

## 6.0 APPENDIX B: HAZARD AND VULNERABILITY DATA

This appendix supplements the assessment and analysis of Seneca County's hazards and vulnerabilities from Section 2: Hazard Identification and Risk Assessment. A complete list of historical incidents of each hazard is provided here. Additionally, detailed data on the anticipated damage to Seneca County from a 100-year flood and earthquake, per HAZUS estimates, is provided.

### 5.1 HAZARD HISTORY DATA

The National Climactic Data Center has maintained records on weather incidents across the United States since 1950. The tables below provide a history of the incidents on record for Seneca County from 1950 through present day.

#### 5.1.1 Drought and Extreme Heat

These incidents include all occurrences categorized as drought or extreme heat.

Hazard	Location	Date	Injuries	Deaths	Property Damage	Crop Damage
Drought	Seneca (Zone)	08/01/1996	0	0	0	0
Drought	Seneca (Zone)	06/01/1999	0	0	0	0
Drought	Seneca (Zone)	07/01/1999	0	0	0	0
Drought	Seneca (Zone)	08/01/1999	0	0	0	0
Drought	Seneca (Zone)	09/01/1999	0	0	0	18M

#### 5.1.2 Flood

The flood incidents identified in this table include events classified as flood and flash flood that occurred in Seneca County since 1950.

Hazard	Location	Date	Deaths	Injuries	Property Damage	Crop Damage
Flash Flood	Tiffin (south)	04/29/1996	0	0	0	0
Flash Flood	SE Portion	05/16/1996	0	0	0	0
Flash Flood	Southern Portion	07/29/1996	0	0	0	0
Flash Flood	Countywide	05/25/1997	0	0	0	0
Flash Flood	Countywide	06/01/1997	0	0	70K	40K
Flood	Seneca (Zone)	06/01/1997	0	0	100K	0
Flash Flood	Countywide	01/08/1998	0	0	0	0
Flood	Seneca (Zone)	01/08/1998	0	0	0	0

Hazard	Location	Date	Deaths	Injuries	Property Damage	Crop Damage
Flash Flood	Countywide	06/28/1998	0	0	10K	0
Flash Flood	Countywide	08/25/1998	0	0	100K	0
Flash Flood	Bettsville	08/26/1998	0	0	50K	0
Flash Flood	Countywide	08/23/2000	0	0	0	0
Flash Flood	Countywide	07/08/2003	0	0	100K	500K
Flood	Seneca (Zone)	08/04/2003	0	0	100K	0
Flash Flood	Countywide	05/21/2004	0	0	400K	0
Flood	Seneca (Zone)	01/01/2005	0	0	375K	0
Flash Flood	South Portion	07/16/2005	0	0	100K	0
Flash Flood	West Portion	06/21/2006	0	0	450K	750K
Flash Flood	Bettsville	08/20/2007	0	0	75K	0
Flood	Bettsville	08/20/2007	0	0	1.5M	2K
Flood	Tiffin	08/21/2007	0	0	0	0
Flash Flood	Tiffin	02/28/2011	0	0	1.5M	0
Flash Flood	Bascom	05/14/2011	0	0	15K	0
Flash Flood	Tiffin	07/23/2011	0	0	100K	0
Flash Flood	Tiffin	07/01/2013	0	0	50K	0
Flood	Tiffin Airport	12/22/2013	1	0	5K	0
Flash Flood	Cromers	12/23/2013	0	0	40K	0
Flood	Fostoria	07/13/2017	0	0	0	0

### 5.1.3 Severe Thunderstorm

Thunderstorm incidents include events that produced any combination of hail, lightning and thunderstorm wind; all hazards were not necessarily present in all incidents.

Hazard	Location	Date	Deaths	Injuries	Property Damage	Crop Damage
Hail	Seneca County	07/01/1959	0	0	0	0
Thunderstorm Wind	Seneca County	08/08/1962	0	0	0	0
Hail	Seneca County	08/08/1962	0	0	0	0
Hail	Seneca County	04/06/1967	0	0	0	0
Thunderstorm Wind	Seneca County	06/21/1968	0	0	0	0
Thunderstorm Wind	Seneca County	06/01/1969	0	0	0	0
Hail	Seneca County	05/12/1970	0	0	0	0
Thunderstorm Wind	Seneca County	06/12/1973	0	0	0	0

Hazard	Location	Date	Deaths	Injuries	Property Damage	Crop Damage
Hail	Seneca County	06/26/1973	0	0	0	0
Thunderstorm Wind	Seneca County	06/28/1973	0	0	0	0
Thunderstorm Wind	Seneca County	07/05/1973	0	0	0	0
Thunderstorm Wind	Seneca County	08/11/1973	0	0	0	0
Hail	Seneca County	08/11/1973	0	0	0	0
Thunderstorm Wind	Seneca County	05/11/1974	0	0	0	0
Thunderstorm Wind	Seneca County	07/04/1974	0	0	0	0
Hail	Seneca County	07/03/1975	0	0	0	0
Thunderstorm Wind	Seneca County	07/16/1976	0	0	0	0
Thunderstorm Wind	Seneca County	07/31/1976	0	0	0	0
Thunderstorm Wind	Seneca County	05/08/1978	0	0	0	0
Thunderstorm Wind	Seneca County	05/08/1978	0	0	0	0
Hail	Seneca County	04/08/1980	0	0	0	0
Thunderstorm Wind	Seneca County	04/08/1980	0	0	0	0
Thunderstorm Wind	Seneca County	06/07/1980	0	0	0	0
Thunderstorm Wind	Seneca County	06/07/1980	0	0	0	0
Thunderstorm Wind	Seneca County	08/02/1980	0	0	0	0
Hail	Seneca County	03/16/1982	0	0	0	0
Hail	Seneca County	05/27/1982	0	0	0	0
Hail	Seneca County	05/27/1982	0	0	0	0
Thunderstorm Wind	Seneca County	05/27/1982	0	0	0	0
Hail	Seneca County	05/27/1982	0	0	0	0
Thunderstorm Wind	Seneca County	05/27/1982	0	0	0	0
Hail	Seneca County	05/27/1982	0	0	0	0
Thunderstorm Wind	Seneca County	05/27/1982	0	0	0	0
Thunderstorm Wind	Seneca County	06/15/1982	0	0	0	0
Hail	Seneca County	05/02/1983	0	0	0	0
Hail	Seneca County	05/02/1983	0	0	0	0
Hail	Seneca County	07/01/1983	0	0	0	0
Thunderstorm Wind	Seneca County	07/01/1983	0	0	0	0
Thunderstorm Wind	Seneca County	07/04/1983	0	0	0	0
Hail	Seneca County	07/04/1983	0	0	0	0
Thunderstorm Wind	Seneca County	09/06/1983	0	0	0	0
Hail	Seneca County	08/10/1984	0	0	0	0
Thunderstorm Wind	Seneca County	08/10/1984	0	0	0	0
Hail	Seneca County	08/10/1984	0	0	0	0

Hazard	Location	Date	Deaths	Injuries	Property Damage	Crop Damage
Hail	Seneca County	08/10/1984	0	0	0	0
Thunderstorm Wind	Seneca County	04/05/1985	0	0	0	0
Hail	Seneca County	05/27/1985	0	0	0	0
Thunderstorm Wind	Seneca County	07/10/1985	0	0	0	0
Hail	Seneca County	08/14/1985	0	0	0	0
Thunderstorm Wind	Seneca County	08/14/1985	0	0	0	0
Thunderstorm Wind	Seneca County	03/10/1986	0	0	0	0
Thunderstorm Wind	Seneca County	05/06/1986	0	0	0	0
Thunderstorm Wind	Seneca County	06/02/1987	0	0	0	0
Thunderstorm Wind	Seneca County	06/08/1987	0	0	0	0
Thunderstorm Wind	Seneca County	06/29/1987	0	0	0	0
Thunderstorm Wind	Seneca County	08/02/1987	0	0	0	0
Thunderstorm Wind	Seneca County	08/05/1988	0	0	0	0
Hail	Seneca County	06/03/1989	0	0	0	0
Thunderstorm Wind	Seneca County	09/14/1990	0	0	0	0
Thunderstorm Wind	Seneca County	03/27/1991	0	0	0	0
Hail	Seneca County	05/30/1991	0	0	0	0
Thunderstorm Wind	Seneca County	06/15/1991	0	2	0	0
Thunderstorm Wind	Seneca County	06/30/1991	0	0	0	0
Thunderstorm Wind	Seneca County	06/17/1992	0	0	0	0
Thunderstorm Wind	Seneca County	06/18/1992	0	0	0	0
Hail	Seneca County	06/23/1992	0	0	0	0
Hail	Seneca County	07/13/1992	0	0	0	0
Thunderstorm Wind	Seneca County	07/14/1992	0	0	0	0
Hail	Seneca County	09/09/1992	0	0	0	0
Hail	S Portion	08/02/1993	0	0	5K	500K
Thunderstorm Wind	Tiffin	04/15/1994	0	0	50K	0
Thunderstorm Wind	Bloomville	05/04/1994	0	0	50K	0
Thunderstorm Wind	Tiffin 7 NE and	06/20/1994	0	0	5K	0
Hail	Tiffin	11/01/1994	0	0	0	0
Thunderstorm Wind	Fostoria	04/11/1995	0	0	20K	0
Hail	Seneca County	05/10/1995	0	0	0	0
Hail	South of Fostoria	05/10/1995	0	0	40K	0
Thunderstorm Wind	Seneca County	05/28/1995	0	0	30K	0
Thunderstorm Wind	Countywide	06/26/1995	0	0	3K	0
Thunderstorm Wind	McCutherville	06/27/1995	0	0	0	0

Hazard	Location	Date	Deaths	Injuries	Property Damage	Crop Damage
Thunderstorm Wind	Countywide	07/13/1995	0	0	80K	10K
Thunderstorm Wind	Adrian	07/29/1996	0	0	0	2K
Thunderstorm Wind	Countywide	10/30/1996	0	0	75K	0
Thunderstorm Wind	Countywide	11/07/1996	0	0	15K	0
Thunderstorm Wind	Fostoria	05/18/1997	0	0	20K	0
Thunderstorm Wind	Bettsville	05/18/1997	0	0	50K	0
Thunderstorm Wind	Countywide	06/21/1997	0	0	10K	0
Thunderstorm Wind	Countywide	06/29/1997	0	0	5K	0
Thunderstorm Wind	Fostoria	07/14/1997	0	0	5K	0
Thunderstorm Wind	Fostoria	08/04/1997	0	0	10K	0
Thunderstorm Wind	Republic	08/04/1997	0	0	5K	0
Thunderstorm Wind	Fostoria	08/12/1997	0	0	5K	0
Thunderstorm Wind	Lowell	09/19/1997	0	0	50K	0
Thunderstorm Wind	Tiffin	03/28/1998	0	0	10K	0
Thunderstorm Wind	Fostoria	05/31/1998	0	0	1K	0
Hail	New Riegel	05/31/1998	0	0	0	0
Hail	Tiffin	05/31/1998	0	0	0	0
Hail	Attica	05/31/1998	0	0	0	0
Thunderstorm Wind	Tiffin	06/12/1998	0	0	4K	0
Thunderstorm Wind	Countywide	06/27/1998	0	0	50K	0
Thunderstorm Wind	Tiffin	06/28/1998	0	0	20K	0
Hail	Bloomville	06/28/1998	0	0	0	0
Thunderstorm Wind	Countywide	06/28/1998	0	0	30K	0
Thunderstorm Wind	Bettsville	06/29/1998	0	0	0	0
Thunderstorm Wind	Tiffin	08/24/1998	0	0	20K	0
Hail	Countywide	08/24/1998	0	0	0	20K
Thunderstorm Wind	Countywide	08/24/1998	0	0	20K	0
Thunderstorm Wind	Countywide	08/25/1998	0	0	10K	0
Hail	Attica	09/07/1998	0	0	0	5K
Thunderstorm Wind	Tiffin	11/10/1998	0	0	40K	0
Thunderstorm Wind	Fostoria	11/10/1998	0	0	40K	0
Thunderstorm Wind	Tiffin	12/06/1998	0	0	2K	0
Hail	Maple Grove	06/10/1999	0	0	0	0
Thunderstorm Wind	Countywide	06/10/1999	0	0	125K	0
Hail	Attica	06/12/1999	0	0	0	0
Lightning	Tiffin	07/06/1999	0	1	0	0

Hazard	Location	Date	Deaths	Injuries	Property Damage	Crop Damage
Thunderstorm Wind	Tiffin	07/06/1999	0	0	10K	0
Hail	Fostoria	07/09/1999	0	0	0	0
Thunderstorm Wind	Countywide	07/09/1999	0	0	100K	0
Thunderstorm Wind	Countywide	10/13/1999	0	0	25K	0
Thunderstorm Wind	New Riegel	04/20/2000	0	0	50K	0
Thunderstorm Wind	Tiffin	06/14/2000	0	0	5K	0
Hail	Tiffin	07/14/2000	0	0	0	0
Thunderstorm Wind	Fostoria	07/29/2000	0	0	5K	0
Thunderstorm Wind	Fostoria	08/06/2000	0	0	20K	0
Thunderstorm Wind	Amsden	09/23/2000	0	0	2K	0
Thunderstorm Wind	Bloomville	09/23/2000	0	0	0	0
Hail	Bascom	05/15/2001	0	0	0	0
Hail	Bloomville	05/15/2001	0	0	0	0
Hail	Tiffin	06/19/2001	0	0	0	0
Hail	Bloomville	06/19/2001	0	0	0	0
Thunderstorm Wind	Bettsville	08/08/2001	0	0	15K	0
Thunderstorm Wind	Tiffin	10/24/2001	0	0	0	0
Thunderstorm Wind	Fostoria	02/20/2002	0	0	15K	0
Hail	Tiffin	05/29/2002	0	0	5K	0
Thunderstorm Wind	Republic	06/04/2002	0	0	25K	0
Hail	Republic	06/04/2002	0	0	5K	0
Thunderstorm Wind	Tiffin	06/04/2002	0	0	10K	0
Thunderstorm Wind	Countywide	06/04/2002	0	0	20K	0
Lightning	New Riegel	06/04/2002	0	0	75K	0
Hail	Bascom	07/04/2002	0	0	10K	0
Hail	Fostoria	07/19/2002	0	0	2K	0
Thunderstorm Wind	Fostoria	07/19/2002	0	0	2K	0
Hail	Tiffin	07/27/2002	0	0	0	0
Thunderstorm Wind	Countywide	07/29/2002	0	0	10K	0
Thunderstorm Wind	Fostoria	08/23/2002	0	0	5K	0
Hail	New Riegel	11/10/2002	0	0	5K	0
Hail	Tiffin	11/10/2002	0	0	20K	0
Hail	Fostoria	03/20/2003	0	0	2K	0
Hail	Tiffin	04/04/2003	0	0	2K	0
Hail	Kansas	04/04/2003	0	0	10K	0
Hail	Fostoria	04/04/2003	0	0	5K	0

Hazard	Location	Date	Deaths	Injuries	Property Damage	Crop Damage
Hail	Fostoria	04/04/2003	0	0	5K	0
Hail	Tiffin	04/20/2003	0	0	2K	0
Thunderstorm Wind	Fostoria	04/20/2003	0	0	150K	0
Hail	Republic	05/10/2003	0	0	0	0
Thunderstorm Wind	Tiffin	07/04/2003	0	0	5K	0
Thunderstorm Wind	Attica	07/04/2003	0	0	15K	0
Thunderstorm Wind	Countywide	07/07/2003	0	0	15K	0
Thunderstorm Wind	Countywide	07/08/2003	0	0	500K	0
Thunderstorm Wind	Countywide	07/08/2003	0	0	35K	0
Thunderstorm Wind	Fostoria	07/27/2003	0	0	15K	0
Hail	Bascom	08/04/2003	0	0	0	0
Thunderstorm Wind	Amsden	08/04/2003	0	0	0	0
Hail	Bloomville	08/04/2003	0	0	0	0
Thunderstorm Wind	Fostoria	08/26/2003	0	0	3K	0
Thunderstorm Wind	Tiffin	11/12/2003	0	0	5K	0
Hail	Old Ft	04/17/2004	0	0	0	0
Hail	Tiffin	04/17/2004	0	0	0	0
Hail	Tiffin	04/17/2004	0	0	1K	0
Hail	Attica	04/17/2004	0	0	5K	0
Thunderstorm Wind	Bascom	05/17/2004	0	0	3K	0
Hail	Tiffin	05/21/2004	0	0	0	0
Thunderstorm Wind	Countywide	05/21/2004	0	0	75K	0
Hail	Attica	05/21/2004	0	0	2K	0
Thunderstorm Wind	Fostoria	05/30/2004	0	0	2K	0
Thunderstorm Wind	New Riegel	05/30/2004	0	0	2K	0
Thunderstorm Wind	Tiffin	06/13/2004	0	0	5K	0
Thunderstorm Wind	Bascom	06/14/2004	0	0	8K	0
Hail	Tiffin	08/18/2004	0	0	0	0
Thunderstorm Wind	McCutchenville	08/18/2004	0	0	15K	0
Thunderstorm Wind	Bloomville	08/18/2004	0	0	10K	0
Hail	Bloomville	08/18/2004	0	0	0	0
Hail	Central Portion	04/20/2005	0	0	0	0
Thunderstorm Wind	Countywide	05/13/2005	0	0	10K	0
Thunderstorm Wind	Tiffin	05/23/2005	0	0	150K	0
Thunderstorm Wind	Attica	06/05/2005	0	0	2K	0
Hail	Attica	06/05/2005	0	0	0	0

Hazard	Location	Date	Deaths	Injuries	Property Damage	Crop Damage
Hail	Fostoria	06/30/2005	0	0	0	0
Thunderstorm Wind	Green Springs	06/30/2005	0	0	4K	0
Thunderstorm Wind	Fostoria	07/25/2005	0	0	8K	0
Thunderstorm Wind	Attica	07/26/2005	0	0	2K	0
Thunderstorm Wind	Tiffin	07/26/2005	0	0	2K	0
Thunderstorm Wind	Tiffin	07/26/2005	0	0	1K	0
Thunderstorm Wind	Tiffin	11/06/2005	0	0	1K	0
Thunderstorm Wind	Bloomville	11/06/2005	0	0	1K	0
Hail	Bettsville	04/07/2006	0	0	5K	0
Hail	Green Springs	04/07/2006	0	0	0	0
Hail	Flat Rock	05/18/2006	0	0	0	0
Thunderstorm Wind	Tiffin	05/25/2006	0	0	0	0
Thunderstorm Wind	Bascom	05/25/2006	0	0	0	0
Hail	Tiffin	05/30/2006	0	0	0	0
Hail	Tiffin	06/03/2006	0	0	0	0
Hail	Republic	06/08/2006	0	0	<1K	0
Hail	Fostoria	06/19/2006	0	0	0	0
Hail	Old Ft	06/21/2006	0	0	0	0
Thunderstorm Wind	Bloomville	06/21/2006	0	0	0	0
Thunderstorm Wind	Fostoria	06/22/2006	0	0	6K	0
Hail	Bascom	06/22/2006	0	0	8K	0
Hail	Tiffin	06/22/2006	0	0	0	0
Thunderstorm Wind	Tiffin	06/22/2006	0	0	0	0
Hail	Bloomville	07/10/2006	0	0	0	0
Thunderstorm Wind	Fostoria	07/26/2006	0	0	75K	0
Thunderstorm Wind	Tiffin	04/26/2007	0	0	100K	0
Hail	Flat Rock	05/01/2007	0	0	0	0
Thunderstorm Wind	Kansas	05/01/2007	0	0	40K	0
Hail	Bascom	05/01/2007	0	0	25K	0
Hail	Tiffin	05/01/2007	0	0	20K	0
Hail	Tiffin	05/01/2007	0	0	0	0
Hail	Fostoria	05/01/2007	0	0	25K	0
Hail	Tiffin	05/01/2007	0	0	0	0
Hail	St Stephens	05/26/2007	0	0	0	0
Hail	Republic	06/02/2007	0	0	10K	25K
Thunderstorm Wind	Republic	06/02/2007	0	0	5K	0



Hazard	Location	Date	Deaths	Injuries	Property Damage	Crop Damage
Thunderstorm Wind	Tiffin	05/31/2008	0	0	3K	0
Thunderstorm Wind	Fostoria	06/09/2008	0	0	0	0
Thunderstorm Wind	Kansas	06/09/2008	0	0	20K	0
Thunderstorm Wind	Old Ft	06/09/2008	0	0	6K	0
Hail	Tiffin	06/13/2008	0	0	0	0
Thunderstorm Wind	Tiffin	06/15/2008	0	0	2K	0
Hail	Tiffin	06/22/2008	0	0	0	0
Hail	Tiffin	06/22/2008	0	0	0	0
Hail	Republic	06/22/2008	0	0	0	0
Hail	Republic	06/22/2008	0	0	0	0
Thunderstorm Wind	Tiffin	06/25/2008	0	0	1K	0
Hail	Tiffin	06/26/2008	0	0	0	0
Hail	Attica	06/26/2008	0	0	0	0
Thunderstorm Wind	Attica	06/26/2008	0	0	4K	0
Thunderstorm Wind	Attica	06/26/2008	0	0	4K	0
Hail	Tiffin	06/26/2008	0	0	0	0
Hail	Republic	06/26/2008	0	0	0	0
Thunderstorm Wind	Republic	06/26/2008	0	0	1K	0
Hail	Tiffin	04/02/2009	0	0	0	0
Hail	New Riegel	04/02/2009	0	0	0	0
Hail	Tiffin	04/02/2009	0	0	0	0
Hail	Bettsville	04/02/2009	0	0	0	0
Thunderstorm Wind	Melmore	08/20/2009	0	0	3K	0
Thunderstorm Wind	Tiffin	08/28/2009	0	0	1K	0
Hail	New Riegel	05/05/2010	0	0	0	0
Thunderstorm Wind	Bascom	05/05/2010	0	0	2K	0
Hail	Tiffin	05/05/2010	0	0	0	0
Hail	Bascom	05/05/2010	0	0	0	0
Hail	Tiffin	05/05/2010	0	0	0	0
Hail	Tiffin	05/05/2010	0	0	0	0
Hail	Tiffin	05/31/2010	0	0	5K	0
Thunderstorm Wind	Lowell	06/23/2010	0	0	2K	0
Thunderstorm Wind	Tiffin	06/23/2010	0	0	1K	0
Thunderstorm Wind	New Riegel	06/23/2010	0	0	1K	0
Thunderstorm Wind	Tiffin	06/27/2010	0	0	2K	0
Thunderstorm Wind	Bloomville	06/27/2010	0	0	15K	0

Hazard	Location	Date	Deaths	Injuries	Property Damage	Crop Damage
Thunderstorm Wind	Republic	06/27/2010	0	0	25K	0
Thunderstorm Wind	New Riegel	08/04/2010	0	0	12K	0
Thunderstorm Wind	Fostoria	10/26/2010	0	0	1K	0
Thunderstorm Wind	Tiffin	10/26/2010	0	0	10K	0
Thunderstorm Wind	Bloomville	10/26/2010	0	0	1K	0
Hail	Fostoria	05/25/2011	0	0	100K	0
Thunderstorm Wind	Fostoria	05/25/2011	0	0	0	0
Thunderstorm Wind	Fostoria	05/25/2011	0	0	10K	0
Hail	Fostoria	05/25/2011	0	0	0	0
Hail	Bettsville	05/25/2011	0	0	0	0
Hail	Bettsville	05/25/2011	0	0	0	0
Hail	Tiffin	05/25/2011	0	0	50K	0
Hail	Tiffin	05/25/2011	0	0	0	0
Hail	Alvada	05/25/2011	0	0	200K	0
Hail	Tiffin	06/17/2011	0	0	0	0
Thunderstorm Wind	Tiffin	06/17/2011	0	0	1K	0
Thunderstorm Wind	Tiffin	07/18/2011	0	0	0	0
Thunderstorm Wind	Mc Cutchenville	07/22/2011	0	0	1K	0
Thunderstorm Wind	Tiffin	07/23/2011	0	0	3K	0
Hail	Fostoria	08/01/2011	0	0	0	0
Hail	Tiffin	08/01/2011	0	0	0	0
Hail	Tiffin	08/01/2011	0	0	0	0
Hail	New Riegel	08/01/2011	0	0	0	0
Hail	Green Springs	08/09/2011	0	0	0	0
Hail	Republic	08/09/2011	0	0	0	0
Hail	Bloomville	08/09/2011	0	0	0	0
Thunderstorm Wind	Tiffin	08/24/2011	0	0	50K	0
Thunderstorm Wind	Attica	08/24/2011	0	0	20K	0
Thunderstorm Wind	Tiffin	08/24/2011	0	0	20K	0
Thunderstorm Wind	Tiffin	09/03/2011	0	0	50K	0
Hail	Bettsville	03/15/2012	0	0	0	0
Hail	Tiffin	05/09/2012	0	0	0	0
Thunderstorm Wind	Attica	06/18/2012	0	0	2K	0
Thunderstorm Wind	Springville	06/29/2012	0	0	300K	0
Thunderstorm Wind	Green Springs	07/01/2012	0	0	15K	0
Hail	Tiffin	07/03/2012	0	0	0	0

Hazard	Location	Date	Deaths	Injuries	Property Damage	Crop Damage
Thunderstorm Wind	Tiffin Seneca Co Arp	08/04/2012	0	0	2K	0
Hail	Attica	09/06/2012	0	0	0	0
Hail	Attica	09/06/2012	0	0	0	0
Hail	Attica	09/06/2012	0	0	0	0
Thunderstorm Wind	Fostoria	06/12/2013	0	0	0	0
Thunderstorm Wind	Amsden	06/12/2013	0	0	100K	0
Thunderstorm Wind	Fostoria	06/12/2013	0	0	8K	0
Thunderstorm Wind	Green Springs	06/12/2013	0	0	75K	0
Thunderstorm Wind	Old Ft	06/12/2013	0	0	35K	0
Thunderstorm Wind	Bettsville	07/08/2013	0	0	10K	0
Thunderstorm Wind	Fostoria	07/10/2013	0	0	800K	0
Hail	Tiffin	08/07/2013	0	0	0	0
Hail	Republic	08/07/2013	0	0	1K	0
Hail	Weiker Arpt	08/07/2013	0	0	1K	0
Hail	Tiffin	08/31/2013	0	0	0	0
Thunderstorm Wind	Iler	08/31/2013	0	0	10K	0
Thunderstorm Wind	New Riegel	10/31/2013	0	0	1K	0
Thunderstorm Wind	New Riegel	10/31/2013	0	0	250K	0
Thunderstorm Wind	Tiffin Arpt	11/17/2013	0	0	25K	0
Hail	Tiffin	05/07/2014	0	0	1K	0
Hail	Kansas	05/07/2014	0	0	0	0
Thunderstorm Wind	Tiffin	06/18/2014	0	0	40K	0
Thunderstorm Wind	Tiffin	06/18/2014	0	0	0	0
Thunderstorm Wind	Fostoria Metro Arpt	04/09/2015	0	0	5K	0
Thunderstorm Wind	Fostoria	05/26/2015	0	0	1K	0
Thunderstorm Wind	Tiffin	06/12/2015	0	0	10K	0
Thunderstorm Wind	Tiffin	07/14/2015	0	0	10K	0
Hail	Tiffin Arpt	09/03/2015	0	0	1K	0
Hail	Attica	05/07/2016	0	0	0	0
Thunderstorm Wind	Fostoria	07/13/2016	0	0	12K	0
Thunderstorm Wind	Tiffin	07/13/2016	0	0	20K	0
Thunderstorm Wind	Melmore	02/24/2017	0	0	3K	0
Thunderstorm Wind	Bloomville	03/01/2017	0	0	2K	0
Thunderstorm Wind	Tiffin	03/01/2017	0	0	75K	0
Hail	Tiffin	03/30/2017	0	0	0	0
Hail	Bloomville	04/19/2017	0	0	0	0

Hazard	Location	Date	Deaths	Injuries	Property Damage	Crop Damage
Hail	Attica	04/19/2017	0	0	0	0
Thunderstorm Wind	Lowell	06/13/2017	0	0	5K	0
Hail	Tiffin	08/02/2017	0	0	0	0
Hail	Tiffin	08/03/2017	0	0	0	0
Thunderstorm Wind	Tiffin	08/03/2017	0	0	0	0
Thunderstorm Wind	Springville	11/05/2017	0	0	25K	0
Thunderstorm Wind	Bascom	11/05/2017	0	0	0	0
Thunderstorm Wind	New Riegel	11/05/2017	0	0	50K	0
Thunderstorm Wind	Bascom	11/05/2017	0	0	75K	0
Thunderstorm Wind	Bascom	11/05/2017	0	0	250K	0
Thunderstorm Wind	Tiffin Seneca Co Arp	11/05/2017	0	0	500K	0
Thunderstorm Wind	Weiker Arpt	11/05/2017	0	0	125K	0
Thunderstorm Wind	Ink	11/05/2017	0	0	350K	0
Thunderstorm Wind	Attica	11/05/2017	0	0	50K	0
Thunderstorm Wind	Bloomville	07/26/2018	0	0	4K	0
Thunderstorm Wind	Bettsville	10/06/2018	0	0	0	0
Hail	Flat Rock	01/08/2019	0	0	0	0
Thunderstorm Wind	Weiker Arpt	05/23/2019	0	0	0	0
Hail	Berwick	06/01/2019	0	0	0	0

#### 5.1.4 Tornado/Windstorm

Confirmed tornadoes, funnel clouds, and high wind events in Seneca County in since 1950 are listed below.

Hazard	Location	Date	Fujita Scale	Deaths	Injuries	Property Damage	Crop Damage
Tornado	Seneca County	06/13/1960	F1	0	0	0	0
Tornado	Seneca County	02/18/1961	F2	0	0	250K	0
Tornado	Seneca County	05/19/1964	F1	0	0	25K	0
Tornado	Seneca County	04/11/1965	F3	4	30	250K	0
Tornado	Seneca County	11/16/1965	F2	0	0	250K	0
Tornado	Seneca County	09/11/1971	F1	0	0	25K	0
Tornado	Seneca County	05/10/1973	F3	1	0	2.5M	0
Tornado	Seneca County	06/26/1973	F0	0	0	3K	0
Tornado	Seneca County	05/11/1974	F1	0	0	25K	0
Tornado	Seneca County	04/17/1981	F1	0	0	25K	0

Hazard	Location	Date	Fujita Scale	Deaths	Injuries	Property Damage	Crop Damage
Tornado	Seneca County	06/14/1989	F0	0	0	250K	0
Tornado	Seneca County	05/31/1991	F1	0	0	250K	0
Tornado	Seneca County	06/15/1991	F0	0	0	25K	0
Tornado	Seneca County	07/13/1992	F2	0	0	250K	0
High Wind	Seneca (Zone)	01/27/1996		0	0	0	0
High Wind	Seneca (Zone)	02/10/1996		0	0	2.4K	0
High Wind	Seneca (Zone)	03/25/1996		0	0	23K	0
High Wind	Seneca (Zone)	04/25/1996		0	0	2K	0
High Wind	Seneca (Zone)	10/30/1996		0	0	177K	77K
High Wind	Seneca (Zone)	02/27/1997		0	0	6K	0
High Wind	Seneca (Zone)	11/10/1998		0	0	103K	0
High Wind	Seneca (Zone)	05/06/1999		0	0	33K	5K
High Wind	Seneca (Zone)	12/11/2000		0	0	163K	0
High Wind	Seneca (Zone)	02/09/2001		0	0	13K	0
High Wind	Seneca (Zone)	02/25/2001		0	0	20K	0
High Wind	Seneca (Zone)	04/12/2001		0	0	33K	0
Funnel Cloud	New Riegel	05/07/2001	N/A	0	0	0	0
High Wind	Seneca (Zone)	10/25/2001		0	0	28K	0
High Wind	Seneca (Zone)	02/01/2002		0	0	43K	0
High Wind	Seneca (Zone)	03/09/2002		0	0	300K	0
High Wind	Seneca (Zone)	10/04/2002		0	0	35K	0
Tornado	Fostoria	11/10/2002	F1	0	0	1.1M	0
Tornado	Tiffin	11/10/2002	F3	1	2	12.8M	0
Strong Wind	Seneca (Zone)	05/11/2003		0	0	43K	0
High Wind	Seneca (Zone)	11/13/2003		0	0	82K	0
High Wind	Seneca (Zone)	03/05/2004		0	0	86K	0
Strong Wind	Seneca (Zone)	11/27/2004		0	0	6K	0
Strong Wind	Seneca (Zone)	12/07/2004		0	0	12K	0
High Wind	Seneca (Zone)	11/06/2005		0	0	25K	0
High Wind	Seneca (Zone)	02/17/2006		0	0	25K	0
Strong Wind	Seneca (Zone)	03/10/2006		0	0	14K	0
High Wind	Seneca (Zone)	12/01/2006		0	0	12K	0
Tornado	Bettsville	08/05/2007	F0	0	0	60K	0
High Wind	Seneca (Zone)	12/23/2007		0	0	<1K	0
High Wind	Seneca (Zone)	01/30/2008		0	0	30K	0
Tornado	Fostoria	05/31/2008	F1	0	1	750K	0
High Wind	Seneca (Zone)	09/14/2008		0	0	6.1M	550K
High Wind	Seneca (Zone)	02/11/2009		0	0	553K	0

Hazard	Location	Date	Fujita Scale	Deaths	Injuries	Property Damage	Crop Damage
High Wind	Seneca (Zone)	12/09/2009		0	0	340K	0
High Wind	Seneca (Zone)	04/28/2011		0	0	75K	0
High Wind	Seneca (Zone)	02/24/2012		0	0	50K	0
High Wind	Seneca (Zone)	03/02/2012		0	0	20K	0
High Wind	Seneca (Zone)	10/29/2012		0	0	50K	0
High Wind	Seneca (Zone)	11/24/2012		0	1	2K	0
High Wind	Seneca (Zone)	11/24/2012		0	0	0	0
Tornado	Kansas/Bettsville	07/08/2013	EFO	0	0	75K	0
High Wind	Seneca (Zone)	01/10/2017		0	0	0	0
Tornado	Cooper	11/05/2017	EF2	0	0	150K	0
Tornado	West Lodi	11/05/2017	EF1	0	0	200K	0
High Wind	Seneca (Zone)	02/24/2019		0	0	50K	0

### 5.1.6 Winter Storm

Winter storm events include incidents classified as blizzard, extreme cold/wind chill, ice storm, or winter storm that occurred in Seneca County since 1950.

Hazard	Location	Date	Deaths	Injuries	Property Damage	Crop Damage
Winter Storm	Seneca (Zone)	01/02/1999	0	2	15K	0
Winter Storm	Seneca (Zone)	01/08/1999	0	0	2K	0
Winter Storm	Seneca (Zone)	01/13/1999	0	0	2K	0
Winter Storm	Seneca (Zone)	03/16/2000	0	0	10K	0
Winter Storm	Seneca (Zone)	12/13/2000	0	0	75K	0
Winter Storm	Seneca (Zone)	03/24/2002	0	0	50K	0
Winter Storm	Seneca (Zone)	03/26/2002	0	0	100K	0
Winter Storm	Seneca (Zone)	01/04/2004	0	0	100K	0
Winter Storm	Seneca (Zone)	12/22/2004	0	0	2.8M	0
Ice Storm	Seneca (Zone)	01/05/2005	0	0	7.1M	0
Winter Storm	Seneca (Zone)	01/22/2005	0	0	175K	0
Winter Storm	Seneca (Zone)	02/13/2007	0	0	50K	0
Winter Storm	Seneca (Zone)	12/15/2007	0	0	100K	0
Winter Storm	Seneca (Zone)	02/25/2008	0	0	80K	0
Winter Storm	Seneca (Zone)	03/04/2008	0	0	300K	0
Winter Storm	Seneca (Zone)	03/07/2008	0	0	350K	0
Winter Storm	Seneca (Zone)	12/19/2008	0	0	30K	0
Winter Storm	Seneca (Zone)	01/9/2009	0	0	75K	0

Hazard	Location	Date	Deaths	Injuries	Property Damage	Crop Damage
Extreme Cold/Wind Chill	Seneca (Zone)	01/15/2009	0	0	0	0
Winter Storm	Seneca (Zone)	01/27/2009	0	0	125K	0
Winter Storm	Seneca (Zone)	02/09/2010	0	0	150K	0
Extreme Cold/Wind Chill	Seneca (Zone)	01/06/2014	0	0	0	0
Extreme Cold/Wind Chill	Seneca (Zone)	01/27/2014	0	0	0	0
Winter Storm	Seneca (Zone)	02/04/2014	0	0	1M	0
Winter Storm	Seneca (Zone)	03/12/2014	0	0	150K	0
Extreme Cold/Wind Chill	Seneca (Zone)	02/15/2015	0	0	0	0
Winter Storm	Seneca (Zone)	01/19/2019	0	0	75K	0
Extreme Cold/Wind Chill	Seneca (Zone)	01/30/2019	0	0	0	0

## 5.2 HAZUS LOSS ESTIMATES

HAZUS is a nationally accepted methodology that utilizes U.S. Census and local geographic information systems (GIS) data to estimate losses for earthquakes, hurricanes, and floods. Because floods and earthquakes are identified as risks in Seneca County, HAZUS was used to generate and evaluate the county's vulnerability to these incidents. Estimates from HAZUS were generated using 2010 U.S. Census Bureau data. This data shows Seneca County's population as 56,745 and building count as 24,333. Current 2019 figures will be slightly different than the data used in this report.

### 5.2.1 Flood

Seneca County's vulnerability to flood was evaluated utilizing a HAZUS scenario for a 100-year flood event. For a flood of this magnitude, the damage to the county would be significant. The incident would expose a significant portion of the county's buildings to damage. Table 5-1 identifies buildings by occupancy type for all of Seneca County and those exposed to risk in this scenario.

**Table 5-1: Building Exposure by Occupancy**

Occupancy	Seneca County		100-Year Flood Scenario	
	Exposure (\$1000)	Percent of Total	Exposure (\$1000)	Percent of Total
Residential	\$4,814,643	74.5%	\$1,431,607	79.2%
Commercial	\$844,086	12.1%	\$199,807	11.1%
Industrial	\$448,032	6.9%	\$79,405	4.4%
Agricultural	\$79,440	1.2%	\$33,915	1.9%
Religion	\$155,721	2.4%	\$35,282	2.0%
Government	\$29,111	0.5%	\$8,143	0.5%
Education	\$94,724	1.5%	\$19,621	1.1%
<b>Total</b>	<b>\$6,465,757</b>	<b>100%</b>	<b>\$1,807,780</b>	<b>100%</b>

### Essential Facility Inventory

Essential facilities are healthcare facilities like hospitals and clinics, fire and EMS stations, police stations, and operations and dispatch centers. Schools are included in essential facilities.

Seneca County's essential facilities are identified in Table 5-2.

**Table 5-2: Essential Facility Inventory**

Facility Type	Number
Hospital	1 (115 beds)
Schools	35
Fire Stations	10
Police Stations	9

### Estimated Building Damage

Per HAZUS estimates, 163 buildings will sustain at least moderate damage. This accounts for 82% of the total buildings identified for the scenario. Four buildings are estimated to be completely destroyed. Tables 5-3 and 5-4 identify the anticipated building damage based on occupancy type and building type.

**Table 5-3: Expected Building Damage by Occupancy**

Occupancy	Percent Damaged					
	1-10%	11-20%	21-30%	31-40%	41- 50 %	> 50%
Agriculture	0	0	0	0	0	0
Commercial	0	2	0	0	0	0
Education	1	0	0	0	0	0
Government	0	0	0	0	0	0
Industrial	0	0	1	0	0	0
Religious	0	0	0	0	0	0
Residential	71	105	35	13	3	4
<b>Total</b>	<b>72</b>	<b>107</b>	<b>36</b>	<b>13</b>	<b>3</b>	<b>4</b>

**Table 5-4: Expected Building Damage by Building Type**

Building Type	Percent Damaged					
	1-10%	11-20%	21-30%	31-40%	41- 50 %	> 50%
Concrete	0	0	0	0	0	0
Manufactured Housing	0	0	0	0	0	0
Masonry	10	13	4	0	0	0
Steel	0	0	0	0	0	0
Wood	62	93	31	13	3	4
<b>Total</b>	<b>72</b>	<b>106</b>	<b>35</b>	<b>13</b>	<b>3</b>	<b>4</b>

Based on this scenario, HAZUS predict that a limited number of critical facilities will sustain moderate or significant damage. Per estimates, three schools would sustain substantial damage and loss of use. All other schools as well as hospital beds, emergency services, and institutional services normally present in the county would continue to be functional in a 100-year flood scenario.



**Table 5-5: Expected Damage to Essential Facilities**

Classification	Total	Moderate Damage	Substantial Damage	Loss of Use
Fire Stations	10	0	0	0
Hospitals	1	0	0	0
Police Stations	9	0	0	0
Schools	35	0	3	3

### *Shelter Requirements*

When flooding forces people from their homes, some will seek refuge at a public shelter. In this incident, it is anticipated that 765 households (approximately 2,294 people) would be displaced. Of those households, approximately 60 people are anticipated to seek temporary shelter in a public shelter.

### *Building Related Losses*

The total economic loss for the identified 100-year flood event is estimated to be \$160.64M.

Building-related losses are addressed in two loss categories: direct building loss and business interruption loss. Building losses include structural damage and damage to contents. Business interruption losses include the costs associated with not being able to conduct normal business, displaced workers, and lost opportunities. Table 5-6 provides a summary of the anticipated losses.

**Table 5-6: Building-Related Economic Loss Estimates**

Area	Residential	Commercial	Industrial	Others	Total
<b><i>Building Loss</i></b>					
Building	29.99	5.55	3.30	1.13	<b>39.97</b>
Content	18.84	15.47	7.40	5.85	<b>47.56</b>
Inventory	0	0.30	0.91	0.05	<b>1.27</b>
<b><i>Business Interruption</i></b>					
Income	1.32	12.83	0.14	2.97	<b>17.25</b>
Relocation	9.62	3.09	0.23	1.44	<b>14.38</b>
Rental Income	6.47	2.22	0.04	0.10	<b>8.82</b>
Wage	3.10	12.62	0.25	15.41	<b>31.39</b>
<b>Total</b>	<b>69.34</b>	<b>52.07</b>	<b>12.27</b>	<b>26.96</b>	<b>160.64</b>

## **5.2.2 Earthquake**

The simulated earthquake epicenter was assumed to be in Tiffin, the county's most populated jurisdiction. The simulated earthquake had a magnitude of 5.0 on the Richter Scale and a depth of 5.0 km. The HAZUS loss estimation program utilized 2010 U.S. Census data for this scenario. There are an estimated 24,000 buildings in the county with a replacement value of \$6,465M.

### *Critical Facility Inventory*

HAZUS separates critical facilities into essential facilities and high potential loss (HPL) facilities. Essential facilities are healthcare facilities like hospitals and clinics, fire and EMS stations, police stations, and operations centers. Schools are included in essential facilities. HPL facilities include dams, levees, nuclear power plants, military installations and hazardous material sites.

**Table 5-7: Critical Facility Inventory**

Essential Facilities		High Potential Loss Facilities	
Facility Type	Number	Facility Type	Number
Hospital	1 (115 beds)	Hazardous Materials Sites	29
Schools	35		
Fire Stations	10		
Police Stations	9		

### *Transportation and Utility Lifeline Inventory*

Lifeline systems are defined as transportation and utilities. Transportation systems include highways, railways, and airports. Utility systems include water treatment and potable water plants, wastewater treatment plants, natural gas suppliers, fuel oil suppliers, electrical power plants, and communications hubs. The total value of these lifeline systems exceeds \$1,762M and includes 109 miles of highway, 312 bridges, and 8,587 miles of pipes.

**Table 5-8: Transportation System Inventory**

System	Components	Quantity	Replacement Value
Highways	Bridges	312	\$83.52M
	Segments	49	\$659.18M
Railways	Bridges	8	\$0.57M
	Segments	152	\$198.81M
Airport	Facilities	4	\$42.60M
	Runways	4	\$151.86M
<b>Total</b>			<b>\$1,136.60M</b>

**Table 5-9: Utility System Inventory**

System	Components	Quantity	Replacement Value
Potable Water	Distribution Lines	N/A	\$138.21M
Waste Water	Distribution Lines	N/A	\$89.92M
	Facilities	5	\$349.65M
Natural Gas	Distribution Lines	N/A	\$55.28M
Oil Systems	Facilities	1	\$0.11M
Communication	Facilities	5	\$0.53M
<b>Total</b>			<b>\$626.70M</b>

### *Building Damage*

The estimated building damage according to HAZUS is extensive. The number of buildings projected to sustain moderate damage is 4,194, approximately 17% of all buildings in the county. It is estimated that 260 buildings would be destroyed. Table 5-10 summarizes the anticipated building damages.

**Table 5-10: Expected Building Damage by Occupancy**

<b>Occupancy</b>	<b>None</b>	<b>Slight</b>	<b>Moderate</b>	<b>Extensive</b>	<b>Complete</b>
Agriculture	181	65	69	33	7
Commercial	550	251	277	134	40
Education	24	9	10	4	1
Government	18	9	10	4	1
Industrial	209	81	91	45	12
Other Residential	1,088	504	503	210	47
Religion	84	29	25	12	3
Single Family Residential	12,855	4,176	1,975	527	148
<b>Total</b>	<b>15,012</b>	<b>5,126</b>	<b>2,964</b>	<b>971</b>	<b>261</b>

Depending on the type of building construction, damage from an earthquake can be more or less serious. Based on common types of construction, the scenario is extrapolated into damage according to type of construction type.

**Table 5-11: Expected Building Damage by Building Type**

<b>Building Type</b>	<b>None</b>	<b>Slight</b>	<b>Moderate</b>	<b>Extensive</b>	<b>Complete</b>
Wood	11,346	3,452	1,203	146	11
Steel	292	106	171	108	31
Concrete	99	35	41	20	4
Precast	96	29	46	31	6
Reinforced Masonry	36	9	14	9	1
Unreinforced Masonry	2,630	1,205	1,109	488	172
Manufactured Housing	510	277	376	167	34
<b>Total</b>	<b>15,012</b>	<b>5,126</b>	<b>2,964</b>	<b>971</b>	<b>261</b>

### *Essential Facility Damage*

According to HAZUS estimates, only 18 of the county's hospital beds (16%) would be available and functional on the day of the earthquake. These would be needed by patients already hospitalized at the time of the earthquake and by those requiring hospitalization for injuries sustained in the incident. After one week, it is estimated that 28% of the beds would be available. By the 30-day mark, an estimated 59% would be fully functional. Anticipated damage to other essential facilities is detailed in Table 5-12.

**Table 5-12: Expected Damage to Essential Facilities**

<b>Classification</b>	<b>Total</b>	<b>Moderate Damage &gt;50%</b>	<b>Complete Damage &gt; 50%</b>	<b>With Functionality &gt;50% on Day 1</b>
Hospitals	1	1	0	0
Schools	35	16	0	10
Police Stations	9	1	0	7
Fire Stations	10	3	0	5

*Transportation and Utility Lifeline Damage*

Per HAZUS estimates, highways, bridges, railways, and rail bridges will have more than 50% functionality on the first day after an earthquake and will continue to experience greater than 50% function throughout the recovery period. Limited damage to these transportation systems is expected.

Airports are also expected to have at least 50% functionality immediately following the incident. It is anticipated that one airport will sustain at least moderate damage. This damage is not expected to prevent them from functioning.

Tables 5-13 and 5-14 describe the anticipated damage to utility system facilities and pipelines.

**Table 5-13: Expected Utility System Facility Damage**

<b>System</b>	<b>Total</b>	<b>Moderate Damage</b>	<b>Complete Damage</b>	<b>Day 1 &gt;50% Functionality</b>	<b>Day 7 &gt;50% Functionality</b>
Waste Water	5	4	0	0	5
Oil Systems	1	0	0	1	1
Communication	5	3	0	4	5

**Table 5-14: Expected Utility System Pipeline Damage**

<b>Utility</b>	<b>Total Pipeline</b>	<b>Anticipated Leaks</b>	<b>Anticipated Line Breaks</b>
Potable Water	4,294	447	112
Waste Water	2,576	224	56
Natural Gas	1,718	77	19

Electrical service and potable water systems are more difficult to restore. Table 5-15 outlines the number of customers anticipated to be without potable water or electric service following the incident. There are 21,774 households in the county.

**Table 5-15: Expected Without Service**

<b>Days Post-Event</b>	<b>Potable Water</b>	<b>Electric Power</b>
Day 1	161	9,195
Day 3	8	5,667
Day 7	0	2,138
Day 30	0	353
Day 90	0	12

### *Debris Generation*

The amount of debris generated by an earthquake can be substantial. HAZUS classifies debris into two types based on the handling equipment required: brick/wood and reinforced concrete/steel. In the given scenario, a total of 174,000 tons of debris is anticipated. Brick/wood would comprise 49% of that amount. When converting these totals to truckloads, debris removal would require 6,960 truckloads, assuming 25 tons per truck.

### *Shelter Needs*

Temporary public shelters are often necessary post-quake to provide housing for people displaced by the event. HAZUS estimates that 332 households would be displaced and 205 people would seek temporary housing in a public shelter.

### *Casualties*

The number of people estimated to be injured or killed by the earthquake is divided into four categories based on the extent of the victim's injuries:

- Severity Level 1 – Require medical attention but not hospitalization
- Severity Level 2 – Require hospitalization for non-life-threatening injuries
- Severity Level 3 – Require hospitalization for critical injuries
- Severity Level 4 – Fatalities

Casualty estimates are provided for 3 times of day that represent periods of the day that various sectors of the community operate at peak capacity loads. These figures are provided in Table 5-16.

**Table 5-16: Casualty Estimates**

<b>Time</b>	<b>Location</b>	<b>Level 1</b>	<b>Level 2</b>	<b>Level 3</b>	<b>Level 4</b>
<b>2 AM</b>	Commercial	1.47	0.34	0.04	0
	Commuting	0	0	0	0
	Educational	0	0	0	0
	Hotels	0	0	0	0
	Industrial	3.88	0.88	0.11	0.21
	Other Residential	34.46	7.75	0.99	1.92
	Single Family Residential	84.39	18.57	2.47	4.83
	<b>TOTAL</b>	<b>124</b>	<b>28</b>	<b>4</b>	<b>7</b>
<b>2 PM</b>	Commercial	86.60	20.08	2.62	5.07
	Commuting	0.02	0.03	0.04	0.01
	Educational	56.53	13.81	2.00	3.86
	Hotels	0	0	0	0
	Industrial	28.60	6.52	0.82	1.58
	Other Residential	7.12	1.62	0.21	0.40
	Single Family	17.89	4.06	0.56	1.05
	<b>TOTAL</b>	<b>197</b>	<b>46</b>	<b>6</b>	<b>12</b>
<b>5 PM</b>	Commercial	63.46	14.79	1.95	3.72
	Commuting	0.31	0.53	0.75	0.15
	Educational	10.77	2.68	0.39	0.76
	Hotels	0	0	0	0
	Industrial	17.87	4.07	0.51	0.99
	Other Residential	13.34	3.07	0.41	0.76
	Single Family Residential	33.85	7.69	1.07	2.00
	<b>TOTAL</b>	<b>140</b>	<b>33</b>	<b>5</b>	<b>8</b>

*Economic Loss*

Total economic loss for this earthquake scenario is estimated to be \$713.62M. This includes building and lifeline related losses and is based on the building inventory in the county. Building losses are examined in two categories: direct building loss and business interruption loss. Direct building losses include structural damage and damage to contents. Business interruption losses include the costs associated with not being able to conduct normal business, displaced workers, and lost opportunities.

Total estimated building losses are anticipated to be \$599.43M. Business interruption expenses account for 18% of this total. Residential structures are expected to sustain the greatest loss by far, more than 54% of the total loss for the county.

Table 5-17 provides a summary of the anticipated building-related losses. All figures are expressed in millions of dollars.

**Table 5-17: Building-Related Economic Loss Estimates**

Area	Single-Family	Other Residential	Commercial	Industrial	Other	Total
<b>Income Losses</b>						
Wage	0	0.97	20.16	1.59	1.46	24.18
Capital Related	0	0.41	16.34	0.95	0.39	18.11
Rental	6.02	4.72	8.06	0.51	0.62	19.93
Relocation	20.99	3.29	13.81	2.22	5.87	46.18
<b>Capital Stock Losses</b>						
Structural	33.49	9.83	21.29	8.09	7.92	80.64
Non-Structural	130.77	44.07	58.47	25.53	17.94	276.79
Content	53.03	13.18	32.99	18.32	10.93	128.46
Inventory	0	0	0.91	3.89	0.30	5.11
<b>TOTAL</b>	<b>244.32</b>	<b>76.48</b>	<b>172.03</b>	<b>61.15</b>	<b>45.45</b>	<b>599.43</b>

*Transportation and Utility Lifeline Losses*

Earthquakes often cause extensive damage to a community's infrastructure. Tables 5-18 and 5-19 depict the potential damage Seneca County could expect to its transportation and utility systems. Loss figures address only the cost to repair, not business interruption costs. Numbers are expressed in millions of dollars.

**Table 5-18: Transportation System Economic Losses**

System	Component	Inventory Value	Economic Loss
Highway	Segments	\$659.18	0
	Bridges	\$83.52	\$1.05
Railways	Segments	\$198.81	0
	Bridges	\$0.57	\$0.01
Airport	Facilities	\$42.60	\$8.21
	Runways	\$151.85	0
<b>Total</b>		<b>\$1,136.55</b>	<b>\$9.26</b>

**Table 5-19: Utility System Economic Losses**

System	Component	Inventory Value	Economic Loss
Potable Water	Distribution Lines	\$138.20	\$2.01
Waste Water	Facilities	\$349.65	\$101.45
	Distribution Lines	\$93.92	\$1.00
Natural Gas	Distribution Lines	\$55.28	\$0.35
Oil Systems	Facilities	\$0.10	\$0.01
Communication	Facilities	\$0.52	\$0.11
<b>Total</b>		<b>\$626.69</b>	<b>\$104.93</b>