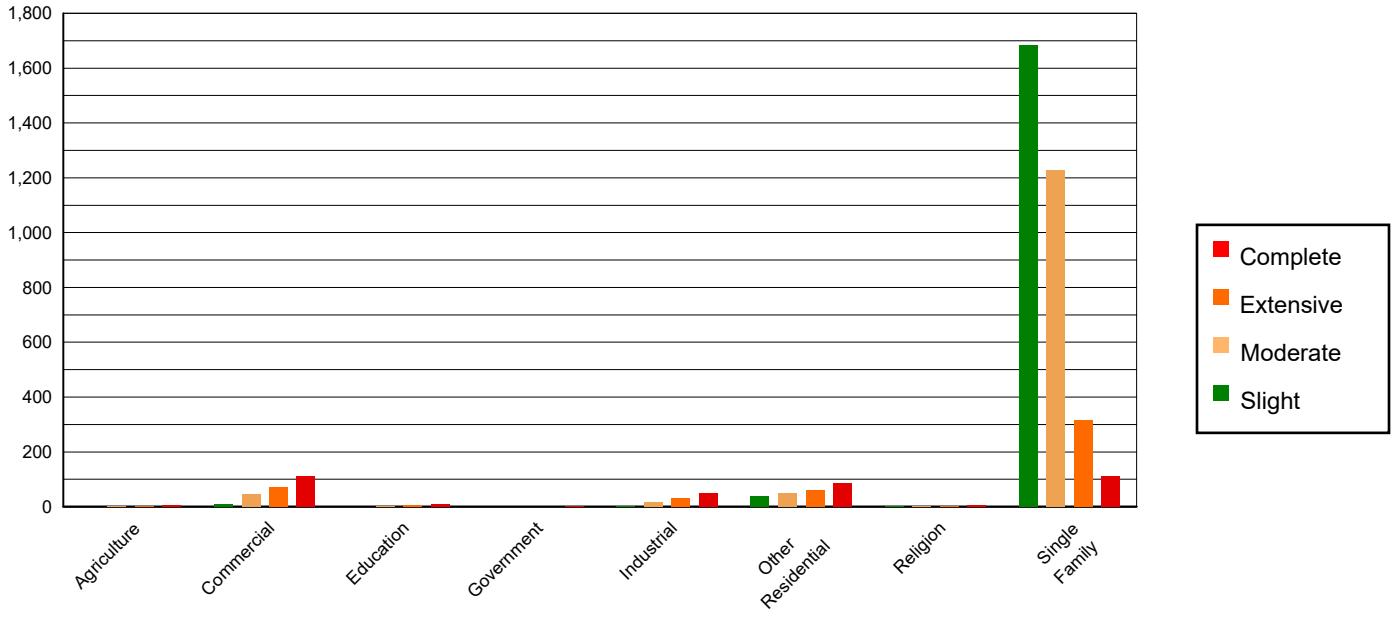


Table 3: Expected Building Damage by Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	0.18	0.01	0.60	0.03	2.61	0.19	3.32	0.67	4.29	1.15
Commercial	3.83	0.27	10.46	0.60	44.31	3.29	72.52	14.73	109.88	29.35
Education	0.31	0.02	0.76	0.04	3.19	0.24	5.59	1.14	8.16	2.18
Government	0.02	0.00	0.06	0.00	0.28	0.02	0.61	0.12	1.03	0.28
Industrial	1.39	0.10	3.31	0.19	15.13	1.12	30.04	6.10	48.14	12.86
Other Residential	29.99	2.14	39.69	2.28	48.60	3.61	60.88	12.37	84.84	22.66
Religion	1.84	0.13	2.58	0.15	3.22	0.24	3.26	0.66	5.10	1.36
Single Family	1364.94	97.32	1683.10	96.70	1228.92	91.28	316.10	64.21	112.94	30.17
Total	**1,402**		**1,741**		**1,346**		**492**		**374**	

Table 4: Expected Building Damage by Building Type (All Design Levels)

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Wood	1391.00	99.18	1710.74	98.29	1239.48	92.07	293.50	59.62	45.26	12.09
Steel	1.75	0.12	3.47	0.20	21.30	1.58	57.50	11.68	99.97	26.70
Concrete	0.28	0.02	0.58	0.03	3.75	0.28	9.81	1.99	16.85	4.50
Precast	0.13	0.01	0.22	0.01	1.42	0.11	3.32	0.67	7.73	2.06
RM	1.12	0.08	1.36	0.08	7.10	0.53	13.88	2.82	19.38	5.18
URM	7.81	0.56	21.77	1.25	59.85	4.45	77.44	15.73	130.24	34.79
MH	0.39	0.03	2.42	0.14	13.36	0.99	36.86	7.49	54.97	14.68
Total	**1,402**		**1,741**		**1,346**		**492**		**374**	

*Note:

RM Reinforced Masonry
URM Unreinforced Masonry
MH Manufactured Housing

Essential Facility Damage

Before the earthquake, the region had hospital beds available for use. On the day of the earthquake, the model estimates that only hospital beds (%) are available for use by patients already in the hospital and those injured by the earthquake. After one week, % of the beds will be back in service. By 30 days, % will be operational.

Table 5: Expected Damage to Essential Facilities

Classification	Total	# Facilities		
		At Least Moderate Damage > 50%	Complete Damage > 50%	With Functionality > 50% on day 1
Hospitals	0	0	0	0
Schools	5	5	3	0
EOCs	1	1	1	0
PoliceStations	1	1	1	0
FireStations	3	3	1	0

Transportation Lifeline Damage

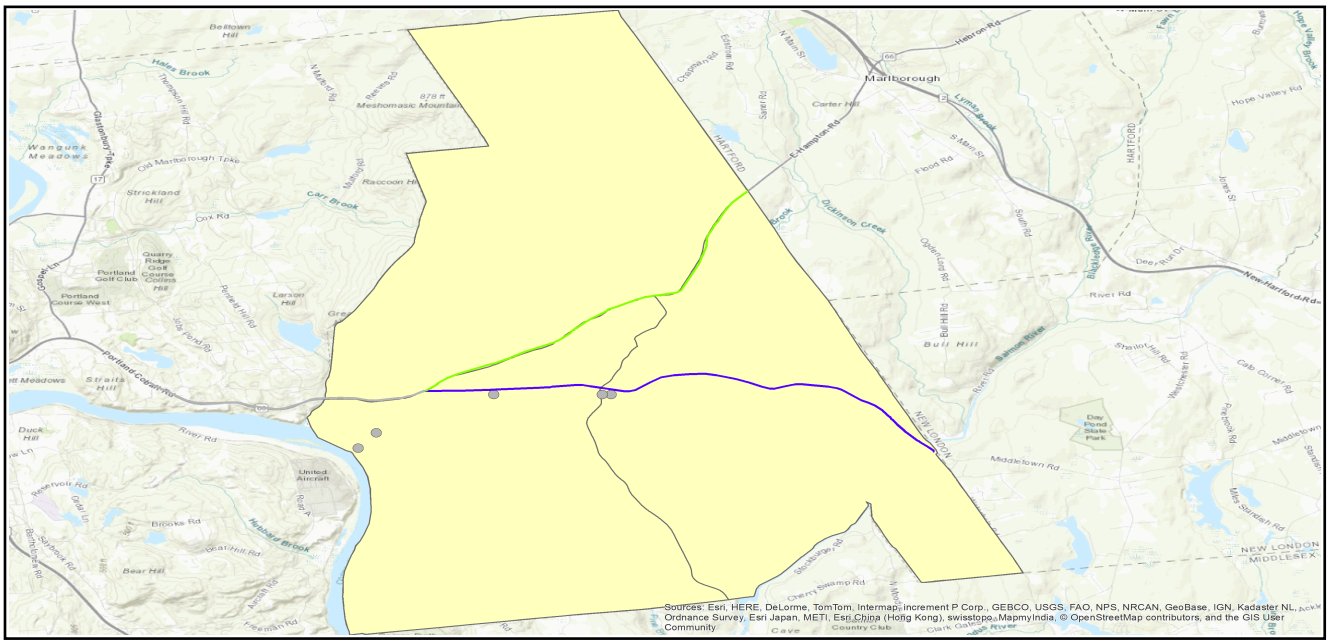


Table 6: Expected Damage to the Transportation Systems

System	Component		Number of Locations			
		Locations/ Segments	With at Least Mod. Damage	With Complete Damage	With Functionality > 50 %	
					After Day 1	After Day 7
Highway	Segments	9	0	0	6	6
	Bridges	5	0	0	5	5
	Tunnels	0	0	0	0	0
Railways	Segments	0	0	0	0	0
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	0	0	0	0	0
Light Rail	Segments	0	0	0	0	0
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	0	0	0	0	0
Bus	Facilities	0	0	0	0	0
Ferry	Facilities	0	0	0	0	0
Port	Facilities	0	0	0	0	0
Airport	Facilities	0	0	0	0	0
	Runways	0	0	0	0	0

Table 6 provides damage estimates for the transportation system.

Note: Roadway segments, railroad tracks and light rail tracks are assumed to be damaged by ground failure only. If ground failure maps are not provided, damage estimates to these components will not be computed.

Tables 7-9 provide information on the damage to the utility lifeline systems. Table 7 provides damage to the utility system facilities. Table 8 provides estimates on the number of leaks and breaks by the pipelines of the utility systems. For electric power and potable water, Hazus performs a simplified system performance analysis. Table 9 provides a summary of the system performance information.

Table 7 : Expected Utility System Facility Damage

System	# of Locations				
	Total #	With at Least Moderate Damage	With Complete Damage	with Functionality > 50 %	
				After Day 1	After Day 7
Potable Water	0	0	0	0	0
Waste Water	1	0	0	0	0
Natural Gas	0	0	0	0	0
Oil Systems	0	0	0	0	0
Electrical Power	0	0	0	0	0
Communication	0	0	0	0	0

Table 8 : Expected Utility System Pipeline Damage (Site Specific)

System	Total Pipelines Length (miles)	Number of Leaks	Number of Breaks
Potable Water	303	0	0
Waste Water	182	0	0
Natural Gas	121	0	0
Oil	0	0	0

Table 9: Expected Potable Water and Electric Power System Performance

	Total # of Households	Number of Households without Service				
		At Day 1	At Day 3	At Day 7	At Day 30	At Day 90
Potable Water						
Electric Power						

Induced Earthquake Damage

Fire Following Earthquake

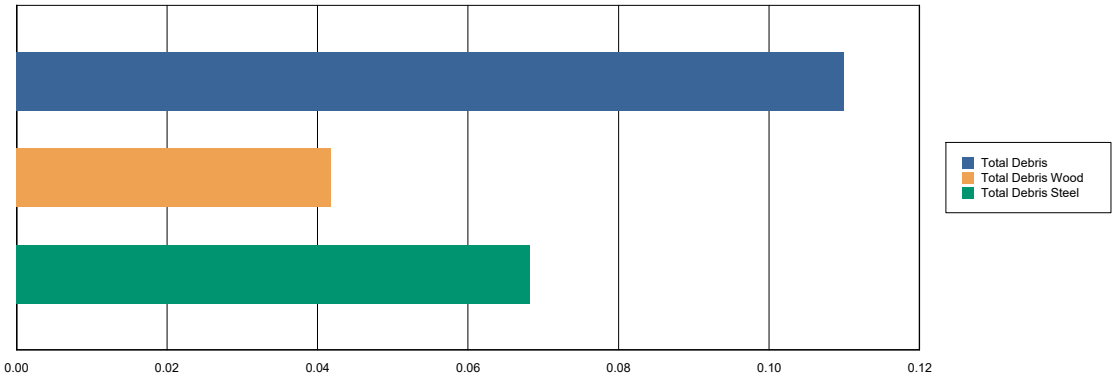
Fires often occur after an earthquake. Because of the number of fires and the lack of water to fight the fires, they can often burn out of control. Hazus uses a Monte Carlo simulation model to estimate the number of ignitions and the amount of burnt area. For this scenario, the model estimates that there will be 0 ignitions that will burn about 0.00 sq. mi 0.00 % of the region's total area.) The model also estimates that the fires will displace about 0 people and burn about 0 (millions of dollars) of building value.

Debris Generation

Hazus estimates the amount of debris that will be generated by the earthquake. The model breaks the debris into two general categories: a) Brick/Wood and b) Reinforced Concrete/Steel. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 110,000 tons of debris will be generated. Of the total amount, Brick/Wood comprises 38.00% of the total, with the remainder being Reinforced Concrete/Steel. If the debris tonnage is converted to an estimated number of truckloads, it will require 4,400 truckloads (@25 tons/truck) to remove the debris generated by the earthquake.

Earthquake Debris (millions of tons)



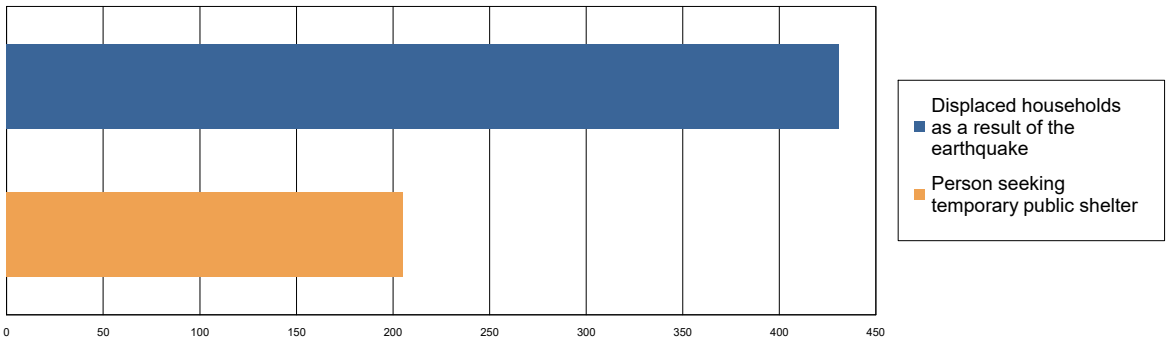
Brick/ Wood	Reinforced Concrete/Steel	Total Debris	Truck Load
0.04	0.07	0.11	4,400 (@25 tons/truck)

Social Impact

Shelter Requirement

Hazus estimates the number of households that are expected to be displaced from their homes due to the earthquake and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 431 households to be displaced due to the earthquake. Of these, 205 people (out of a total population of 12,959) will seek temporary shelter in public shelters.

Displaced Households/ Persons Seeking Short Term Public Shelter



Displaced households as a result of the earthquake	Persons seeking temporary public shelter
431	205

Casualties

Hazus estimates the number of people that will be injured and killed by the earthquake. The casualties are broken down into four (4) severity levels that describe the extent of the injuries. The levels are described as follows;

- Severity Level 1: Injuries will require medical attention but hospitalization is not needed.
- Severity Level 2: Injuries will require hospitalization but are not considered life-threatening
- Severity Level 3: Injuries will require hospitalization and can become life threatening if not promptly treated.
- Severity Level 4: Victims are killed by the earthquake.

The casualty estimates are provided for three (3) times of day: 2:00 AM, 2:00 PM and 5:00 PM. These times represent the periods of the day that different sectors of the community are at their peak occupancy loads. The 2:00 AM estimate considers that the residential occupancy load is maximum, the 2:00 PM estimate considers that the educational, commercial and industrial sector loads are maximum and 5:00 PM represents peak commute time.

Table 10 provides a summary of the casualties estimated for this earthquake

Table 10: Casualty Estimates

		Level 1	Level 2	Level 3	Level 4
2 AM	Commercial	4.25	1.29	0.20	0.40
	Commuting	0.00	0.01	0.01	0.00
	Educational	0.00	0.00	0.00	0.00
	Hotels	0.00	0.00	0.00	0.00
	Industrial	7.75	2.40	0.39	0.76
	Other-Residential	34.73	10.46	1.61	3.15
	Single Family	50.26	11.96	1.57	3.06
	Total	**97**	**26**	**4**	**7**
2 PM	Commercial	239.45	72.75	11.40	22.31
	Commuting	0.02	0.05	0.06	0.01
	Educational	135.84	42.45	7.04	13.67
	Hotels	0.00	0.00	0.00	0.00
	Industrial	57.47	17.81	2.88	5.61
	Other-Residential	6.43	1.96	0.31	0.59
	Single Family	9.17	2.25	0.31	0.58
	Total	**448**	**137**	**22**	**43**
5 PM	Commercial	172.88	52.59	8.32	16.02
	Commuting	0.40	0.95	1.10	0.24
	Educational	34.92	10.92	1.81	3.53
	Hotels	0.00	0.00	0.00	0.00
	Industrial	35.92	11.13	1.80	3.51
	Other-Residential	13.57	4.13	0.65	1.23
	Single Family	20.09	4.94	0.68	1.27
	Total	**278**	**85**	**14**	**26**

Economic Loss

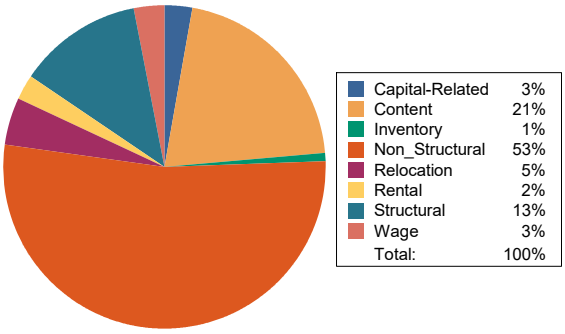
The total economic loss estimated for the earthquake is 573.57 (millions of dollars), which includes building and lifeline related losses based on the region's available inventory. The following three sections provide more detailed information about these losses.

Building-Related Losses

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the earthquake. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the earthquake.

The total building-related losses were 572.36 (millions of dollars); 13 % of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 59 % of the total loss. Table 11 below provides a summary of the losses associated with the building damage.

Earthquake Losses by Loss Type ($ millions)



Earthquake Losses by Occupancy Type ($ millions)

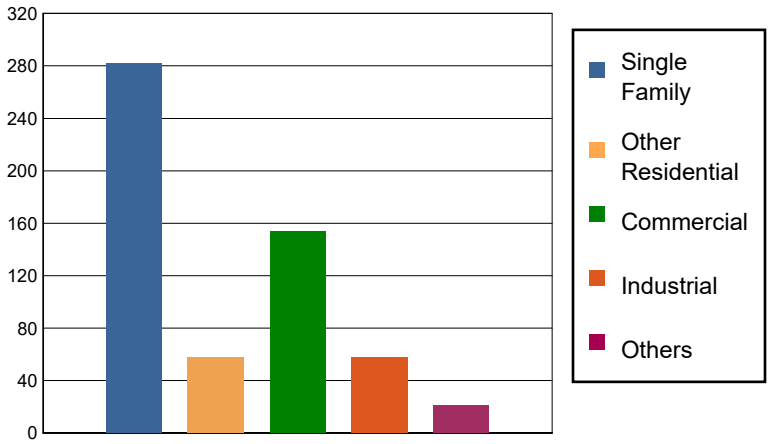


Table 11: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses							
	Wage	0.0000	1.1332	14.4744	0.9803	0.3526	16.9405
	Capital-Related	0.0000	0.4815	14.7429	0.5754	0.1533	15.9531
	Rental	4.1609	3.2019	6.0713	0.2592	0.1738	13.8671
	Relocation	14.7779	2.0337	8.4795	1.1641	2.0102	28.4654
	Subtotal	**18.9388**	**6.8503**	**43.7681**	**2.9790**	**2.6899**	**75.2261**
Capital Stock Losses							
	Structural	35.3135	7.1312	19.0668	6.9033	3.3841	71.7989
	Non_Structural	166.6948	35.4374	62.1719	27.2046	10.4393	301.9480
	Content	61.1172	8.2773	28.1739	17.0576	4.7380	119.3640
	Inventory	0.0000	0.0000	0.6700	3.3039	0.0514	4.0253
	Subtotal	**263.1255**	**50.8459**	**110.0826**	**54.4694**	**18.6128**	**497.1362**
	Total	**282.06**	**57.70**	**153.85**	**57.45**	**21.30**	**572.36**

Transportation and Utility Lifeline Losses

For the transportation and utility lifeline systems, Hazus computes the direct repair cost for each component only. There are no losses computed by Hazus for business interruption due to lifeline outages. Tables 12 & 13 provide a detailed breakdown in the expected lifeline losses.

Table 12: Transportation System Economic Losses
(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Highway	Segments	239.1284	0.0000	0.00
	Bridges	10.1431	1.2063	11.89
	Tunnels	0.0000	0.0000	0.00
	Subtotal	**249.2715**	**1.2063**	
Railways	Segments	0.0000	0.0000	0.00
	Bridges	0.0000	0.0000	0.00
	Tunnels	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Light Rail	Segments	0.0000	0.0000	0.00
	Bridges	0.0000	0.0000	0.00
	Tunnels	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Bus	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Ferry	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Port	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Airport	Facilities	0.0000	0.0000	0.00
	Runways	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
	Total	**249.27**	**1.21**	

Table 13: Utility System Economic Losses

(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Potable Water	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Distribution Lines	9.7664	0.0000	0.00
	Subtotal	**9.7664**	**0.0000**	
Waste Water	Pipelines	0.0000	0.0000	0.00
	Facilities	76.5900	0.0000	0.00
	Distribution Lines	5.8599	0.0000	0.00
	Subtotal	**82.4499**	**0.0000**	
Natural Gas	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Distribution Lines	3.9066	0.0000	0.00
	Subtotal	**3.9066**	**0.0000**	
Oil Systems	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Electrical Power	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Communication	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
	Total	**96.12**	**0.00**	

Appendix A: County Listing for the Region

Middlesex,CT

Appendix B: Regional Population and Building Value Data

State	County Name	Population	Building Value (millions of dollars)		
			Residential	Non-Residential	Total
Connecticut					
	Middlesex	12,959	1,786	248	2,034
Total Region		**12,959**	**1,786**	**248**	**2,034**

Hazus: Earthquake Global Risk Report

Region Name: EastHampton

Earthquake Scenario: Stamford

Print Date: October 16, 2019

Disclaimer:

This version of Hazus utilizes 2010 Census Data.

Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific earthquake. These results can be improved by using enhanced inventory, geotechnical, and observed ground motion data.

Table of Contents

General Description of the Region

Hazus-MH is a regional earthquake loss estimation model that was developed by the Federal Emergency Management Agency (FEMA) and the National Institute of Building Sciences. The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The earthquake loss estimates provided in this report was based on a region that includes 1 county(ies) from the following state(s):

Connecticut

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 36.89 square miles and contains 3 census tracts. There are over 5 thousand households in the region which has a total population of 12,959 people (2010 Census Bureau data). The distribution of population by Total Region and County is provided in Appendix B.

There are an estimated 5 thousand buildings in the region with a total building replacement value (excluding contents) of 2,034 (millions of dollars). Approximately 93.00 % of the buildings (and 88.00% of the building value) are associated with residential housing.

The replacement value of the transportation and utility lifeline systems is estimated to be 249 and 96 (millions of dollars) , respectively.

Building and Lifeline Inventory

Building Inventory

Hazus estimates that there are 5 thousand buildings in the region which have an aggregate total replacement value of 2,034 (millions of dollars) . Appendix B provides a general distribution of the building value by Total Region and County.

In terms of building construction types found in the region, wood frame construction makes up 87% of the building inventory. The remaining percentage is distributed between the other general building types.

Critical Facility Inventory

Hazus breaks critical facilities into two (2) groups: essential facilities and high potential loss facilities (HPL). Essential facilities include hospitals, medical clinics, schools, fire stations, police stations and emergency operations facilities. High potential loss facilities include dams, levees, military installations, nuclear power plants and hazardous material sites.

For essential facilities, there are 0 hospitals in the region with a total bed capacity of beds. There are 5 schools, 3 fire stations, 1 police stations and 1 emergency operation facilities. With respect to high potential loss facilities (HPL), there are no dams identified within the inventory. The inventory also includes no hazardous material sites, no military installations and no nuclear power plants.

Transportation and Utility Lifeline Inventory

Within Hazus, the lifeline inventory is divided between transportation and utility lifeline systems. There are seven (7) transportation systems that include highways, railways, light rail, bus, ports, ferry and airports. There are six (6) utility systems that include potable water, wastewater, natural gas, crude & refined oil, electric power and communications. The lifeline inventory data are provided in Tables 1 and 2.

The total value of the lifeline inventory is over 345.00 (millions of dollars). This inventory includes over 27.34 miles of highways, 5 bridges, 606.46 miles of pipes.

Table 1: Transportation System Lifeline Inventory

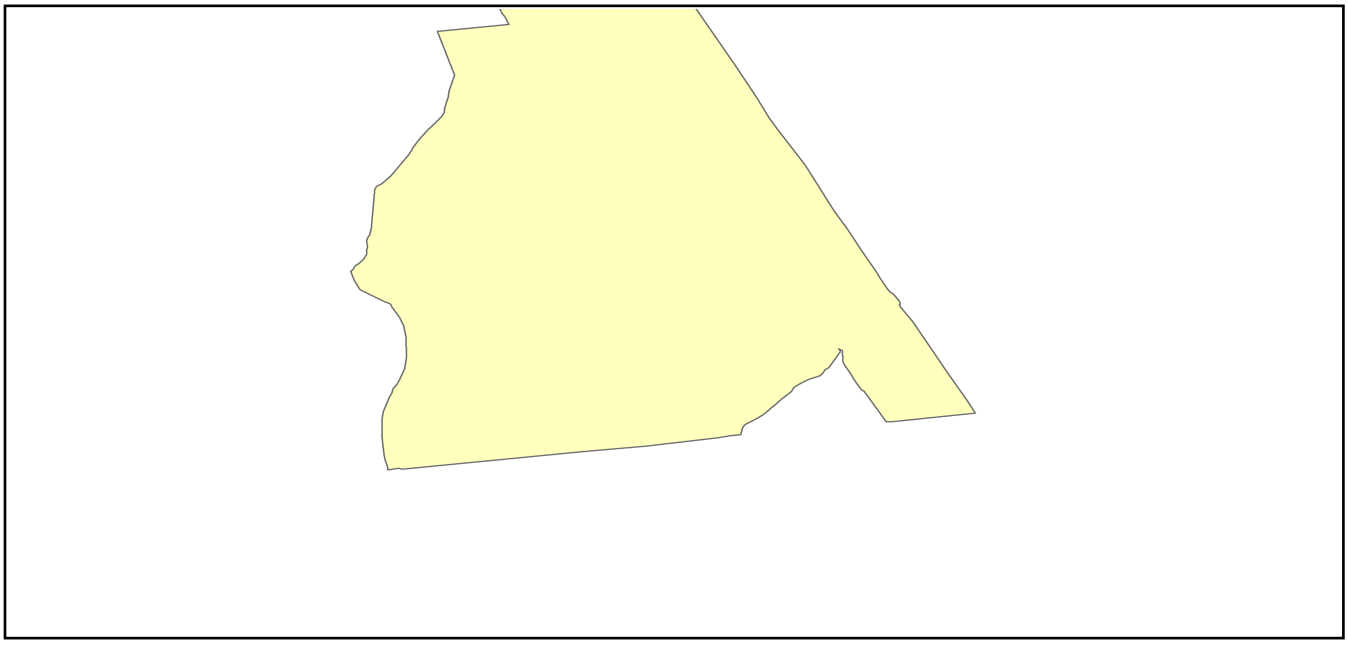
System	Component	# Locations/ # Segments	Replacement value (millions of dollars)
Highway	Bridges	5	10.1431
	Segments	9	239.1284
	Tunnels	0	0.0000
		Subtotal	**249.2715**
Railways	Bridges	0	0.0000
	Facilities	0	0.0000
	Segments	0	0.0000
	Tunnels	0	0.0000
		Subtotal	**0.0000**
Light Rail	Bridges	0	0.0000
	Facilities	0	0.0000
	Segments	0	0.0000
	Tunnels	0	0.0000
		Subtotal	**0.0000**
Bus	Facilities	0	0.0000
		Subtotal	**0.0000**
Ferry	Facilities	0	0.0000
		Subtotal	**0.0000**
Port	Facilities	0	0.0000
		Subtotal	**0.0000**
Airport	Facilities	0	0.0000
	Runways	0	0.0000
		Subtotal	**0.0000**
		Total	**249.30**

Table 2: Utility System Lifeline Inventory

System	Component	# Locations / Segments	Replacement value (millions of dollars)
Potable Water	Distribution Lines	NA	9.7664
	Facilities	0	0.0000
	Pipelines	0	0.0000
		Subtotal	**9.7664**
Waste Water	Distribution Lines	NA	5.8599
	Facilities	1	76.5900
	Pipelines	0	0.0000
		Subtotal	**82.4499**
Natural Gas	Distribution Lines	NA	3.9066
	Facilities	0	0.0000
	Pipelines	0	0.0000
		Subtotal	**3.9066**
Oil Systems	Facilities	0	0.0000
	Pipelines	0	0.0000
		Subtotal	**0.0000**
Electrical Power	Facilities	0	0.0000
		Subtotal	**0.0000**
Communication	Facilities	0	0.0000
		Subtotal	**0.0000**
		Total	**96.10**

Earthquake Scenario

Hazus uses the following set of information to define the earthquake parameters used for the earthquake loss estimate provided in this report.



Scenario Name	Stamford
Type of Earthquake	Arbitrary
Fault Name	NA
Historical Epicenter ID #	NA
Probabilistic Return Period	NA
Longitude of Epicenter	-73.56
Latitude of Epicenter	41.11
Earthquake Magnitude	5.70
Depth (km)	10.00
Rupture Length (Km)	NA
Rupture Orientation (degrees)	NA
Attenuation Function	Central & East US (CEUS 2008)

Direct Earthquake Damage

Building Damage

Hazus estimates that about 22 buildings will be at least moderately damaged. This is over 0.00 % of the buildings in the region. There are an estimated 0 buildings that will be damaged beyond repair. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the Hazus technical manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 below summarizes the expected damage by general building type.

Damage Categories by General Occupancy Type

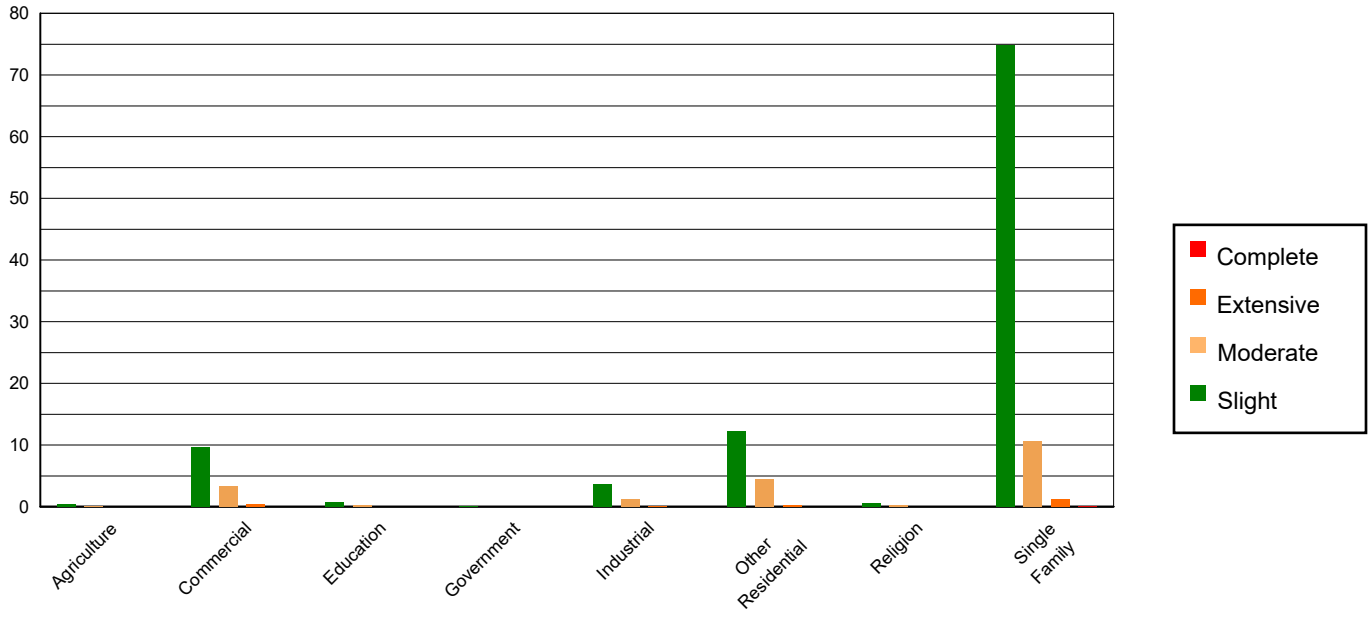


Table 3: Expected Building Damage by Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	10.44	0.20	0.42	0.41	0.12	0.59	0.02	0.71	0.00	0.50
Commercial	227.62	4.35	9.64	9.44	3.29	16.30	0.43	19.44	0.03	19.30
Education	17.07	0.33	0.67	0.66	0.22	1.11	0.03	1.24	0.00	1.51
Government	1.90	0.04	0.07	0.07	0.02	0.12	0.00	0.12	0.00	0.11
Industrial	92.96	1.78	3.65	3.57	1.24	6.17	0.15	6.62	0.01	5.76
Other Residential	247.10	4.72	12.23	11.99	4.39	21.77	0.26	11.84	0.01	10.64
Religion	15.15	0.29	0.59	0.58	0.22	1.10	0.03	1.49	0.00	1.88
Single Family	4619.20	88.30	74.77	73.27	10.66	52.84	1.29	58.54	0.08	60.31
Total	**5,231**		**102**		**20**		**2**		**0**	

Table 4: Expected Building Damage by Building Type (All Design Levels)

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Wood	4607.91	88.08	65.86	64.54	5.75	28.51	0.46	20.99	0.00	0.00
Steel	175.65	3.36	6.20	6.08	1.96	9.72	0.17	7.95	0.00	3.23
Concrete	29.98	0.57	0.99	0.97	0.29	1.42	0.01	0.62	0.00	0.00
Precast	11.79	0.23	0.60	0.58	0.37	1.85	0.07	2.97	0.00	0.67
RM	40.86	0.78	1.25	1.23	0.63	3.12	0.08	3.84	0.00	0.00
URM	268.26	5.13	19.24	18.85	8.15	40.42	1.33	60.53	0.13	96.10
MH	97.00	1.85	7.91	7.75	3.02	14.96	0.07	3.10	0.00	0.00
Total	**5,231**		**102**		**20**		**2**		**0**	

*Note:

RM Reinforced Masonry
URM Unreinforced Masonry
MH Manufactured Housing

Essential Facility Damage

Before the earthquake, the region had hospital beds available for use. On the day of the earthquake, the model estimates that only hospital beds (%) are available for use by patients already in the hospital and those injured by the earthquake. After one week, % of the beds will be back in service. By 30 days, % will be operational.

Table 5: Expected Damage to Essential Facilities

Classification	Total	# Facilities		
		At Least Moderate Damage > 50%	Complete Damage > 50%	With Functionality > 50% on day 1
Hospitals	0	0	0	0
Schools	5	0	0	5
EOCs	1	0	0	1
PoliceStations	1	0	0	1
FireStations	3	0	0	3

Transportation Lifeline Damage

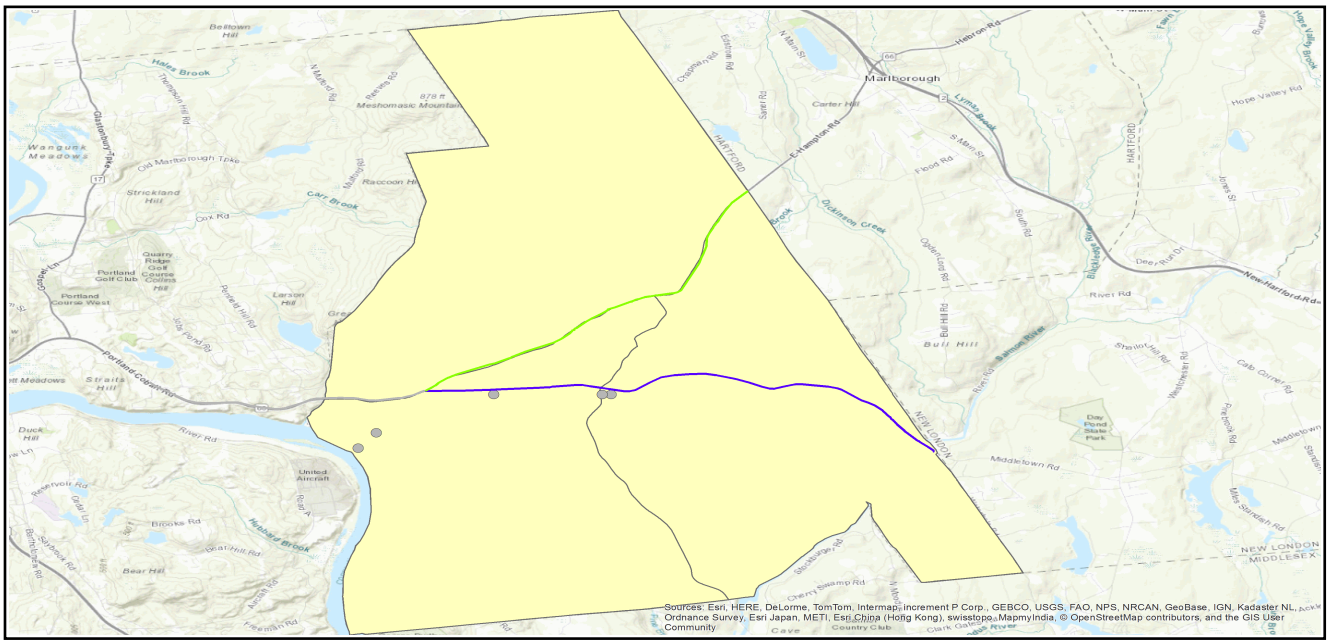


Table 6: Expected Damage to the Transportation Systems

System	Component		Number of Locations			
		Locations/ Segments	With at Least Mod. Damage	With Complete Damage	With Functionality > 50 %	
					After Day 1	After Day 7
Highway	Segments	9	0	0	6	6
	Bridges	5	0	0	5	5
	Tunnels	0	0	0	0	0
Railways	Segments	0	0	0	0	0
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	0	0	0	0	0
Light Rail	Segments	0	0	0	0	0
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	0	0	0	0	0
Bus	Facilities	0	0	0	0	0
Ferry	Facilities	0	0	0	0	0
Port	Facilities	0	0	0	0	0
Airport	Facilities	0	0	0	0	0
	Runways	0	0	0	0	0

Table 6 provides damage estimates for the transportation system.

Note: Roadway segments, railroad tracks and light rail tracks are assumed to be damaged by ground failure only. If ground failure maps are not provided, damage estimates to these components will not be computed.

Tables 7-9 provide information on the damage to the utility lifeline systems. Table 7 provides damage to the utility system facilities. Table 8 provides estimates on the number of leaks and breaks by the pipelines of the utility systems. For electric power and potable water, Hazus performs a simplified system performance analysis. Table 9 provides a summary of the system performance information.

Table 7 : Expected Utility System Facility Damage

System	# of Locations				
	Total #	With at Least Moderate Damage	With Complete Damage	with Functionality > 50 %	
				After Day 1	After Day 7
Potable Water	0	0	0	0	0
Waste Water	1	0	0	0	0
Natural Gas	0	0	0	0	0
Oil Systems	0	0	0	0	0
Electrical Power	0	0	0	0	0
Communication	0	0	0	0	0

Table 8 : Expected Utility System Pipeline Damage (Site Specific)

System	Total Pipelines Length (miles)	Number of Leaks	Number of Breaks
Potable Water	303	0	0
Waste Water	182	0	0
Natural Gas	121	0	0
Oil	0	0	0

Table 9: Expected Potable Water and Electric Power System Performance

	Total # of Households	Number of Households without Service				
		At Day 1	At Day 3	At Day 7	At Day 30	At Day 90
Potable Water						
Electric Power						

Induced Earthquake Damage

Fire Following Earthquake

Fires often occur after an earthquake. Because of the number of fires and the lack of water to fight the fires, they can often burn out of control. Hazus uses a Monte Carlo simulation model to estimate the number of ignitions and the amount of burnt area. For this scenario, the model estimates that there will be 0 ignitions that will burn about 0.00 sq. mi 0.00 % of the region's total area.) The model also estimates that the fires will displace about 0 people and burn about 0 (millions of dollars) of building value.

Debris Generation

Hazus estimates the amount of debris that will be generated by the earthquake. The model breaks the debris into two general categories: a) Brick/Wood and b) Reinforced Concrete/Steel. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 0 tons of debris will be generated. Of the total amount, Brick/Wood comprises 75.00% of the total, with the remainder being Reinforced Concrete/Steel. If the debris tonnage is converted to an estimated number of truckloads, it will require 0 truckloads (@25 tons/truck) to remove the debris generated by the earthquake.

Earthquake Debris (millions of tons)

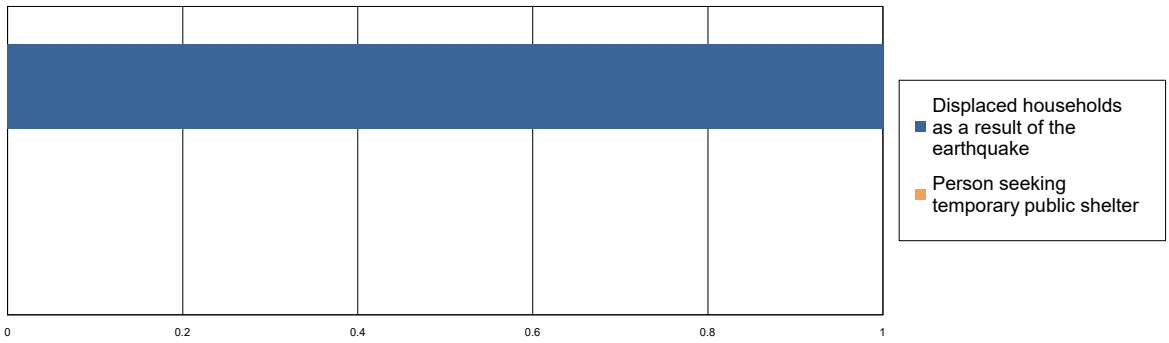
Brick/ Wood	Reinforced Concrete/Steel	Total Debris	Truck Load
0.00	0.00	0.00	0 (@25 tons/truck)

Social Impact

Shelter Requirement

Hazus estimates the number of households that are expected to be displaced from their homes due to the earthquake and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 1 households to be displaced due to the earthquake. Of these, 0 people (out of a total population of 12,959) will seek temporary shelter in public shelters.

Displaced Households/ Persons Seeking Short Term Public Shelter



Displaced households as a result of the earthquake	Persons seeking temporary public shelter
1	0

Casualties

Hazus estimates the number of people that will be injured and killed by the earthquake. The casualties are broken down into four (4) severity levels that describe the extent of the injuries. The levels are described as follows;

- Severity Level 1: Injuries will require medical attention but hospitalization is not needed.
- Severity Level 2: Injuries will require hospitalization but are not considered life-threatening
- Severity Level 3: Injuries will require hospitalization and can become life threatening if not promptly treated.
- Severity Level 4: Victims are killed by the earthquake.

The casualty estimates are provided for three (3) times of day: 2:00 AM, 2:00 PM and 5:00 PM. These times represent the periods of the day that different sectors of the community are at their peak occupancy loads. The 2:00 AM estimate considers that the residential occupancy load is maximum, the 2:00 PM estimate considers that the educational, commercial and industrial sector loads are maximum and 5:00 PM represents peak commute time.

Table 10 provides a summary of the casualties estimated for this earthquake

Table 10: Casualty Estimates

		Level 1	Level 2	Level 3	Level 4
2 AM	Commercial	0.01	0.00	0.00	0.00
	Commuting	0.00	0.00	0.00	0.00
	Educational	0.00	0.00	0.00	0.00
	Hotels	0.00	0.00	0.00	0.00
	Industrial	0.01	0.00	0.00	0.00
	Other-Residential	0.10	0.01	0.00	0.00
	Single Family	0.24	0.02	0.00	0.00
	Total	**0**	**0**	**0**	**0**
2 PM	Commercial	0.51	0.06	0.00	0.01
	Commuting	0.00	0.00	0.00	0.00
	Educational	0.26	0.03	0.00	0.00
	Hotels	0.00	0.00	0.00	0.00
	Industrial	0.10	0.01	0.00	0.00
	Other-Residential	0.02	0.00	0.00	0.00
	Single Family	0.04	0.00	0.00	0.00
	Total	**1**	**0**	**0**	**0**
5 PM	Commercial	0.37	0.05	0.00	0.01
	Commuting	0.00	0.00	0.00	0.00
	Educational	0.07	0.01	0.00	0.00
	Hotels	0.00	0.00	0.00	0.00
	Industrial	0.06	0.01	0.00	0.00
	Other-Residential	0.04	0.01	0.00	0.00
	Single Family	0.09	0.01	0.00	0.00
	Total	**1**	**0**	**0**	**0**

Economic Loss

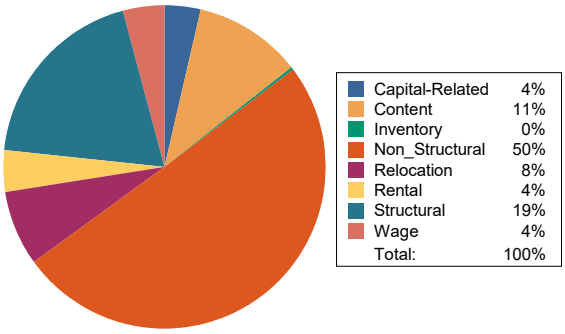
The total economic loss estimated for the earthquake is 2.45 (millions of dollars), which includes building and lifeline related losses based on the region's available inventory. The following three sections provide more detailed information about these losses.

Building-Related Losses

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the earthquake. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the earthquake.

The total building-related losses were 2.45 (millions of dollars); 20 % of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 68 % of the total loss. Table 11 below provides a summary of the losses associated with the building damage.

Earthquake Losses by Loss Type ($ millions)



Earthquake Losses by Occupancy Type ($ millions)

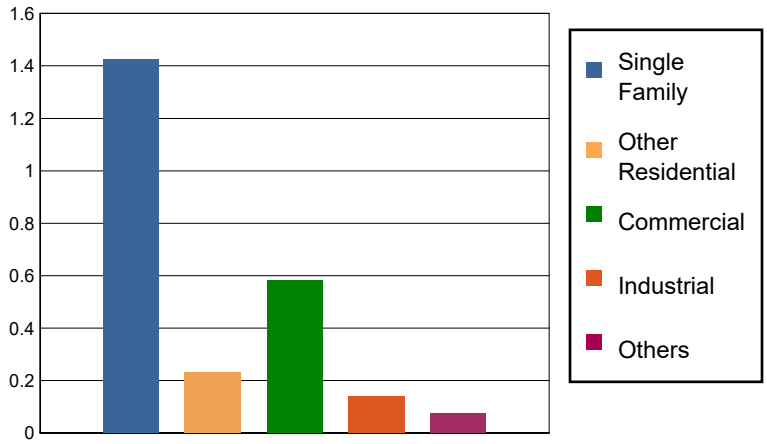


Table 11: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses							
	Wage	0.0000	0.0041	0.0885	0.0050	0.0026	0.1002
	Capital-Related	0.0000	0.0017	0.0856	0.0030	0.0011	0.0914
	Rental	0.0257	0.0228	0.0512	0.0017	0.0011	0.1025
	Relocation	0.0828	0.0193	0.0625	0.0088	0.0132	0.1866
	Subtotal	**0.1085**	**0.0479**	**0.2878**	**0.0185**	**0.0180**	**0.4807**
Capital Stock Losses							
	Structural	0.2775	0.0488	0.0929	0.0311	0.0183	0.4686
	Non_Structural	0.8791	0.1181	0.1485	0.0526	0.0285	1.2268
	Content	0.1593	0.0164	0.0498	0.0299	0.0089	0.2643
	Inventory	0.0000	0.0000	0.0011	0.0058	0.0000	0.0069
	Subtotal	**1.3159**	**0.1833**	**0.2923**	**0.1194**	**0.0557**	**1.9666**
	Total	**1.42**	**0.23**	**0.58**	**0.14**	**0.07**	**2.45**

Transportation and Utility Lifeline Losses

For the transportation and utility lifeline systems, Hazus computes the direct repair cost for each component only. There are no losses computed by Hazus for business interruption due to lifeline outages. Tables 12 & 13 provide a detailed breakdown in the expected lifeline losses.

Table 12: Transportation System Economic Losses
(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Highway	Segments	239.1284	0.0000	0.00
	Bridges	10.1431	0.0000	0.00
	Tunnels	0.0000	0.0000	0.00
	Subtotal	**249.2715**	**0.0000**	
Railways	Segments	0.0000	0.0000	0.00
	Bridges	0.0000	0.0000	0.00
	Tunnels	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Light Rail	Segments	0.0000	0.0000	0.00
	Bridges	0.0000	0.0000	0.00
	Tunnels	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Bus	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Ferry	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Port	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Airport	Facilities	0.0000	0.0000	0.00
	Runways	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
	Total	**249.27**	**0.00**	

Table 13: Utility System Economic Losses

(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Potable Water	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Distribution Lines	9.7664	0.0000	0.00
	Subtotal	**9.7664**	**0.0000**	
Waste Water	Pipelines	0.0000	0.0000	0.00
	Facilities	76.5900	0.0000	0.00
	Distribution Lines	5.8599	0.0000	0.00
	Subtotal	**82.4499**	**0.0000**	
Natural Gas	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Distribution Lines	3.9066	0.0000	0.00
	Subtotal	**3.9066**	**0.0000**	
Oil Systems	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Electrical Power	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Communication	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
	Total	**96.12**	**0.00**	

Appendix A: County Listing for the Region

Middlesex,CT

Appendix B: Regional Population and Building Value Data

State	County Name	Population	Building Value (millions of dollars)		
			Residential	Non-Residential	Total
Connecticut					
	Middlesex	12,959	1,786	248	2,034
Total Region		**12,959**	**1,786**	**248**	**2,034**

Hazus: Earthquake Global Risk Report

Region Name: EastHampton

Earthquake Scenario: Annualized

Print Date: October 17, 2019

Disclaimer:

This version of Hazus utilizes 2010 Census Data.

Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific earthquake. These results can be improved by using enhanced inventory, geotechnical, and observed ground motion data.

Table of Contents

General Description of the Region

Hazus-MH is a regional earthquake loss estimation model that was developed by the Federal Emergency Management Agency (FEMA) and the National Institute of Building Sciences. The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The earthquake loss estimates provided in this report was based on a region that includes 1 county(ies) from the following state(s):

Connecticut

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 36.89 square miles and contains 3 census tracts. There are over 5 thousand households in the region which has a total population of 12,959 people (2010 Census Bureau data). The distribution of population by Total Region and County is provided in Appendix B.

There are an estimated 5 thousand buildings in the region with a total building replacement value (excluding contents) of 2,034 (millions of dollars). Approximately 93.00 % of the buildings (and 88.00% of the building value) are associated with residential housing.

The replacement value of the transportation and utility lifeline systems is estimated to be 249 and 96 (millions of dollars) , respectively.

Building and Lifeline Inventory

Building Inventory

Hazus estimates that there are 5 thousand buildings in the region which have an aggregate total replacement value of 2,034 (millions of dollars) . Appendix B provides a general distribution of the building value by Total Region and County.

In terms of building construction types found in the region, wood frame construction makes up 87% of the building inventory. The remaining percentage is distributed between the other general building types.

Critical Facility Inventory

Hazus breaks critical facilities into two (2) groups: essential facilities and high potential loss facilities (HPL). Essential facilities include hospitals, medical clinics, schools, fire stations, police stations and emergency operations facilities. High potential loss facilities include dams, levees, military installations, nuclear power plants and hazardous material sites.

For essential facilities, there are 0 hospitals in the region with a total bed capacity of beds. There are 5 schools, 3 fire stations, 1 police stations and 1 emergency operation facilities. With respect to high potential loss facilities (HPL), there are no dams identified within the inventory. The inventory also includes no hazardous material sites, no military installations and no nuclear power plants.

Transportation and Utility Lifeline Inventory

Within Hazus, the lifeline inventory is divided between transportation and utility lifeline systems. There are seven (7) transportation systems that include highways, railways, light rail, bus, ports, ferry and airports. There are six (6) utility systems that include potable water, wastewater, natural gas, crude & refined oil, electric power and communications. The lifeline inventory data are provided in Tables 1 and 2.

The total value of the lifeline inventory is over 345.00 (millions of dollars). This inventory includes over 27.34 miles of highways, 5 bridges, 606.46 miles of pipes.

Table 1: Transportation System Lifeline Inventory

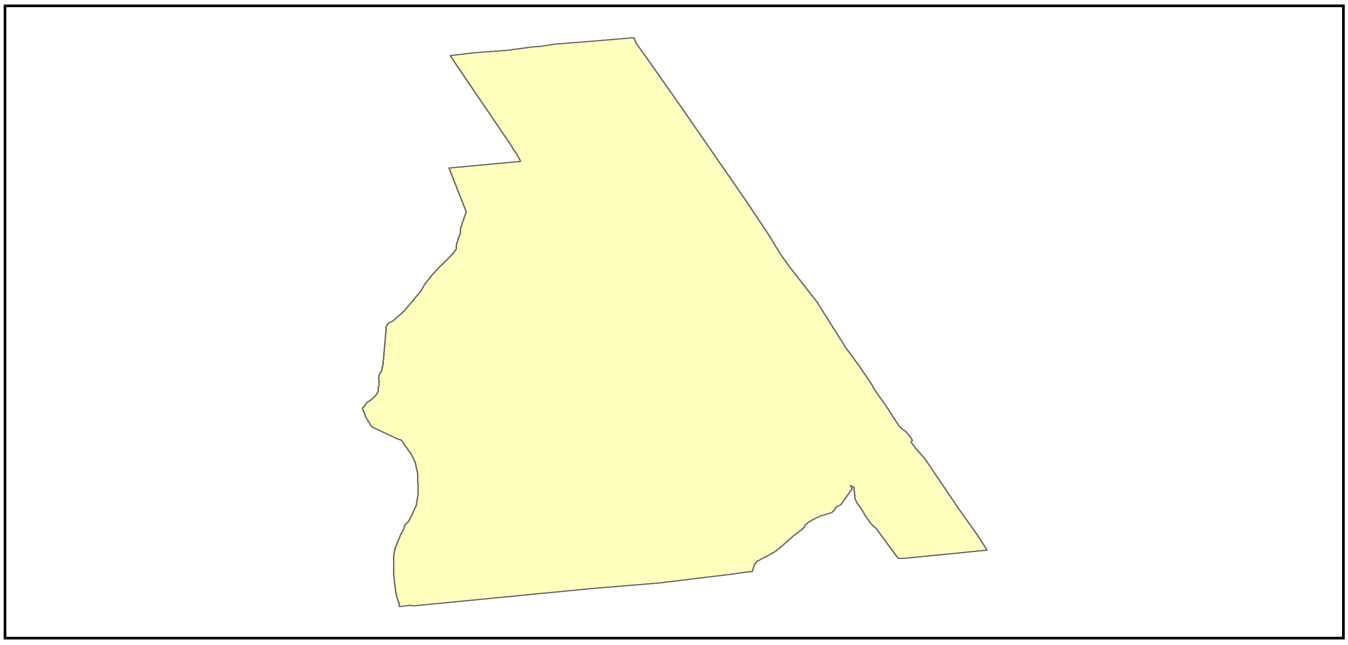
System	Component	# Locations/ # Segments	Replacement value (millions of dollars)
Highway	Bridges	5	10.1431
	Segments	9	239.1284
	Tunnels	0	0.0000
		Subtotal	**249.2715**
Railways	Bridges	0	0.0000
	Facilities	0	0.0000
	Segments	0	0.0000
	Tunnels	0	0.0000
		Subtotal	**0.0000**
Light Rail	Bridges	0	0.0000
	Facilities	0	0.0000
	Segments	0	0.0000
	Tunnels	0	0.0000
		Subtotal	**0.0000**
Bus	Facilities	0	0.0000
		Subtotal	**0.0000**
Ferry	Facilities	0	0.0000
		Subtotal	**0.0000**
Port	Facilities	0	0.0000
		Subtotal	**0.0000**
Airport	Facilities	0	0.0000
	Runways	0	0.0000
		Subtotal	**0.0000**
		Total	**249.30**

Table 2: Utility System Lifeline Inventory

System	Component	# Locations / Segments	Replacement value (millions of dollars)
Potable Water	Distribution Lines	NA	9.7664
	Facilities	0	0.0000
	Pipelines	0	0.0000
		Subtotal	**9.7664**
Waste Water	Distribution Lines	NA	5.8599
	Facilities	1	76.5900
	Pipelines	0	0.0000
		Subtotal	**82.4499**
Natural Gas	Distribution Lines	NA	3.9066
	Facilities	0	0.0000
	Pipelines	0	0.0000
		Subtotal	**3.9066**
Oil Systems	Facilities	0	0.0000
	Pipelines	0	0.0000
		Subtotal	**0.0000**
Electrical Power	Facilities	0	0.0000
		Subtotal	**0.0000**
Communication	Facilities	0	0.0000
		Subtotal	**0.0000**
		Total	**96.10**

Earthquake Scenario

Hazus uses the following set of information to define the earthquake parameters used for the earthquake loss estimate provided in this report.



Scenario Name	Annualized
Type of Earthquake	Probabilistic
Fault Name	NA
Historical Epicenter ID #	NA
Probabilistic Return Period	Annualized
Longitude of Epicenter	NA
Latitude of Epicenter	NA
Earthquake Magnitude	NA
Depth (km)	NA
Rupture Length (Km)	NA
Rupture Orientation (degrees)	NA
Attenuation Function	NA

Direct Earthquake Damage

Building Damage

Hazus estimates that about 10 buildings will be at least moderately damaged. This is over 0.00 % of the buildings in the region. There are an estimated 0 buildings that will be damaged beyond repair. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the Hazus technical manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 below summarizes the expected damage by general building type.

Damage Categories by General Occupancy Type

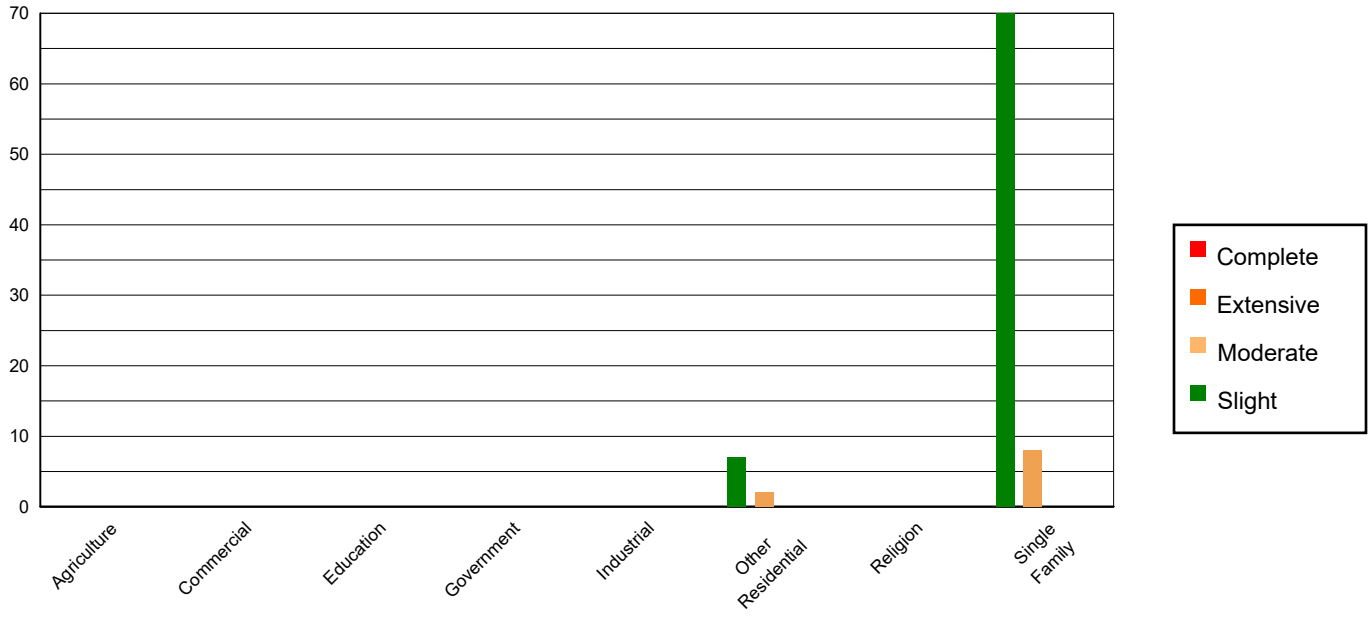


Table 3: Expected Building Damage by Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	3.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Commercial	93.00	1.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Education	2.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Government	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Industrial	33.00	0.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Residential	202.00	4.08	7.00	9.09	2.00	20.00	0.00	0.00	0.00	0.00
Religion	6.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Single Family	4615.00	93.16	70.00	90.91	8.00	80.00	0.00	0.00	0.00	0.00
Total	**4,954**		**77**		**10**		**0**		**0**	

Table 4: Expected Building Damage by Building Type (All Design Levels)

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Wood	4572.00	92.29	61.00	79.22	4.00	40.00	0.00	0.00	0.00	0.00
Steel	64.00	1.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Concrete	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Precast	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RM	3.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
URM	219.00	4.42	9.00	11.69	4.00	40.00	0.00	0.00	0.00	0.00
MH	96.00	1.94	7.00	9.09	2.00	20.00	0.00	0.00	0.00	0.00
Total	**4,954**		**77**		**10**		**0**		**0**	

*Note:

RM Reinforced Masonry
URM Unreinforced Masonry
MH Manufactured Housing

Essential Facility Damage

Before the earthquake, the region had hospital beds available for use. On the day of the earthquake, the model estimates that only hospital beds (%) are available for use by patients already in the hospital and those injured by the earthquake. After one week, % of the beds will be back in service. By 30 days, % will be operational.

Table 5: Expected Damage to Essential Facilities

Classification	Total	# Facilities		
		At Least Moderate Damage > 50%	Complete Damage > 50%	With Functionality > 50% on day 1
Hospitals	0	0	0	0
Schools	5	0	0	5
EOCs	1	0	0	1
PoliceStations	1	0	0	1
FireStations	3	0	0	3

Transportation Lifeline Damage

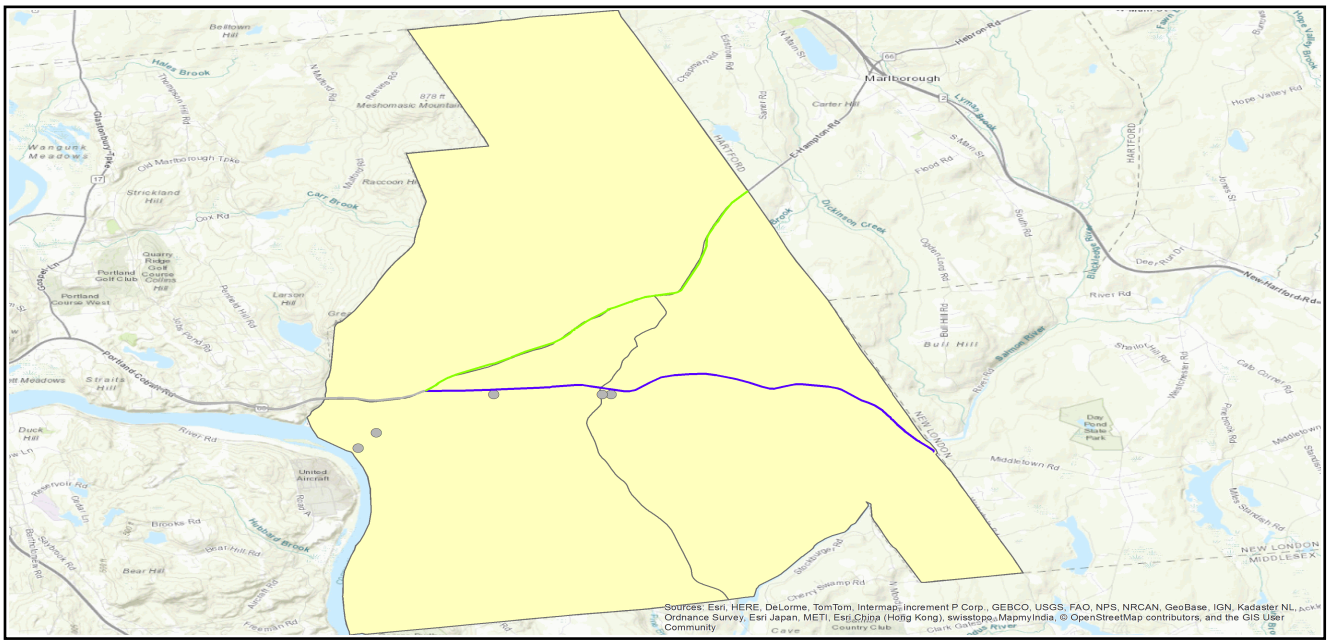


Table 6: Expected Damage to the Transportation Systems

System	Component		Number of Locations			
		Locations/ Segments	With at Least Mod. Damage	With Complete Damage	With Functionality > 50 %	
					After Day 1	After Day 7
Highway	Segments	9	0	0	6	6
	Bridges	5	0	0	5	5
	Tunnels	0	0	0	0	0
Railways	Segments	0	0	0	0	0
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	0	0	0	0	0
Light Rail	Segments	0	0	0	0	0
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	0	0	0	0	0
Bus	Facilities	0	0	0	0	0
Ferry	Facilities	0	0	0	0	0
Port	Facilities	0	0	0	0	0
Airport	Facilities	0	0	0	0	0
	Runways	0	0	0	0	0

Table 6 provides damage estimates for the transportation system.

Note: Roadway segments, railroad tracks and light rail tracks are assumed to be damaged by ground failure only. If ground failure maps are not provided, damage estimates to these components will not be computed.

Tables 7-9 provide information on the damage to the utility lifeline systems. Table 7 provides damage to the utility system facilities. Table 8 provides estimates on the number of leaks and breaks by the pipelines of the utility systems. For electric power and potable water, Hazus performs a simplified system performance analysis. Table 9 provides a summary of the system performance information.

Table 7 : Expected Utility System Facility Damage

System	# of Locations				
	Total #	With at Least Moderate Damage	With Complete Damage	with Functionality > 50 %	
				After Day 1	After Day 7
Potable Water	0	0	0	0	0
Waste Water	1	0	0	0	0
Natural Gas	0	0	0	0	0
Oil Systems	0	0	0	0	0
Electrical Power	0	0	0	0	0
Communication	0	0	0	0	0

Table 8 : Expected Utility System Pipeline Damage (Site Specific)

System	Total Pipelines Length (miles)	Number of Leaks	Number of Breaks
Potable Water	303	0	0
Waste Water	182	0	0
Natural Gas	121	0	0
Oil	0	0	0

Table 9: Expected Potable Water and Electric Power System Performance

	Total # of Households	Number of Households without Service				
		At Day 1	At Day 3	At Day 7	At Day 30	At Day 90
Potable Water						
Electric Power						

Induced Earthquake Damage

Fire Following Earthquake

Fires often occur after an earthquake. Because of the number of fires and the lack of water to fight the fires, they can often burn out of control. Hazus uses a Monte Carlo simulation model to estimate the number of ignitions and the amount of burnt area. For this scenario, the model estimates that there will be 0 ignitions that will burn about 0.00 sq. mi 0.00 % of the region's total area.) The model also estimates that the fires will displace about 0 people and burn about 0 (millions of dollars) of building value.

Debris Generation

Hazus estimates the amount of debris that will be generated by the earthquake. The model breaks the debris into two general categories: a) Brick/Wood and b) Reinforced Concrete/Steel. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 0 tons of debris will be generated. Of the total amount, Brick/Wood comprises 75.00% of the total, with the remainder being Reinforced Concrete/Steel. If the debris tonnage is converted to an estimated number of truckloads, it will require 0 truckloads (@25 tons/truck) to remove the debris generated by the earthquake.

Earthquake Debris (millions of tons)

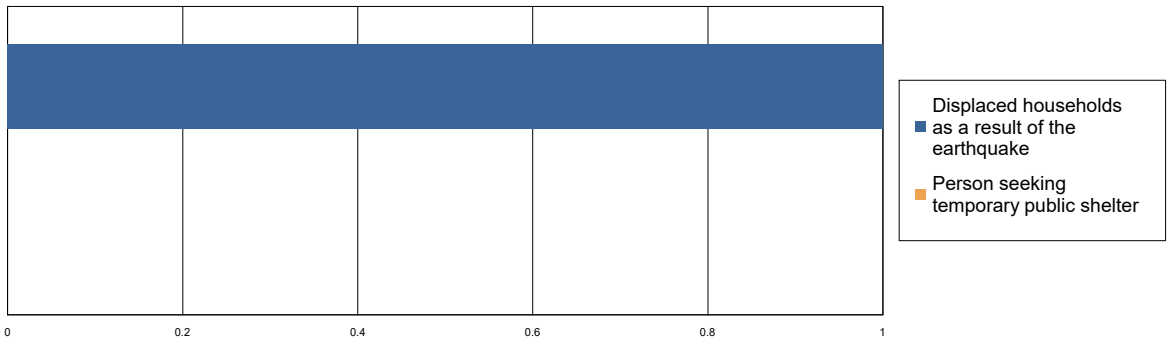
Brick/ Wood	Reinforced Concrete/Steel	Total Debris	Truck Load
0.00	0.00	0.00	0 (@25 tons/truck)

Social Impact

Shelter Requirement

Hazus estimates the number of households that are expected to be displaced from their homes due to the earthquake and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 1 households to be displaced due to the earthquake. Of these, 0 people (out of a total population of 12,959) will seek temporary shelter in public shelters.

Displaced Households/ Persons Seeking Short Term Public Shelter



Displaced households as a result of the earthquake	Persons seeking temporary public shelter
1	0

Casualties

Hazus estimates the number of people that will be injured and killed by the earthquake. The casualties are broken down into four (4) severity levels that describe the extent of the injuries. The levels are described as follows;

- Severity Level 1: Injuries will require medical attention but hospitalization is not needed.
- Severity Level 2: Injuries will require hospitalization but are not considered life-threatening
- Severity Level 3: Injuries will require hospitalization and can become life threatening if not promptly treated.
- Severity Level 4: Victims are killed by the earthquake.

The casualty estimates are provided for three (3) times of day: 2:00 AM, 2:00 PM and 5:00 PM. These times represent the periods of the day that different sectors of the community are at their peak occupancy loads. The 2:00 AM estimate considers that the residential occupancy load is maximum, the 2:00 PM estimate considers that the educational, commercial and industrial sector loads are maximum and 5:00 PM represents peak commute time.

Table 10 provides a summary of the casualties estimated for this earthquake

Table 10: Casualty Estimates

		Level 1	Level 2	Level 3	Level 4
2 AM	Commercial	0.00	0.00	0.00	0.00
	Commuting	0.00	0.00	0.00	0.00
	Educational	0.00	0.00	0.00	0.00
	Hotels	0.00	0.00	0.00	0.00
	Industrial	0.00	0.00	0.00	0.00
	Other-Residential	0.00	0.00	0.00	0.00
	Single Family	0.00	0.00	0.00	0.00
	Total	**0**	**0**	**0**	**0**
2 PM	Commercial	0.00	0.00	0.00	0.00
	Commuting	0.00	0.00	0.00	0.00
	Educational	0.00	0.00	0.00	0.00
	Hotels	0.00	0.00	0.00	0.00
	Industrial	0.00	0.00	0.00	0.00
	Other-Residential	0.00	0.00	0.00	0.00
	Single Family	0.00	0.00	0.00	0.00
	Total	**0**	**0**	**0**	**0**
5 PM	Commercial	0.00	0.00	0.00	0.00
	Commuting	0.00	0.00	0.00	0.00
	Educational	0.00	0.00	0.00	0.00
	Hotels	0.00	0.00	0.00	0.00
	Industrial	0.00	0.00	0.00	0.00
	Other-Residential	0.00	0.00	0.00	0.00
	Single Family	0.00	0.00	0.00	0.00
	Total	**0**	**0**	**0**	**0**

Economic Loss

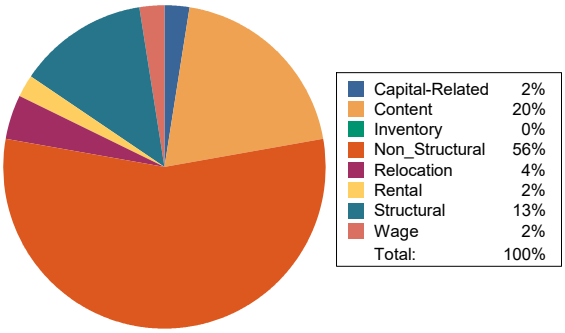
The total economic loss estimated for the earthquake is 0.02 (millions of dollars), which includes building and lifeline related losses based on the region's available inventory. The following three sections provide more detailed information about these losses.

Building-Related Losses

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the earthquake. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the earthquake.

The total building-related losses were 0.02 (millions of dollars); 12 % of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 74 % of the total loss. Table 11 below provides a summary of the losses associated with the building damage.

Earthquake Losses by Loss Type ($ millions)



Earthquake Losses by Occupancy Type ($ millions)

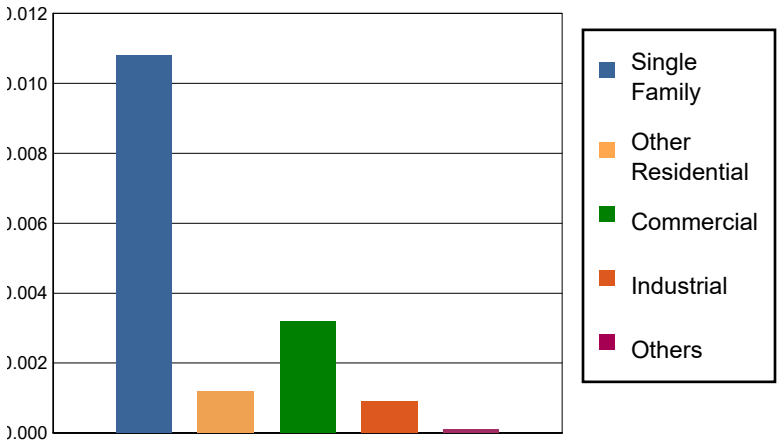


Table 11: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses							
	Wage	0.0000	0.0000	0.0004	0.0000	0.0000	0.0004
	Capital-Related	0.0000	0.0000	0.0004	0.0000	0.0000	0.0004
	Rental	0.0001	0.0001	0.0002	0.0000	0.0000	0.0004
	Relocation	0.0004	0.0000	0.0003	0.0000	0.0000	0.0007
	Subtotal	**0.0005**	**0.0001**	**0.0013**	**0.0000**	**0.0000**	**0.0019**
Capital Stock Losses							
	Structural	0.0014	0.0002	0.0004	0.0001	0.0000	0.0021
	Non_Structural	0.0066	0.0008	0.0010	0.0005	0.0001	0.0090
	Content	0.0023	0.0001	0.0005	0.0003	0.0000	0.0032
	Inventory	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Subtotal	**0.0103**	**0.0011**	**0.0019**	**0.0009**	**0.0001**	**0.0143**
	Total	**0.01**	**0.00**	**0.00**	**0.00**	**0.00**	**0.02**

Transportation and Utility Lifeline Losses

For the transportation and utility lifeline systems, Hazus computes the direct repair cost for each component only. There are no losses computed by Hazus for business interruption due to lifeline outages. Tables 12 & 13 provide a detailed breakdown in the expected lifeline losses.

Table 12: Transportation System Economic Losses
(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Highway	Segments	239.1284	0.0000	0.00
	Bridges	10.1431	0.0000	0.00
	Tunnels	0.0000	0.0000	0.00
	Subtotal	**249.2715**	**0.0000**	
Railways	Segments	0.0000	0.0000	0.00
	Bridges	0.0000	0.0000	0.00
	Tunnels	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Light Rail	Segments	0.0000	0.0000	0.00
	Bridges	0.0000	0.0000	0.00
	Tunnels	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Bus	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Ferry	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Port	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Airport	Facilities	0.0000	0.0000	0.00
	Runways	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
	Total	**249.27**	**0.00**	

Table 13: Utility System Economic Losses

(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Potable Water	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Distribution Lines	9.7664	0.0000	0.00
	Subtotal	**9.7664**	**0.0000**	
Waste Water	Pipelines	0.0000	0.0000	0.00
	Facilities	76.5900	0.0000	0.00
	Distribution Lines	5.8599	0.0000	0.00
	Subtotal	**82.4499**	**0.0000**	
Natural Gas	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Distribution Lines	3.9066	0.0000	0.00
	Subtotal	**3.9066**	**0.0000**	
Oil Systems	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Electrical Power	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Communication	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
	Total	**96.12**	**0.00**	

Appendix A: County Listing for the Region

Middlesex,CT

Appendix B: Regional Population and Building Value Data

State	County Name	Population	Building Value (millions of dollars)		
			Residential	Non-Residential	Total
Connecticut					
	Middlesex	12,959	1,786	248	2,034
Total Region		**12,959**	**1,786**	**248**	**2,034**