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ULSTER COUNTY TRANSPORTATION RESILIENCY PROJECT
DATA COLLECTION PLAN

December 2021
File No. 18.0175293.00

UCTC
ULSTER COUNTY
TRANSPORTATION COUNCIL

PREPARED FOR:
Ulster County Transportation Council
244 Fair Street
Kingston, NY 12401

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December 14, 2021
File No. 18.0175293.00

Mr. Dennis Doyle, Director
Ulster County Planning Department
244 Fair Street
Kingston, New York 12401

Re: Data Collection Plan
Critical Transportation Infrastructure Vulnerability Assessment
Ulster County, New York

Dear Mr. Doyle:

In accordance with GZA's current contract with the County of Ulster dated August 18, 2021, for the above referenced project solicited under the RFP-UC21-015 Critical Transportation Infrastructure Vulnerability Assessment and its contract terms, we are pleased to present this Data Collection Plan. This Plan is subject to the limitations outlined in **Appendix A**.

Please contact Sam Bell, the Project Manager for GZA, at (781) 223-7091 or by email at samuel.bell@gza.com with any questions.

Very truly yours,

GZA GEOENVIRONMENTAL, INC.

Samuel J. Bell, CFM
Sr. Project Manager/Climate Resiliency Planner

Chad W. Cox P.E.(MA)
Consultant Reviewer/Sr. Principal

David M. Leone, CFM, P.E.
Associate Principal

Attachment: Final Data Collection Plan

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1.0 INTRODUCTION AND OBJECTIVE

Ulster County, New York is home to approximately 180,000 people occupying over 1,100 square miles. More than 50,000 of the County's residents reside in the City of Kingston's urbanized area, making it a regional hub of transportation and commerce. The County is also home to numerous vibrant business districts including New Paltz, Saugerties, Woodstock, Ellenville, Rosendale, and many others. Residents and visitors alike depend on the over 2,300 miles of roadways in the County, in addition to bus networks, trail systems, and other transportation infrastructure for commuting to work, experiencing the outdoors, and participating in the local economy.

The Ulster County Transportation Council (UCTC) determine transportation system includes:

- Roads
- Bridges
- Railroads
- Highway garages and associated remote or salt storage facilities
- Operations centers, Intermodal facilities
- Other surface transportation assets including public transportation assets and non-motorized assets such as trails.

A key part of collecting the UCTC transportation data from the categories outlined above will include the GZA Team working with the UCTC to identify what specific UCTC transportation system assets are critical and a priority for inclusion in the vulnerability assessment. This will assist in establishing a focused approach that is designed to focus on the transportation assets that are the most critical to the UCTC. The critical transportation assets provide access to and support for essential facilities located within the County and local communities that provide critical life safety services to community members located within the Metropolitan Area of Ulster County. Example essential facilities from the Homeland Infrastructure Foundation-Level Data (HIFLD) include:

- Fire Stations
- Police Stations
- Hospitals
- Emergency Management Service Facilities
- Schools

Many of these transportation assets and essential facilities are in areas that are highly vulnerable to natural hazards including flooding, severe weather, windstorms, and other hazards. UCTC's vulnerable assets may also become increasingly exposed because of our changing climate.

To assist the UCTC Project Team complete this first step, UCTC in collaboration with GZA and the Technical Advisory Committee (TAC) prepared a data collection plan for the study area, which encompasses the Metropolitan Planning Area of Ulster County (including seven census blocks in southeastern Greene County). The goal of this plan is to provide a systematic approach for identifying and collecting the data inputs needed for conducting the vulnerability assessment. These inputs include local and UCTC asset data (including supporting essential facilities), hazard data, associated natural hazard data, and past hazard events.

2.0 DATA COLLECTION PLAN

Data collection and processing are the critical building blocks of undertaking a vulnerability risk assessment and the quality and suitability of available data determines the output and even the outcome of the assessment. Data that needs to be collected and processed for this purpose can be broadly classified into the following:

- Hazard data;
- Asset data;
- Socio-economic data[1]; and
- Past hazard events.

The purpose of this data collection plan is to identify the sources and types of data for application on this project, and to describe how the GZA Team, UCTC and TAC collectively intends to obtain the data. Our approach to data collection is to leverage existing data sources and climate variables, scenarios and sensitivity thresholds from previous studies and projects based on the scope and scale of this project.

The UCTC Data Collection Plan uses the following steps, discussed in more detail below:

1. Identify and Establish List of UCTC Transportation Assets, Essential Facilities and Socio-Economic Data
2. Establish List of Private and Non-Publicly Available Asset Data
3. Develop a Hazards Events Inventory
4. Identify Associated Natural Hazards and Climate Change Data
5. Incorporate Data from Steps 1 through 4 into the Project GIS and Story Maps

STEP 1. ESTABLISH LIST OF UCTC TRANSPORTATION ASSETS, ESSENTIAL FACILITIES AND SOCIO-ECONOMIC DATA

UCTC uses its GIS-based Ulster County Parcel Viewer Tool to manage, evaluate, and visualize certain information to assist in the management of County owned assets. In addition, other key UCTC and local transportation asset data are documented by the New York State Department of Transportation (NYS DOT), New York State Thruway Authority (NYS TA); United States Department of Transportation (USDOT). UCTC also developed an independent dataset identifying county owned culverts and other assets that will be included in the asset data inventory. An overview of these assets, includes the following:

- Roads: including local and county roads, and critical portions of state-owned roads
- Bridges: including local and county owned assets and critical state-owned bridges
- Railroad Lines:
- Facilities: including 1) Highway garages and associated remote or salt storage facilities; and 2) Operations centers; 3) Intermodal facilities; and 4) Essential facilities

[1] We propose to include the critical socioeconomic data included in the UCTC's Long Range Transportation Plan and if available any travel demand model that may cover the area within Ulster County. This will assist in evaluating existing and projected population and employment data for Ulster County.

- Other surface transportation assets including public transportation assets and non-motorized assets such as trails and physical features including topography; and
- Other Infrastructure and physical features: including flood control structures, stormwater infrastructure, and other infrastructure.

Appendix B includes additional details of the proposed asset, essential facility, and socio-economic geospatial layers for consideration by the UCTC and TAC for inclusion in the vulnerability assessment. These data sets are generally publicly available and have been downloaded by GZA. In addition, the UCTC will provide GZA Team with the county owned culverts data set, critical future planned County transportation infrastructure, NYSDOT vulnerability assessment for Ulster County, and any other relevant UCTC asset and climate adaptation (i.e., hazards) data that is not publicly available. GZA Team will facilitate a call with the UCTC and TAC to evaluate the publicly available data to establish and finalize the list of critical assets for inclusion in the vulnerability assessment. This will also include identification of critical state-owned assets for inclusion; however, we anticipate that the focus of the vulnerability assessment will be on County and locally owned assets. This call will also include a discussion of any missing data that may impede the performance of the vulnerability assessment and will assign responsibility for tracking down this data, if available. It's important to note that even though the focus of the assessment is on county and local roads, we will also look at the network as a whole in conducting a system-wide assessment.

After identifying the approved assets that exist within the study area for inclusion in the vulnerability assessment during the call with the TAC and UCTC Project Team, the next steps are anticipated to include:

- Incorporate the assets data into the project GIS (see Step 5).
- Prepare a Story Map of the Assets (see Step 5).
- Collect additional data based on the results of the gap analysis.

These approved assets, along with available private and non-publicly available transportation related assets identified in Step 2 will serve as the basis for identifying the assets for inclusion as a part of the vulnerability assessment.

STEP 2. ESTABLISH LIST OF PRIVATE AND NON-PUBLICLY AVAILABLE ASSET DATA

During the call to evaluate the publicly available asset data outlined in Step 1, the Project Team will also identify available private and non-publicly available transportation related assets. Based on these discussions with the TAC, the GZA Team will include other state-owned or privately-owned infrastructure related assets as appropriate. This will require the GZA Team, with UCTC and TAC support, to reach out to other entities, such as New York State entities including the New York State Department of Transportation and/or private entities such as CSX. We understand that that the UCTC has had limited success collecting information from CSX in the past. If the UCTC is not able to collect the CSX data, we propose to evaluate the available CSX data included in the Federal Railroad Administration (FRA) data. GZA will include these assets as a part of the overall asset inventory, including the GIS database. Private data to be collected will be directly requested from individual entities, with the assumed support of the TAC as necessary to validate the GZA team's request. No field data collection or survey is included in our scope of work at this time. Nor can we guarantee private entities will respond in a timely manner to our request for their information.

GZA will work in coordination with UCTC and TAC members to collect the additional data after the meeting. Upon collection of the additional data the next steps may include:

- Evaluate if the data received is pertinent to the vulnerability assessment.

- Incorporate the pertinent assets data into the project GIS and Story Map (see Step 5).

STEP 3. DEVELOP PAST HAZARD EVENTS INVENTORY

Based on an evaluation of the 2017 Ulster County Hazard Mitigation Plan Update (2017 UCHMP (see Reference 4)) and FEMA Declared Disasters Website (see Reference 1), GZA identified 76 hazard events (including natural and man-made hazards) that resulted in federal disaster declarations from 1952 to October 2021 in the State of New York. Of those 76 disaster declarations that impacted various parts of the State, 25 resulted in Ulster County. **Appendix C** includes a detailed list of these hazard events for UCTC review. During the call to evaluate the publicly available asset data outlined in Step 1, the Project Team will also review these hazard events. This will support our screening of different hazard types to carry forward for vulnerability assessment. After this review, the next step will include incorporating the hazards inventory into the project GIS and Story Map (see Step 5).

STEP 4. IDENTIFY NATURAL HAZARDS AND AVAILABLE CLIMATE CHANGE PROJECTIONS

GZA conducted an initial screening of the following hazards based on the natural hazards outlined in the scope of work for the project:

- Atmospheric hazards: extreme temperatures, extreme wind, hurricanes and tropical storms, lightning, nor'easters, tornadoes, and winter storms*;
- Hydrologic hazards: flooding (riverine, coastal, and cloudburst/rainfall-induced local flooding), drought, and dam failures*;
- Geologic hazards: earthquakes and landslides*; and
- Wildfires*.

*Note that every hazard will not be included for evaluation in the vulnerability assessment. As presented in **Appendix E**, the GZA Team will screen hazards to identify the key hazards using a screening criteria developed in collaboration with the TAC for use in the vulnerability assessment.

The GZA Team identified existing hazard data for inclusion in the vulnerability assessment based on an evaluation of the following data sources:

- the latest Multi-Jurisdictional HMP (see Reference 4);
- the New York State Department of Environmental Conservation's (DEC) Flood Risk Management Guidance for Implementation of the Community Risk and Resiliency Act (CRRA) including sea level rise estimates, design flow multipliers, etc. (see Reference 3);
- the New York Climate Change Science Clearinghouse (see Reference 2);
- the publicly available USDOT's Downscaled and Downloaded Climate Data, in addition to national-level resources such as the U.S. National Climate Assessment Reports (see Reference 4);
- Special Flood Hazard Area data from FEMA;
- the U.S. Army Corps of Engineers North Atlantic Coast Comprehensive Study for storm surges (for areas along the Hudson River).

Based on this evaluation, the GZA Team will develop a criteria for screening the hazards and conducting the assessment. The assessment criteria will include proposed climate change time horizons for inclusion in the project. To support the compatibility with other climate change assessment and initiatives, the GZA Team will coordinate with the UCTC and TAC on the data sources. Upon completion, GZA will provide both criteria and an **Appendix D**[2] that will present the tabular database of the available associated natural hazards and climate change interactions geospatial data and standardized data sources for conducting the vulnerability assessment. The GZA Team will then coordinate a call with the TAC and UCTC to screen hazards to identify key hazards for use in the assessment and confirm the data sources.

After finalizing the agreed upon hazards for inclusion in the vulnerability assessment based on the UCTC and TAC review, the GZA Team will incorporate the hazard data into the project GIS with the capability of overlaying the hazards data with the asset data collected in Step 1. The GZA Team will also incorporate the hazard data into an additional Story Map that will provide context and narrative for each hazard evaluated (See Step 5).

STEP 5. INCORPORATE DATA FROM STEPS 1 THROUGH 4 INTO THE PROJECT GIS AND STORY MAPS

Upon approval by the UCTC and GZA will work with the UCTC to incorporate the data from Steps 1 through 4 into the project GIS and Story Maps. The approach for preparing the project GIS, based on a project call with UCTC on September 30th, 2021 includes:

- The GZA Team will initially develop a web-based mapping platform (GeoTool) on GZA's enterprise GIS platform[3] to visualize the available data collected as a part of Steps 1 through 4.
- The GZA Team will incorporate the data from Steps 1 through 4 into the GeoTool that will initially include the study boundaries (i.e., Ulster County and seven (7) Greene County Census Block Boundaries) and will then moving the data into the project geodatabase as outlined in the Scope of Work.
- The GZA Team will provide access to GeoTool to the UCTC to review the data incorporated into the GeoTool for each Task.
- The GZA Team will revise data incorporated into the GeoTool based on UCTC feedback.
- In coordination with the UCTC, the GZA Team will provide access to TAC members to review the mapping of the assets, hazard events and hazards.
- Upon completion of Draft deliverables, the GZA Team will coordinate calls to review draft deliverables as per the Project Work Plan (see **Appendix E**).
- The GZA Team will work with the UCTC to establish additional procedures as needed for utilizing the GeoTool such as determining what data layers can be displayed publicly and how to integrate the results presented on the GeoTool onto the UCTC's GIS platform at the end of the project.

The approach for preparing the Story Maps, based on a project call with UCTC on 30 September 2021, includes:

- UCTC will provide access to Ulster County's ArcHub to the GZA Team for the preparation of the Story Maps.

[2] Note that the timeline for completing Step 4 will start upon completion of Tasks 1 through 3 as per the Project Workplan. To assist in reducing the time to completion of Task 4, the GZA Team is already in the process of developing **Appendix D**; however, **Appendix D** will not be ready for review until completion of the draft criteria outlined above with an anticipated timeframe of mid-December, if not sooner.

[3] The GeoTool will not be a publicly facing web-based platform during the preparation of the study.

- The GZA Team will develop content for the Story Maps directly on the UCTC ArcHub site for Steps 1 through 4 using the UCTC graphic standards as outlined in the Scope of Work[4].
- Upon completion of Draft deliverables, the GZA Team will coordinate calls to review Draft Story Map deliverables as per the Project Work Plan (see **Appendix E**).
- The GZA Team will work with the UCTC to establish additional procedures needed for utilizing the UCTC ArcHub such as developing user groups for the review of draft and final Story Map deliverables (e.g., TAC members).

3.0 REFERENCES

1. FEMA, Declared Disasters Website (Accessed September 2021)

   Declared Disasters | FEMA.gov

2. New York Department of Environmental Conservation (NYDEC), The New York Climate Change Science Clearinghouse (NYCCSC) New York Climate Change Science Clearinghouse (nyclimatescience.org)
3. NYDEC, August 2020 *Flood Risk Management Guidance for Implementation of the Community Risk and Resiliency Act (CRRA)* CRRA Flood Risk Management Guidance (ny.gov)
4. Ulster County, 2017 Multi-Jurisdictional Hazard Mitigation Plan Update Multi-Jurisdictional Hazard Mitigation Plan | Ulster County (ulstercountyny.gov)
5. USDOT: Federal Highway Administration, CMIP Climate Data Processing Tool 2.1 CMIP - Climate Data Processing Tool (dot.gov)

[4] The access to the UCTC ArcHub site for the development of content during the development of project deliverables on the UCTC ArcHub site will be limited to the UTCT and GZA Team.

APPENDIX A - LIMITATIONS

Use of Report

1. GZA GeoEnvironmental, Inc. (GZA) prepared this report on behalf of, and for the exclusive use of the Ulster County Transportation Council (Client) for the stated purpose(s) and location(s) identified in the Report. Use of this report, in whole or in part, at other locations, or for other purposes, may lead to inappropriate conclusions; and we do not accept any responsibility for the consequences of such use(s). Further, reliance by any party not identified in the agreement, for any use, without our prior written permission, shall be at that party's sole risk, and without any liability to GZA.

Standard of Care

2. Our findings and conclusions are based on the work conducted as part of the Scope of Services set forth in the Report and/or proposal, and reflect our professional judgment. These findings and conclusions must be considered not as scientific or engineering certainties, but rather as our professional opinions concerning the limited data gathered during the course of our work. Conditions other than described in this report may be found at the subject location(s).

3. Our services were performed using the degree of skill and care ordinarily exercised by qualified professionals performing the same type of services at the same time, under similar conditions, at the same or a similar property. No warranty, expressed or implied, is made.

4. Note that the probabilities presented in this study are approximate and uncertain. They describe future potential conditions to support planning-level decision-making. The scenarios are appropriate for use in understanding the risk of different climate change scenarios and planning. For example, applying higher amounts of inland flooding may be appropriate when considering risk mitigation for high value lifeline assets, which would merit protection against events with a low probability of occurrence.

General

5. The observations described in this report were made under the conditions stated therein. The conclusions presented were based solely upon the services described therein, and not on scientific tasks or procedures beyond the scope of described services or the time and budgetary constraints imposed by the Client.

6. In preparing this report, GZA relied on certain information provided by the Client, state and local officials, and other parties referenced therein available to GZA at the time of the evaluation. GZA did not attempt to independently verify the accuracy or completeness of all information reviewed or received during the course of this evaluation.

7. Any GZA hydrologic analysis presented herein is for the rainfall volumes and distributions stated herein. For storm conditions other than those analyzed, the response of the site's spillway, impoundment, and drainage network has not been evaluated.

8. Observations were made of the site and of structures on the site as indicated within the report. Where access to portions of the structure or site, or to structures on the site was unavailable or limited, GZA renders no opinion as to the condition of that portion of the site or structure.

9. In reviewing this Report, it should be realized that the reported condition of any features discusses is based on observations of field conditions during the course of this study along with data made available to GZA. It is important to note that the conditions noted depend on numerous and constantly changing circumstances and are evolutionary in nature.

Compliance with Codes and Regulations

10. We used reasonable care in identifying and interpreting applicable codes and regulations. These codes and regulations are subject to various, and possibly contradictory, interpretations. Compliance with codes and regulations by other parties is beyond our control.

APPENDIX B – ULSTER COUNTY TRANSPORTATION ASSETS, ESSENTIAL FACILITIES AND SOCIOECONOMIC DATA

GIS DATA DICTIONARY: ASSETS

GIS Data Dictionary: Assets

CATEGORY	USED IN ANALYSIS (YES/NO)	DESCRIPTION	WEB SERVICE	SOURCE	DATA TYPE (SHP, FGDB, Service)	Metadata URL	Available Jurisdictions	COMMENTS
Infrastructure								
Building Footprints	Yes	Microsoft Building Footprints		Esri, Ulster County	FGDB	https://cugir.library.cornell.edu/catalog/cugir-009087		
Dams	Yes	This dataset is used to show the location of dams in New York State's inventory of dams, and lists selected attributes of each dam.		NYS Dept. of Environmental Conservation (DEC)	FGDB	http://gis.ny.gov/gisdata/inventories/details.cfm?DSID=1130		
HIFLD Critical Facilities	Yes	Homeland Infrastructure Foundation-Level Data (HIFLD) of critical and essential facilities such as hospitals, schools, fire/police stations, etc.		HIFLD	FGDB	https://gii.dhs.gov/hifld/		facilities in terms of emergency access
Transportation								
NYS Roadway Inventory System Geodatabase	Yes	A roadway layer generated from NYSDOTs Roadway Inventory System showing roadway characteristics and administrative attributes.		NYS Office of Cyber Security	FGDB	https://gis.ny.gov/gisdata/inventories/details.cfm?DSID=1302	NYS DOT, County, Town, City or Village	Most consistent data for use in assessment
NYS Bridges	Yes	Point layer of all New York State bridge that carry or cross a public road including general inventory attributes.		NYS DOT	FGDB	http://gis.ny.gov/gisdata/metadata/dot.Bridges.xml	NYSDOT, County, City, Town, Village, Railroad	Most consistent data for use in assessment
NYS DOT Facilities	Yes	Point file of DOT facility locations including regional offices and maintenance residencies and other DOT facilities.		NYS DOT	FGDB	http://gis.ny.gov/gisdata/inventories/details.cfm?DSID=391		Locked (Follow-up with David Staas)
NYS DOT Large Culverts	Yes	Point layer of large culverts (span between 5 and 20 feet) that carry state highways including general inventory attributes.		NYS DOT	FGDB	http://gis.ny.gov/gisdata/inventories/details.cfm?DSID=1255	State	
NYS Railroad Freight Stations	Yes	Point shapefile of railroad freight stations.		NYS DOT	SHP	http://gis.ny.gov/gisdata/inventories/details.cfm?DSID=1262	State	
NYS Railroad Lines	Yes	Line shapefile of active railroad lines.		NYS DOT	SHP	http://gis.ny.gov/gisdata/inventories/details.cfm?DSID=904	State	Break into jurisdictions (Evaluate to identify if CSX rail line) Brian will follow-up with FRA and CSX.
NYS Railroad Junctions and Locations	Yes	Point shapefile of railroad junctions and locations.		NYS DOT	SHP	http://gis.ny.gov/gisdata/inventories/details.cfm?DSID=1102	State	
NYS Railroad Passenger Stations	Yes	Point shapefile of railroad passenger stations.		NYS DOT	SHP	http://gis.ny.gov/gisdata/inventories/details.cfm?DSID=1263	State	
NYSDOT Stormwater Outfalls	Yes	Vector point file of NYS Dept of Transportation Stormwater Outfalls along or near State Highways and NYSDOT facilities in designated urban areas.		NYS DOT	SHP	http://gis.ny.gov/gisdata/inventories/details.cfm?DSID=1160		Locked
NYS DOT Residency Boundaries	Yes	Polygon shapefile of NYS Department of Transportation maintenance residency boundaries.		NYS DOT	SHP	http://gis.ny.gov/gisdata/inventories/details.cfm?DSID=395		
DEC Roads and Trails	No	Lines depicting transportation corridors on state DEC lands.		NYDEC	SHP	http://gis.ny.gov/gisdata/inventories/details.cfm?DSID=1167	Foot trail, unpaved road, multipurpose trail, paved road, bike trail, snowmobile trail	remove
NYS Thruway Bridges	No	Statewide file showing the locations of all Thruway bridges. Includes bridges that the Thruway maintains, but may be owned by other entities		NYS Thruway Authority	FGDB	http://gis.ny.gov/gisdata/inventories/details.cfm?DSID=438	State	remove
NYS Thruway Interchanges	No	Statewide file showing the locations of all Thruway exits.		NYS Thruway Authority	FGDB	http://gis.ny.gov/gisdata/inventories/details.cfm?DSID=439	State	remove
NYS Thruway Park and Ride Lots	Yes	This dataset contains the location and the attribute information associated with Park and Ride Lots along the NYS Thruway.		NYS Thruway Authority	FGDB	http://gis.ny.gov/gisdata/inventories/details.cfm?DSID=1191	State	have maintenance - include this layer
NYS Thruway Rest Areas	No	A GIS layer representing the rest areas (a.k.a. parking areas or text stops) for which the NY State Thruway Authority maintains jurisdiction.		NYS Thruway Authority	FGDB	http://gis.ny.gov/gisdata/inventories/details.cfm?DSID=1354	State	remove
NYS Thruway Route System	No	Statewide coverage of all roads maintained by the New York State Thruway Authority.		NYS Thruway Authority	FGDB	http://gis.ny.gov/gisdata/inventories/details.cfm?DSID=440	State	remove
NYS Thruway Service Areas	No	A GIS layer representing the service areas (a.k.a. travel plazas) for which the NY State Thruway Authority maintains jurisdiction.		NYS Thruway Authority	FGDB	http://gis.ny.gov/gisdata/inventories/details.cfm?DSID=436	State	remove
NYS Thruway Toll Gantries	No	This dataset shows the locations and attributes for toll gantries across the NY State Thruway Authority's roadways.		NYS Thruway Authority	FGDB	http://gis.ny.gov/gisdata/inventories/details.cfm?DSID=1374	State	remove
NYS Thruway Toll Plazas	No	Statewide file showing the locations of all toll plazas on New York State Thruway roadways		NYS Thruway Authority	FGDB	http://gis.ny.gov/gisdata/inventories/details.cfm?DSID=437	State	remove
NYS Thruway Welcome Centers	No	A GIS layer representing the Welcome Centers for which the NY State Thruway Authority maintains jurisdiction.		NYS Thruway Authority	FGDB	http://gis.ny.gov/gisdata/inventories/details.cfm?DSID=1355		remove
Mohonk Preserve Roads	No	Carriage roads and farm roads of the Mohonk Preserve, Inc. Mapped with GPS Unit with 1-3 meter accuracy. 1998-2000 by Mohonk Preserve.		Mohonk Preserve, Inc.	FGDB	http://gis.ny.gov/gisdata/inventories/details.cfm?DSID=295		Hosted by Mohonk Preserve - Must Request (remove)
Intermodal Passenger Connectivity Database (IPCD)	Yes	Nationwide database of passenger transportation terminals and connections.		USDOT	FGDB	https://www.bts.gov/content/intermodal-passenger-connectivity-database		Database resource not found online (terminal locations, transfer stations) Coordinate with CS
North American Rail Lines (National)	Yes	Comprehensive database of North America's railway system at 1:24,000 to 1:100,000 scale	https://fragis.fra.dot.gov/arcgis/rest/services/FRA/	USDOT	FGDB	https://railroads.dot.gov/maps-and-data/maps-geographic-information-		
New York Department of State/Governor's office of storm recovery		data where 10 community members mapped critical/essential facilites						New York Rising Data - GZA to collect this data for the 10 communities
Ulster County Culverts	Yes			Esri, Ulster County				Ulster County will provide data - (Coordinate with Amanda Lavalle) Large County Owned Culverts Data corresponds to the county maintained road network and some areas related to town network)
Bus Routes and Stations	?			Private				Ulster County Area Transit - UCTC has those routes mapped and will provide if needed
CSX Data	?			Private				Bridge Location Data - Brian to coordinate with CSX and emergency management
Airports	?	5 Local airports in the county						NYS has utility airports (have diversion areas for other airports and eligible for federal funding) - Kingston and Ellenville.
NYC DEP Stream Feature Inventory								Amanda LaValle to provide
Boundaries								
Ulster County Tax Parcels	Yes	Assessor tax parcel polygons	https://gis.ulstercountyny.gov/arcgis/rest/services/Tax_Parcel	Ulster County	FGDB			
Land Use Resources								
Ulster County Zoning	Yes			Ulster County	SHP			
Land Cover	Yes			PASDA	Raster			
Natural Resources								
Ulster County Surface Water	No			Ulster County	SHP			
Ulster County Habitat Cores	No			Ulster County				
National Hydrography Dataset (NHD)	No			USGS	FGDB			
Freshwater Wetlands	No			NYSDEC				
National Wetlands Inventory	No			USFWS				
Recreation								
County Trails	?							Include - Coordinate with David on this layer.

GIS DATA DICTIONARY: SOCIO ECONOMICS

GIS Data Dictionary: Socio-economic								
CATEGORY	USED IN ANALYSIS (YES/NO)	DESCRIPTION	WEB SERVICE	FGDB FEATURE CLASS NAME	SOURCE	DATA TYPE (SHP, FGDB, Service)	FILE NAME	Metadata URL
EJSCREEN Data	Yes	EJ Screening Areas			US EPA	FGDB		https://gaftp.epa.gov/EJSCREEN/
Social Vulnerability Index (SoVI)	Yes	Social Vulnerability Index	https://coast.noaa.gov/arcgis/rest/services/sovi/sovi_tracts2010/MapServer		NOAA	FGDB		Europa to provide transportation related data (https://catalog.data.gov/dataset/social-vulnerability-index-sovi-for-the-u-s-coastal-states
NYS Heat Index Data (includes focused data)	Yes	Transportation data						Europa McGovern to provide transportation related data

GIS DATA DICTIONARY: TOPOGRAPHY

GIS Data Dictionary: Topography

CATEGORY	DATA USED IN ANALYSIS (YES/NO)	LAYER NAME	FGDB Feature Class Name	SOURCE	DATA TYPE (SHP, FGDB, Service)	FILE NAME	MAP SERVICE URL	COMMENTS
Topography								
Ulster County 2ft Contours	Yes		REMOVE	Ulster County, USGS				FGDB
Digital Elevation Models (DEMs)	Yes		REMOVE	Ulster County, USGS				Data download web application

APPENDIX C – ULSTER COUNTY HAZARDS INVENTORY

GIS DATA DICTIONARY: NATURAL HAZARD EVENTS 1863 to 2021

GIS Data Dictionary: Natural Hazard Events 1863 to 2021

PROFILE	CATEGORY	DATE	DESCRIPTION	NOTES
Atmospheric				
	Extreme Heat	6/7/1999	High reached 95°F; Heat Index 100-105	Tied daily record from 1925
		7/4-7/6/1999	High reached 95°F; Heat Index peaked 110 on 7/6	Led to severe thunderstorm outbreak on
		8/8-8/9/2001	High reached 102°F in Poughkeepsie, 96°F in Albany; Heat Index 110-115 in Poughkeepsie, 105-110 Albany	Cause some heat related health problems in Schenectany; heat led to record electricity consumption
		6/9/2008	Highs in mid-upper 90s °F; Heat Index 100-104	
		7/21-7/22/2011	Highs in 90s °F; Heat Index 105-110	Third highest peak energy consumptions on 7/21
		7/15-7/19/2013	Highs in mid-upper 90s °F; Heat Index 105-110	New power consumption record set on 7/19
		9/11/2013	Highs in low-mid 90s °F; Heat Index 105-110	
	Extreme Wind	11/6/1994	High winds downed trees and powerlines; Kingston hit hardest	One death, $500,000 in property damages
		12/24/1994	Caused by coastal storm; Olive, Woodstock, Wawarsing hit hardest	$500,000 in property damages
		3/19/1996	Trees blown down in Kingston, Woodstock, Wawarsing	$89,000 in property damages
		5/29/1998	Thunderstorm winds downed trees and powerlines	Man killed in Ellenville
		7/1/2001	Microburst causing 100 mph winds; damage in Gardiner, Ireland Corners, New Paltz	$65,000 in property damages
		11/13-11/14/2003	Steep pressure gradient causes slow moving storm, 2-day event; downed powerlines caused brush fire outside of New Paltz	One injury, $275,000 in property damages
		7/22/2006	Microburst causing 70-80 mph winds over lower Catskills	$35,000 in property damages
		12/1/2006	Strong winds cause tree to collapse on apartment building in Wawarsing	One death
		10/29-10/30/2012	Superstorm Sandy	One death caused by debris thrown through windshield, 63,000 customers without power
	Hurricane and Tropical Storm	9/19/1863	Unnamed	Tropical Storm; Max wind speed 40 knots
		10/23/1878	Unnamed	Category 1; Max wind speed 70 knots
		8/22/1888	Unnamed	Tropical Storm; Max wind speed 40 knots
		8/24/1893	Unnamed	Category 1; Max wind speed 75 knots
		8/29/1893	Unnamed	Tropical Storm; Max wind speed 55 knots
		8/29/1949	Unnamed	Tropical Storm; Max wind speed 50 knots
		8/28/1971	Doria	Tropical Storm; Max wind speed 45 knots
		6/23/1972	Agnes	Tropical Storm; Max wind speed 45 knots
		9/6/1979	David	Tropical Storm; Max wind speed 40 knots
		Sep-99	Floyd	High winds, heavy rains, some flooding; significant property damage in Saugerties; some residents without power for almost a week
		Sep-04	Ivan	High winds, heavy rains, some flooding

GIS DATA DICTIONARY: NATURAL HAZARD EVENTS 1863 to 2021

PROFILE	CATEGORY	DATE	DESCRIPTION	NOTES
		8/28/2011	Irene	Tropical Storm; Max wind speed 55 knots
		9/7/2011	Lee	
		10/29/2012	Superstorm Sandy	
		9/1-9/3/2021	Hurricane Ida	
	Lightning	7/15/1997	Storage facility in Lloyd is burned to the ground following lightning strike	$250,000 in damages
		7/4/1999	Left 3,500 residents without power in Mid-Hudson Valley; property damage to 2 houses in Kingstown and town of Ulster	
		8/10/2003	Lightning struck house in Saugerties, set house ablaze and destroyed home	Two dog deaths, one injury, $100,000 in damages
		6/14/2008	Three hikers and baby were injured from strike while taking cover on park bench	
		7/27/2008	Lightning struck house in the Town of Rochester	$50,000 in property damages
		7/3/2009	Lightning struck man in his backyard in Town of Lloyd	One death
		7/29/2009	Lightning strikes down trees and wires in Woodstock	$5,000 in property damages
		6/3/2014	Lightning strikes down wires in Saugerties	$1,000 in property damages
	Nor'easter	Blizzard of 1993	Large cyclonic storm occurred on the East coast	State of emergency declared by local towns
		2/23-2/25/1998	25 inches of snow at Slide Mountain, Western Ulster County	
		12/30/2000	Snowfall rates up to 2 in/hr.; snow emergency declared in Kingston	One death
		12/26-12/27/2010	Snowfall rates 1-3 in/hr., totals 1-2 ft, wind gusts 35-45 mph	
		10/29-10/30/2011	Wet snow, snowfall rates as high as 2-4 in/hr, totals vary by region, as much as 1-2 feet across the Taconics	Governor declared state of emergency for Ulster County; 115,000 homes and businesses lost power in Ulster and Dutchess Counties
		11/26/2014	Wet snow, total 10-16 inches; day before Thanksgiving causing travel complications	32,000 customers lost power in Ulster and Dutchess Counties
	Tornado	9/20/1975	Ulster (Town); F1 NCDC reported magnitude	1 Injury, $25,000 in property damages
		3/21/1976	Wawarsing; F2 NCDC reported magnitude	
		3/21/1976	Wawarsing; F1 NCDC reported magnitude	$25,000 in property damages
		6/30/1976	Marbletown; F1 NCDC reported magnitude	$25,000 in property damages
		7/21/1983	Denning; F0 NCDC reported magnitude	$25,000 in property damages
		5/12/1984	Rochester; F0 NCDC reported magnitude	$25,000 in property damages
		10/5/1985	Ulster (Town); F1 NCDC reported magnitude	$250,000 in property damages
		7/26/1986	Wawarsing/ Shawangunk; F2 NCDC reported magnitude	2 Injuries, $2,500,000 in property damages
		9/10/1993	Saugerties (Town); F1 NCDC reported magnitude	$50,000 in property damages
		6/26/1998	Hardenburgh; F1 NCDC reported magnitude	$150,000 in property damages

GIS DATA DICTIONARY: NATURAL HAZARD EVENTS 1863 to 2021

PROFILE	CATEGORY	DATE	DESCRIPTION	NOTES
		5/18/2000	Esopus; F2 NCDC reported magnitude	$50,000 in property damages
	Winter Storm?	1/28/2009	4-8 inches of snow, 1/2 of ice accretion	
		12/9/2009	5-12 inches of snow	
		2/23-2/27/2010	Wet snow causing treacherous travel conditions, widespread power outages, even some building collapses; trains were delayed and cancelled; snow totals 1-4 ft	
		12/26-12/29/2012	6-11 inches of snow on the 26-27th, 4-8 inches on the 29th	
		1/1/2014	6-12 inches of snow' single-digit temperatures, wind chill 0-(-20) degrees	
		1/18/2015	Freezing rain lead to hazardous travel conditions	80 auto accidents in mid-Huson valley, 16 caused injuries

GIS DATA DICTIONARY: NATURAL HAZARD EVENTS 1863 to 2021

PROFILE	CATEGORY	DATE	DESCRIPTION	NOTES
Hydrologic				
	Drought	1960s	Forest fires, crop failure, fish kills, water shortages, HABs, heat-related deaths	Federal disaster declaration issued on 8/8/1965
		Aug-Dec 1993	Losses of feed grain well over 40%; estimated $50 million in losses across all impacted counties	Drought alert advisory issued 8/5/1993, later upgraded to drought warning
		June-Sep 1995	Precipitation deficits of 6-12 inches; reduction in hay and corn yields	Drought watch issued
		Apr-99	Second driest April on record, driest of the century; dry brush led to numerous brush fires across Berkshires	
		Aug-99	Record low levels of Mohawk river, numerous forest fires	Drought warning, declaration of agricultural disaster; most communities implemented voluntary or mandatory water restrictions
	Flood	1/19-1/27/1996	Snowmelt and 1-3 inches of rain cause flooding of local streams, and extensive flooding of Hudson River and Esopus Creek, Wallkill River, Rondout Creek	$10,500,000 in property damages; Federal Disaster Assistance
		9/16/1999	Hurricane Floyd; rainfall of 6-12 inches caused flooding of Esopus Creek, Catskill Creek, Schoharie Creek	$1,100,000 in property damages; 80,000 people lost power in Mid-Hudson Valley
		7/14-7/15/2000	24 hr prcp 9.85' in Boiceville, 11.97' in West Shokan; Roads in Denning washed out (County Rt 46); All but one road devastated in Hamlet of Sundown; County Rt 101 impassable	$6,056,000 in property damages
		3/28-4/3/2005	Caused by severe storms; Flooding on Esopus Creek (20.54 ft at 8:00 3/29), Bushnellsville Creek, Rondout Creek; Roads closed: Stone Ridge Rd & Rt 213 (Hamlet of High Falls), Springtown Rd (New Paltz), Rt 42 (Town of Shandaken), Pancake Hollow Rd to South Chodikee Lake Rd (New Paltz), Plains Rd from Main St to Locust Ln (New Paltz)	$2,200,000 in property damages; Federal Disaster Declaration
		2005, 2006, 2007	Flooding of Rondout Creek, Esopus Creek, Twaalfskill Creek; Roads affected: Orlando St, Buckley St, Sandy Rd, Brabant Rd, Creek Locks Rd, Farm to Market Rd, Parish Ln, County Rt 28 (Town of Ulster)	$2,000,000 in property damages; $870,000 in Public Assistance funds from FEMA awarded
		1/25/2010	3-5 in of rain and snowmelt; Esopus Creek at Allaben exceeded its seven foot flood stage; Roads affected: Plank Rd from Phoenicia to Rt 212, Rt 212 from Plank Rd to Rt 28, Sawkill Rd from Hill Rd to Melissa Rd (Kingston), Springtown Rd from Kleinekill Dr to Dug Rd (New Paltz)	
		10/1/2010	Tropical Storm Nicole; 3-9 in of rain; Esopus Creek at Cold Brook crested at 18.86 ft at 06:00 10/1; Roads affected: SR 214, Main St, High St, Station Rd, Plank Rd, Bridge St Bridge (Phoenicia), Rt 32 (Rosendale), Rt 209 (Accocord)	Bridge St Bridge (Phoenicia) suffered structural damage; 15-20 homes in Phoenicia evacuated; State of Emergency declared in Town of Shandaken and Hardenburgh
		8/28/2011	Tropical Storm Irene; Rainfall 8-12 in; Record flooding: Esopus Creek at Cold Brook, Rondout Creek at Rosendale, Hudson River at Poughkeepsie, flooding at Twaalfskill Creek; Roads affected: Rt 214 from Ulster/Greene border to Rt 23A, NY State Thruway from Exit 24 to Exit 8, Rt 42 from Rt 23A to Rt 28	
		9/7/2011	Tropical Storm Lee; Rainfall 4-8 in; minor flooding on Esopus Creek upstream of Ashokan reservoir, and moderate flooding downstream, Wallkill River at Gardiner	Pine Bush schools closed due to flooding
		10/29/2012	Superstorm Sandy; Tidal flooding; Record flooding on Hudson River at Poughkeepsie; 6-ft storm surge at Lighthouse Dr (Saugerties); Flooding on Rondout Creek (Kingston); Roads affected: Rt 213 from Kingston City line to Creeks Lock Rd, Maple St (Smith Landing)	
		7/1/2013	Flash flooding occurred due to already saturated soil conditions; Roads affected: Springtown Rd (New Paltz), Intersection of Rt 32 & Washington Ave (Rosendale)	
		7/2/2014	Thunderstorms with few storms containing hail; Flash flooding; Roads affected: SR 32 from Kallop Rd to Washington Ave (Rosendale), Intersection of Rt 9W & Old Post Rd (Marlboro)	
		7/1/2015	Flash flooding; 3 in of rain; Flooding of Kripplebush Creek; Roads affected: Rt 209 from Oak Ridge Rd to Hang Glider Rd (Ellenville), Kyserike Rd from Old Kings HWY to Lucas Turnpike (Town of Rochester)	

GIS DATA DICTIONARY: NATURAL HAZARD EVENTS 1863 to 2021

PROFILE	CATEGORY	DATE	DESCRIPTION	NOTES
Geologic				
	Earthquake		No significant earthquakes have occurred in Ulster County	
	Landslide		Town of Olive; Natural; earth slump, primary transportation- rotation	
			Town of Shandaken; Natural; earth slump, primary transportation- rotation	
			Town of Shandaken; Natural; earth slump, primary transportation- rotation	
			Town of New Paltz; Man-induced; Bedrock fall, topple, slump or slope	
			Town of Shawangunk; Man-induced; Bedrock fall, topple, slump or slope	
			Town of Saugerties; Man induced; earth slump, transport mech. Rotation	
Wildfire				
	Wildfire	Apr-06	Largest wildfire in state since 2002, lasted 13 days	900 acres of forest in Catskill Park destroyed
		Apr-08	Largest wildfire in state since 1995; lasted 9 days; utilized helicopters and bulldozers in addition to ground crews	3,100 acres of land consumed in Rochester and Wawarsing
		Spring 2015	Total of 47 brush fires reported between 3/16-4/24	Residential brush burning ban in effect every year from 3/16-5/15
		May-15	Started in Shawangunk Ridge State Park and spread to Cragsmoor Valley (Town of Wawarsing) and Walker Valley (Town of Shawngunk) ;started by homeowner burning debris outdoors in violation of burn ban	Over 2,000 acres of Shawangunk Ridge State Forest burned; 50 homes evacuated
		4/24-4/27/2016	Wildfire in Sam's Point Preserve section of Minnewaska State Park; hundreds of park visitors evacuated	Over 2,000 acres of land in Minnewaska State Park burned; 2 minor injuries reported

APPENDIX D – ULSTER COUNTY NATURAL HAZARDS AND CLIMATE CHANGE DATA SOURCES

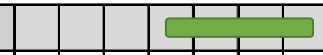
Profile	Category	Example Indicator	Data Source(s)
Atmospheric			
	Extreme Cold	Annual Days with Maximum Temperature < 32°F	NOAA Climate Explorer
	Extreme Heat	Annual Days with Maximum Temperature > 90°F	NOAA Climate Explorer
	Extreme Wind	Assets within wind zones	ASCE 7-16 Hazard Online Tool
	Hurricane and Tropical Storm	Covered in other hazards (Extreme Wind, Flooding)	Covered in other hazards (Extreme Wind, Flooding)
	Lightning	Total number of fatalities	Vaisala Lighning Fatalities by State (2008-2017)
	Nor'easter	Covered in other hazards (Extreme Wind, Flooding, Winter Storms)	Covered in other hazards (Extreme Wind, Flooding, Winter Storms)
	Tornado	Assets within area of relatively moderate to relatively high tornado risk	FEMA National Risk Index: Tornado
	Winter Storm	Annual Snowfall	Observed and Projected Climate Change in New York State: An Overview
Hydrologic			
	Drought	Palmer Drought Severity Index (PDSI)	National Integrated Drought Information System
	Flood	Miles of roadway within 100-yr or 500-yr floodplain	FEMA Flood Map Service Center
Geologic			
	Earthquake	Assets within area of seismic hazard risk	USGS New York Seismic Hazard Map
	Landslide	Assets within area of high susceptibility to landsliding and moderate incidence	USGS Landslide Susceptibility
Wildfire			
	Wildfire	Assets within area of high Wildfire Hazard Potential (WHP) Index	USDA Wildfire Risk to Communities

Category	Example Indicator	Data Source(s)
Extreme Cold	Annual Days with Maximum Temperature < 32°F	NOAA Climate Explorer
Extreme Heat	Annual Days with Maximum Temperature > 90°F	NOAA Climate Explorer
Extreme Wind	Assets within wind zones	Projected impact of climate change not currently available
Hurricane and Tropical Storm	Covered in other hazards (Extreme Wind, Flooding)	Projected impact of climate change not currently available
Lightning	Total number of fatalities	Projected impact of climate change not currently available
Nor'easter	Covered in other hazards (Extreme Wind, Flooding, Winter	Projected impact of climate change not currently available
Tornado	Assets within area of relatively moderate to relatively high tornado risk	Projected impact of climate change not currently available
Winter Storm	Annual Snowfall	Observed and Projected Climate Change in New York State: An Overview
Drought	Palmer Drought Severity Index (PDSI)	Observed and Projected Climate Change in New York State: An Overview
Flood	Miles of roadway within 100-yr or 500-yr floodplain	Considering Current and Future Inland Flood Risk: A Consumer's Guide to Flooding Tools for Communities in
Earthquake	Assets within area of seismic hazard risk	Projected impact of climate change not currently available
Landslide	Assets within area of high susceptibility to landsliding and moderate incidence	Projected impact of climate change not currently available
Wildfire	Assets within area of high Wildfire Hazard Potential (WHP) Index	Projected impact of climate change not currently available

APPENDIX E – PROJECT WORKPLAN

DRAFT ULSTER COUNTY TRANSPORTATION RESILIENCY PROJECT WORK PLAN

TASKS & OBJECTIVES	WORKSTEPS & DELIVERABLES	MONTHS: AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	Start Date	End Date
TASK 1: PROJECT INITATION	***Note:*** *Deliverables noted in green shading and TAC collaboration in* ***Bold*** *.*															8/1/2021	9/15/2021
OBJECTIVES: 1. Work with Ulster County Transportation Council (UCTC) to develop and convene a technical advisory committee (TAC) to guide development of the vulnerability assessment. 2. Work with UCTC to develop and finalize the Project Work Plan. 3. Facilitate a collaborative Kick-off meeting with the TAC and UCTC and establish TAC Collaboration Schedule.	Prepare Draft Work Plan																
	Provide Project Draft Work Plan for Project Team Review																9/8/2021
	Facilitate Kick-off Meeting in collaboration with the TAC & UCTC and establish TAC Collaboration Schedule per the Project Work Plan.																9/10/2021
	Provide Kick-off Meeting Minutes to TAC and Project Team																9/15/2021
OUTCOMES	1) Fully formed TAC of representatives from the County and other representative agencies; 2) Completed kick-off meeting to discuss and agree on items a. through k. outlined in the Scope of Work; and 3) Finalized Work Plan																
TASK 2: INVENTORY OF FACILITIES AND EVENTS AND LOSSES																9/16/2021	11/16/2021
OBJECTIVES: 1. Identify and collect relevant natural hazards data, asset data, socio-economic data and hazards events records. 2. Develop an Inventory of Facilities and Events and Losses for use in conducting the Hazards Assessment. 3. Collaborate with the TAC and UCTC to develop the Inventory GeoTool and Story Map.	Develop Draft Data Collection Plan; Begin collecting publicly available data including: 1) Roads; 2) Bridges; 3) Railroads; 4) Highway garages and associated salt storage facilities; 5) Operations centers, Intermodal facilities; and 6) Other surface transportation assets including public transportation assets and non-motorized assets such as trails.															9/16/2021	10/15/2021
	Call with UC/TAC to 1) discuss draft data collection plan; 2) discuss other state-owned or privately-owned infrastructure related assets as appropriate; and 3) coordinate transportation asset data collection from non-publicly available sources; finalize plan.															9/20/2021	10/4/2021
	Collect publicly available data; **Coordinate with TAC to collect appropriate privately owned transportation infrastructure data (Meet with TAC to review)**; and Prepare Draft Assets Inventory and Hazards Events Inventory and Story Maps.															9/20/2021	10/25/2021
	Provide Draft Assets and Hazards Events Inventories and Story Map to the TAC and Project Team for review																10/25/2021
	Project Team and TAC Review															10/25/2022	11/08/2021
	Provide Final Assets & Hazard Inventory Story Map on ArcHub																11/16/2021
OUTCOMES	1) Identification of the relevant assets, facilities and hazards data; 2) Finalized Assets and Hazard Event Inventories; 3) Finalized Inventory Story Map on ArcHub																

TASK 3: HAZARD ASSESSMENT			11/17/2021 2/22/2022
OBJECTIVES: 1. Identify Natural and non-Natural Hazards for screening 2. Collaborate with the TAC and UCTC to develop criteria for screening hazards and conducting vulnerability assessment. 3. Screen and Prioritize Hazards in coordination with the TAC and UCTC. 4. Develop Hazards GeoTool and Story Map.	Identify Hazards Data Sources for use in the Vulnerability Assessment.		11/17/2021 - 12/10/2021
	Develop Criteria for screening hazards and conducting the assessment in coordination with the TAC. (Meet with TAC)		12/2/2021 12/16/2021
	Screen hazards to identify the key hazards for use in the Vulnerability Assessment and coordinate hazard data sources with the TAC and UCTC. (Meet with TAC)		12/17/2021 1/13/2022
	Develop Hazards Data Inventory and Integrate Hazard Data into the mapping tool and generate a Story Map with narrative for each hazard evaluated.		1/14/2022 1/27/2022
	Provide Draft Hazards Story Map (updated on ArcHub) to the TAC and UCTC for review.		1/27/2021
	TAC and UCTC Review		1/28/2022 2/11/2022
	Revise and provide Final Story Map on ArcHub		2/14/2022 2/22/2022
OUTCOMES	1) Agreed upon Data Sources for Hazards; 2) Established Hazard Screening and Assessment Criteria; 3) Identification of Priority Hazards for Vulnerability Assessment; 4) Inventory of Prioritized Hazards; and 5) Finalized Hazard Assessment Story Map on ArcHub.		4/16/2022
TASK 4: VULNERABILITY ASSESSMENT			2/23/2022 6/21/2022
OBJECTIVES: 1. Develop Scoring Approaches for the Criticality Determination and Vulnerability Assessment. 2. Conduct Criticality Determination and Vulnerability Assessment. 3. Evaluate Criticality Determination and Vulnerability Assessment Results. 4. Develop Vulnerability Assessment Story Map and integrate results into the GeoTool on the UCTC ArcHub Site.	**Select Variables and Inputs in coordination with the TAC and UCTC for use in developing an Scoring Approach for Criticality and Vulnerability Assessment. (Meet with TAC)**		2/23/2022 3/9/2022
	Conduct a Criticality Determination Assessment, which is driven by a GIS-based quantitative approach and a qualitative assessment informed by stakeholder and practitioner input – based on data availability and suitability.		3/10/2022 4/13/2022
	Provide Draft Criticality Determination Assessment Results to the TAC and UCTC for review.		4/14/2022
	TAC and UCTC review		
	Conduct a Vulnerability Assessment to calculate a Vulnerability Score using the three indicators: I) Exposure; II) Sensitivity; 3) Adaptative Capacity.		3/10/2022 4/13/2022
	Provide Draft Vulnerability Assessment Results to the TAC and UCTC for review.		4/14/2022
	TAC and UCTC review		4/14/2022 4/28/2022
	Integrate Vulnerability Assessment Results and Criticality Determination Results into the ArcHub mapping and develop Draft Vulnerability Assessment Story Map		04/29/2022 - 05/16/2022
	Provide Draft Vulnerability Assessment Story Map to TAC and UCTC for review		5/17/2022

	TAC and UCTC review	5/17/2022	5/31/2022
	Revise and Provide Final Vulnerability Assessment Story Map	5/31/2022	6/7/2022
OUTCOMES	1) Scoring Approaches for Criticality Determination and Vulnerability Assessment; 2) Criticality Determination Assessment and Vulnerability Assessment Results; 3) Vulnerability Assessment Story Map and updated ArcHub		
Task 5: RECOMMENDATIONS		5/17/2022	8/22/2022
OBJECTIVES: 1. Identify preferred approach in coordination with the UCTC/TAC for developing a representative set of prioritized list of projects (up to five). 2. Develop prioritized list of projects. 3. Develop recommendations for maintenance activities. 4. Develop list of factors to prioritize projects for future assessment. 5. Prepare a summary of key design criteria to guide future implementation. 6. Develop Recommendations Story Map for the UCTC ArcHub Site.	**Identify one of two approaches per the scope of work for developing a representative set of prioritized list of projects or assets (up to five) in coordination with the UCTC and TAC. (Meet with TAC)**	5/17/2022	6/7/2022
	Based on the Preferred Approach, develop Adaptation Strategies using a desk-based characterization to include high-level considerations for providing resilience/adaptation strategies that apply to existing infrastructure.	6/7/2022	6/30/2022
	Prepare Recommendations for Maintenance Activities Brief Memorandum.	6/23/2022	7/14/2022
	Develop a list of potential factors that can be used for prioritizing actions with the objective of maintaining regional mobility. Perform a review of design documents that will guide the next steps for implementing recommendations and access and a summary memorandum of design criteria for future implementation.	6/23/2022	7/14/2022
	Develop a Draft Recommendations Story Map that includes the identified Action Items and provide to the TAC and UCTC for review.	6/30/2022	7/28/2022
	TAC and UCTC review	7/29/2022	8/12/2022
	Provide Final Recommendations Story Map and Updated ArcHub	8/15/2022	8/29/2022
OBJECTIVES	1) Identified Approach for developing a representative set of prioritized list of projects; 2) A representative set of up to five (5) prioritized projects/assets; 3) A list of potential factors and a summary of key design criteria to guide future implementation; 4) Recommendations for maintenance activities; 5) Final Recommendations Story Map and updated ArcHub Site.		
Task 6: FINAL STORY MAPS & ARCHUB SITE		8/29/2022	9/30/2022
OBJECTIVES: 1. Prepare summary page on the UCTC ArcHub site outlining the results of Tasks 2 - 5 with links to Story Maps and supporting content. 2. Final review of Draft Story Maps	**Final review of StoryMaps and ArcHub content by TAC (Meet with TAC)**	8/29/2022	9/19/2022
	Per TAC and UCTC feedback, revise and publish Final Story Maps from Tasks 2 through 5 for TAC and UCTC review.	9/19/2022	9/30/2022

3. Publish Final Story Maps and finalize geospatial data and electronic deliverable content for project.	Provide Geospatial data and electronic deliverable content generated for the Ulster County ArcHub site as part of this project to the County in its native file format.														
OUTCOMES	1) Final Project Story Maps Landing Page published on the UCTC ArcHub Site; 2) Final Story Maps published on the UCTC ArcHub Site; and 3) Final Project Geospatial and Electronic Content.														

9/30/2022

GZA GeoEnvironmental, Inc.