Supplementary Materials

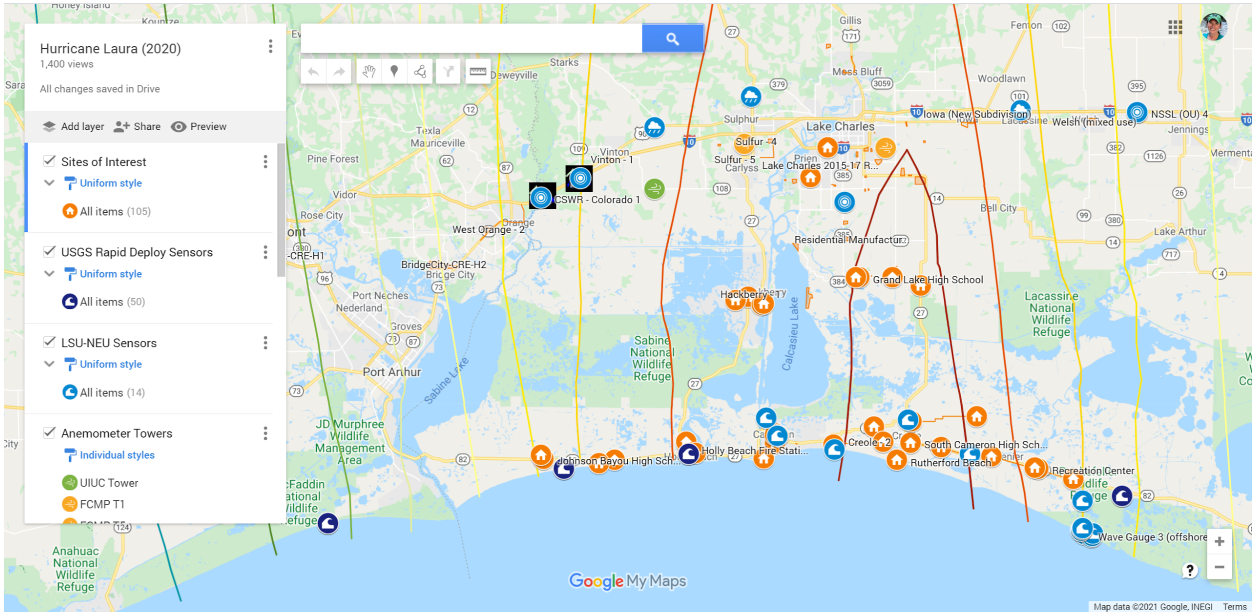

Figure S1. Example of StEER Google Map recording locations of hazard observations and potential structures of interest based on information exchanged during and following the landfall of Hurricane Laura.

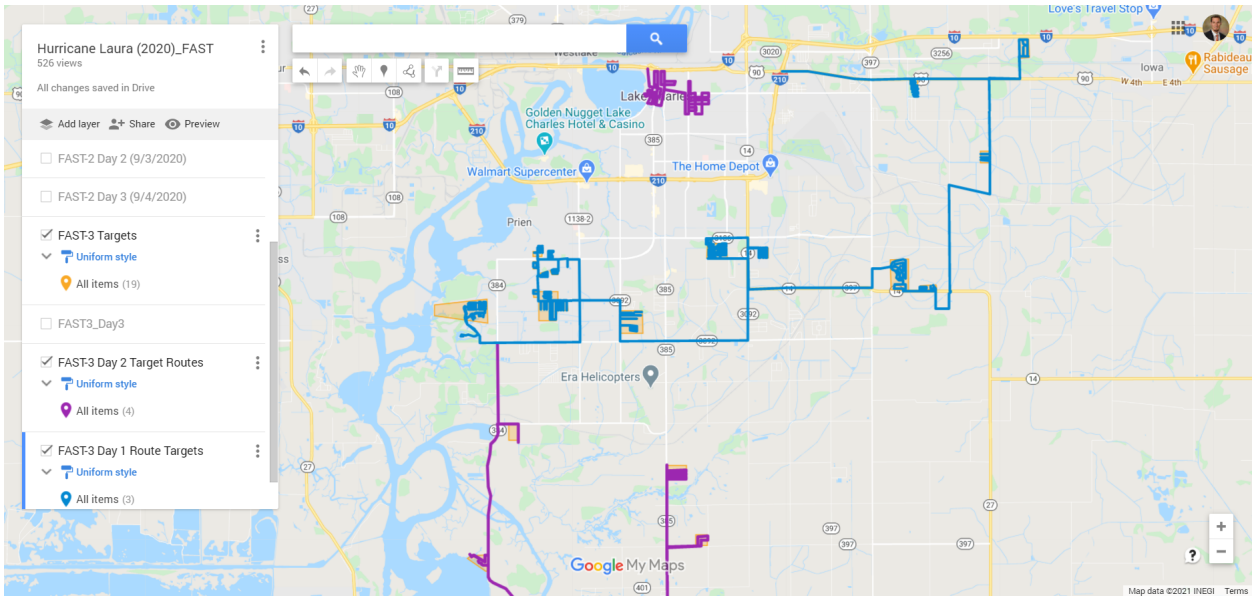

Figure S2. Example of StEER Google Map suggesting structures/routes for the FASTs deploying for Hurricane Laura.

Table S1. StEER Apps Available to Members		
App Name	**Use Case**	**Number of Records**
StEER Building - US (windstorm) shared	documentation of building performance of buildings following a windstorm	V.2: 885
		V1: 4,221
StEER Earthquake Rapid Evaluation Form	rapid documentation of performance of buildings following earthquake	66
StEER Hazard Indicator	documentation of hazard intensity	213
StEER Non-Building (Windstorm)	documentation of non-building structure performance following a windstorm	88
StEER Manufactured Home - US (Windstorm)	detailed assessment of manufactured homes performance following windstorm	186
StEER Forensic Residential - US (Windstorm)	detailed forensic assessment of low-rise residential buildings after windstorms	84
|Training| StEER Building - US (Windstorm)	Training version of StEER Building - US (Windstorm) app	79
|Training| StEER Earthquake Rapid Evaluation Form	Training version of StEER Earthquake Rapid Evaluation Form	162
Hurricane Maria (2017) - Multi-Level	Legacy App: Multi-level prototype for wind damage to caribbean typologies	702
Hurricane Irma (2017)	Legacy App: rapid assessments of exterior structural damage to structures in Florida following Hurricane Irma	1,121
Hurricane Harvey (2017) NSF RAPID shared	Legacy App: rapid assessments of exterior structural damage to structures in Texas following Hurricane Harvey (Lombardo, Roueche, Krupar, Smith)	1,201
Hurricane Harvey	Legacy App: rapid assessments of exterior structural damage to structures in Texas following Hurricane Harvey (GEER Supplement, Kijewski-Correa)	782
Total Number of Records:		5172

Table S2. Fields in StEER Building - US (windstorm) App		
* indicates field priority *Note: These are user-facing fields that can be adjusted/populated by the user, other non-editable metadata is generated for each record automatically by Fulcrum, e.g., user who created the record.*		
Field Name	**Format**	**Response Choices/*Description***
Metadata		
Record ID	Text	Auto-populated
Damage State	Single Choice	0=No Damage 1=Minor 2=Moderate 3=Severe 4=Destroyed
Project	Single Choice	<Auto-populated list of all StEER Projects in Fulcrum>
Latitude	Decimal	Auto-populated
Longitude	Decimal	Auto-populated
Basic Information		
General Notes	Text	*user-supplied general notes*
Assessment Type	Multiple Choice	Aerial Drive-by On-site Remote General Area Other
Sampling Method*	Classification Field	Biased - Damaged Structure Biased - Unique failure Biased - Case study Biased - Other Unbiased - Random Sample Unbiased - Within a Cluster Unbiased - Critical Facility Unbiased - Unique Structure Unbiased - Other
Overall Photos (Front, Left, Right, Back)*	Photos	*user-supplied photos*
Detailed Photos*	Photos	*user-supplied photos*
Audio	Audio	*user-supplied audio*
Google Street View	Hyperlink	<automatically linked in Fulcrum>

show_noaa_aerials	Hyperlink	<automatically linked in Fulcrum>
Overall Damage		
Overall Damage Notes	Text	*user-supplied damage notes*
Hazards Present	Multiple Choice	Flood Rain Surge Tree-fall Wind Wind-borne debris Unknown Other
Wind Damage Rating	Single Choice	No visible exterior damage;0 Minor: No more than 1 broken window, door or garage door. Less than 15% roof cover or wall cladding damage.;1 Moderate: Between 15% and 50% roof cover or wall cladding damage OR <5% roof substrate failure.;2 Severe: >50% roof cover / wall cladding damage OR 20-50% windows/doors damaged OR 5-25% roof sheathing loss OR <15% roof structure damage. ;3 Destruction: >15% roof structure failure OR failure of wall structure OR >25% roof deck loss OR >50% window/door damage;4 Not Applicable;-1
Surge/Flood Damage Rating	Single Choice	No Damage or Very Minor Damage;0 Minor Damage;1 Moderate Damage;2 Severe Damage;3 Very Severe Damage;4 Partial Collapse;5 Collapse;6
Rainwater Ingress Damage Rating	Single Choice	Unknown;-1 None visible;0 Minor ingress through doors, windows, or isolated roof leaks;1 Visible puddles of water or damaged contents around multiple doors and windows and multiple roof leaks leading to puddling or damage to contents;2 Severe inundation leading to partial collapse of roof ceiling, extensive puddling and interior contents loss;3 Complete inundation throughout the structure with majority of contents affected;4
Damage Indicator	Numeric	*User-supplied value defining the type of structure,relating to the Enhanced Fujita*

		Scale (primarily used for tornadoes)
Degree of Damage	Numeric	*User-supplied value defining an overall damage state, relating to the Enhanced Fujita Scale (primarily used for tornadoes).*
Building Attributes		
Attribute Notes	Text	*User-supplied attribute notes*
Address	Address	<Auto-populated by Fulcrum>
Occupancy	Classification Field	Assembly-Small building and tenant spaces Assembly-Theater Assembly-Restaurant Assembly-Religious facility Assembly-Indoor sports facility Assembly-Outdoors sports facility Assembly-Other Business Educational-School Educational-Daycare facilities Educational-University/College Educational-Other Factory and industrial-Industrial Factory and Industrial-Factory Factory and Industrial Other High-hazard-Hazardous materials storage High-hazard-Contains detonation hazard High-hazard-Contains deflagration hazard High-hazard-Contains materials that are health hazard High-hazard-Semiconductor fabrication facilities High-hazard-Contains materials posing multiple hazards High-hazard-Other Institutional-Assisted living facilities Institutional-Alcohol and drug rehabilitation Institutional-Medical Care on a 24-hours basis (Hospital/psychiatric hospital) Institutional-Correctional centers/jails/prisons/etc Institutional-Other Mercantile-Departmental stores Mercantile-Drug stores Mercantile-Gas/service station Mercantile-Retail or wholesale stores Mercantile-sales room Mercantile-Other Residential-Single family Residential-Multi-family homes (duplex, triplex, townhome) Residential-Mobile/Manufactured homes

		Residential-Apartment houses/dormitories/fraternities and sororities Residential-Hotel/motel/boarding houses/congregate living facilities Residential-Other Storage-Moderate-hazard storage Storage-Low-hazard storage Storage-Other Utilities and miscellaneous-Agricultural building Utilities and miscellaneous-Aircraft hangers Utilities and miscellaneous-Barns Utilities and miscellaneous-Carports Utilities and miscellaneous-Fences > 6ft Utilities and miscellaneous-Grain silos Utilities and miscellaneous-Greenhouses Utilities and miscellaneous-Livestock shelters Utilities and miscellaneous-Private garages Utilities and miscellaneous-Retaining walls Utilities and miscellaneous-Sheds Utilities and miscellaneous-Stables Utilities and miscellaneous-Other
Number of Stories	Numeric	1-25
Understory (% of Building Footprint)	Numeric	0% - 100%
First Floor Elevation (feet)	Numeric	0-13
Year Built	Numeric	*User-supplied Four-digit year*
Roof Shape	Multiple Choice	Complex Flat Gable Gable/Hip Combo Gambrel Hip Mansard Monoslope Unknown Other
Roof Slope	Numeric	*User-supplied numerical value (angle relative to horizontal)*
Front Elevation Orientation	Numeric	*User-supplied numerical value (degrees with 0=North, 90=East, etc.)*
Structural Attributes		
Structural Notes	Text	*User-supplied structural notes*
Building Type*	Multiple Choice	Wood Light Frame;W1

		Wood Frames, Commercial and Industrial;W2 Steel Moment Frames;S1 Steel Braced Frames;S2 Steel Light Frames;S3 Steel Frames with Concrete Shear WallsS4 Steel Frame with Infill Masonry Shear Walls;S5 Steel (unknown) Concrete Moment Frames;C1 Concrete Shear Wall Buildings;C2 Concrete Frame with Infill Masonry Shear Walls;C3 Precast/Tilt-up Concrete Shear Wall Buildings;PC1 Precast Concrete Frames;PC2 Concrete (unknown) Reinforced Masonry Bearing Wall Buildings with Flexible Diaphragms;RM1 Reinforced Masonry Bearing Wall Buildings with Stiff Diaphragms;RM2 Unreinforced Masonry Bearing Wall Buildings;URM Masonry (unknown) Wood (unknown) Unknown Other
Walls and Foundation		
Foundation Type*	Single Choice	Slab-on-grade Cast-in-place concrete piers Ground anchors and strapping Reinforced masonry piers Reinforced masonry stem wall Unreinforced masonry piers Unreinforced masonry stem wall Wood Piers <= 8 ft Wood Piers > 8 ft Unknown Other
Wall Anchorage Type*	Multiple Choice	Anchor bolts with nuts and washers Anchor bolts with missing nuts and washers Metal straps Concrete nails Unknown Other
Wall Substrate	Multiple Choice	Wood, sheathing (continuous) Wood, sheathing (corners only) Wood, dimensional planks Insulated sheathing Insulated foam board Non-engineered wood panel

		Metal panels Not Applicable Unknown
Wall Cladding	Multiple Choice	Aluminum siding Brick Curtain Wall EIFS Fiber-Cement Board Corrugated steel panels Plywood Siding Stucco Vinyl Siding (standard) Vinyl Siding (high wind rated) Vinyl Siding (unknown) Wood Boards Wood Shake/Shingle Unknown Other
Soffit Type	Multiple Choice	None Vinyl Metal Wood Unknown Other
Fenestration		
Fenestration Protection*	Multiple Choice	Front Left Back Right None Other
Fenestration Protection Type*	Multiple Choice	None Unknown Impact Resistant Plywood/OSB Panel Hurricane Shutter Other
Sectional/Roll-Up/Garage Door Present?	Yes/No	Yes No N/A
Large Door Opening location	Multiple Choice	Front Left Back Right Other
Large Door Opening Type*	Multiple Choice	None Single garage door (standard)

		Double garage door (standard) Single garage door (wind-rated) Double garage door (wind-rated) Single garage door (unknown) Double garage door (unknown) Sectional door Roll-up door Other
Roof Structure		
Roof System*	Multiple Choice	Steel, cold formed Steel, hot rolled Steel, joists Concrete slab Wood, rafter Wood, trusses Wood, unknown Unknown Other
Roof-to-Wall Attachment*	Multiple Choice	Toe-nails Metal ties Metal straps Bolted connection Welded connection Unknown Other
Roof-to-wall Attachment Type*	Text	*User-supplied description*
Roof Substrate	Single Choice	Plywood/OSB Dimensional lumber Metal deck Concrete None Unknown Other
Roof Cover	Multiple Choice	Asphalt shingles (3-tab) Asphalt shingles (laminated) Built-up with Gravel Built-up without Gravel Clay tiles Concrete tiles Metal shingles Metal, corrugated Metal, standing seam Roll roofing Single ply Wood shake Wood shingle Unknown Other

Secondary Water Barrier	Multiple Choice	None Closed-cell urethane foam adhesive Fully adhered membrane High performance underlayment Self-adhering membrane over joints (~4" strips) Unknown Other
Overhang Length (inches)	Numeric	*User-supplied numerical value*
Parapet Height (inches)	Numeric	*User-supplied numerical value*
Wind-induced Damage Levels		
Wind Damage Details	Text	*User-supplied wind damage notes*
Roof Structure Damage (%)	Numeric	0%-100%
Roof Substrate Damage (%)	Numeric	0%-100%
Roof Cover Damage (%)	Numeric	0%-100%
Wall Structure Damage (%)	Numeric	0%-100%
Wall Substrate Damage (%)	Numeric	0%-100%
Wall Cladding Damage (%)	Numeric	0%-100%
Damaged Windows (%)	Numeric	0%-100%
Damaged Doors (%)	Numeric	0%-100%
Location of Damaged Fenestration	Multiple Choice	Front Left Back Right Other
Sectional/Rollup/Garage Door Failure	Multiple Choice	None Front Left Back Right All Other
Soffit Damage (%)	Numeric	0%-100%
Fascia Damage (%)	Numeric	0%-100%
Stories with Damage	Text	*User-supplied notes on affected stories*
Surge-induced Damage		

Water-Induced Damage Notes	Text	*User-supplied notes on water-induced damage*
Percent of Building Footprint Eroded	Numeric	0%-100%
% Damage to Understory	Numeric	0%-100%
Maximum Scour Depth (inches)	Numeric	*User-supplied numerical value*
% Piles Missing or Collapsed	Numeric	0%-100%
% Piles Leaning or Broken	Numeric	0%-100%
Cause of Foundation Damage	Multiple Choice	Erosion Wave Flood Floating Debris Velocity Scour None Unknown Other
Building Retrofits		
Reroof Year	Numeric	*User-supplied four-digit year*
Retrofit Type (1)	Text	*User-supplied descriptive text*
Retrofit (1) Year	Numeric	*User-supplied four-digit year*
Retrofit Type (2)	Text	*User-supplied descriptive text*
Retrofit (2) Year	Numeric	*User-supplied four-digit year*
Quality Control Tracking		
Data Librarian(s)	Text	*User-supplied name*
QC Progress Code	Single Choice	In Progress;9 Stage 1 has been completed. Location and address have been verified. ;1 Stage 1 has been completed but the location and address have not been verified due to an error or unusual uncertainty. ;1e Stage 2 and below has been completed. The minimum information for a completed assessment has been verified or added. ;2 Stage 2 and below has been completed but there is insufficient information to meet the minimum data standards for a complete record, or there is considerable uncertainty in assignment of one or more critical fields.;2e Stage 3 and below has been completed.

		The majority of Stage 3 fields have been filled in and validated with reasonable confidence in accuracy and precision.;3 Stage 3 and below has been completed but with low confidence in several fields.;3e Stage 4 and below has been completed.;4 Final validation has been completed with automated and manual checks.
QC Notes	Text	*User-supplied notes regarding the DEQC process*

Table S3. Fields in StEER Non-Buildings - Windstorm App		
*indicates field priority *Note: These are user-facing fields that can be adjusted/populated by the user, other non-editable metadata is generated for each record automatically by Fulcrum, e.g., user who created the record.*		
Field Name	**Format**	**Response Choices/*Description***
Metadata		
Record ID	Text	Auto-populated
Damage State	Single Choice	0=No Damage 1=Minor 2=Moderate 3=Severe 4=Destroyed
Project	Single Choice	<Auto-populated list of all StEER Projects in Fulcrum>
Latitude	Decimal	Auto-populated
Longitude	Decimal	Auto-populated
Basic Information		
Photos*	Photos	*user-supplied photos*
Audio	Audio	*user-supplied audio*
Non-Building Assessment Type	Single Choice	Power infrastructure Bridge Dam Road Other
Damage	Yes/No	Yes No
Damage Level	Single Choice	Undamaged Minor Moderate Severe Destruction
Damage Source	Multiple Choice	Flood Flood-borne debris Landslide Surge Wind Wind-borne debris Other

General Notes	Text	*user-supplied general notes*
General Non-Building Assessment		
Description of Structure	Text	*User-supplied general description of structure*
Description of Damage	Text	*User-supplied general description of damage*
Power Infrastructure Form		
Attributes		
Type	Single Choice	Pole Tower Substation Lines
Material	Single Choice	Timber Concrete Steel Other
Diameter/Width (in)*	Numeric	*User-supplied diameter or width*
Height/Length (m)	Numeric	*User-supplied height or length*
Damage		
Damage Type	Single Choice	Undamaged Leaning Fallen Snapped Other
Damage Distribution	Single Choice	Isolated Common Uniform Other
Bridge Form		
Attributes		
Bridge Use	Single Choice	Pedestrian Vehicular Railroad
Material	Multiple Choice	Pre-Cast Concrete Cast in Place Concrete Steel Timber Other

Length or Span (m)	Numeric	*User-supplied length or span of bridge*
Number of Lanes	Numeric	*User-supplied number of lanes*
Damage		
Damage State	Single Choice	Undamaged;0 Light damage, still in use;1 Moderate damage, out of use but repairable;2 Severe damage, structure remains but not repairable;3 Collapsed;4
Functional?	Single Choice	Yes No Don't Know
Dam Form		
Attributes		
Material	Single Choice	Earth Concrete Steel Other
Length or Span (m)	Numeric	*User-supplied length or span of dam*
Height (m)	Numeric	*User-supplied height of dam*
Thickness*	Numeric	*User-supplied thickness of dam*
Damage		
Damage State	Single Choice	Undamaged;0 Light damage, repairable, maintaining function;1 Moderate damage, repairable, minimal loss of function;2 Severe damage, non-repairable, moderate loss of function;3 Destroyed, no longer serves function;4
QC		
QC ID	Text	*User-supplied name*
QC Code	Single Choice	0 1a 1b 1c 2a 2b

QC Notes	Text	*User-supplied notes regarding the DEQC process*

Table S4. Fields in StEER Earthquake Rapid Evaluation App		
**indicates field priority* *Note: These are user-facing fields that can be adjusted/populated by the user, other non-editable metadata is generated for each record automatically by Fulcrum, e.g., user who created the record.*		
Field Name	**Format**	**Response Choices/*Description***
Metadata		
Record ID	Text	Auto-populated
Damage State	Single Choice	0=No Damage 1=Minor 2=Moderate 3=Severe 4=Destroyed
Project	Single Choice	<Auto-populated list of all StEER Projects in Fulcrum>
Latitude	Decimal	Auto-populated
Longitude	Decimal	Auto-populated
Inspection		
Inspector Name	Text	*user-supplied name*
Affiliation	Text	*user-supplied affiliation*
Date	Date	Auto-populated
Inspection Type	Single Choice	Building Lifelines Bridges Liquefaction Landslide Fault Rupture Tsunami Other
Areas Inspected	Single Choice	Exterior Exterior and Interior
Media Attachment		
Audio	Audio	*user-supplied audio*
Overview Photos*	Photos	*user-supplied photos*
Detail Photos	Photos	*user-supplied photos*

Overall Damage		
Overall Damage Notes	Text	*User-supplied overall damage notes*
Overall Damage Rating	Single Choice	None or very minor;0 Minor;1 Moderate;2 Severe;3 Collapsed;4
Functionality State	Single Choice	Completely functional;0 Mostly functional;1 Partially functional;2 Mostly unfunctional;3 Completely unfunctional;4
Site Attributes and Description		
Structure ID	Text	*User-supplied site or structure identification*
Field Notes	Text	*User-supplied notes on site*
Building Description		
Building Name	Text	*User-supplied name of building (if any)*
Address	Address	*User-supplied address*
Building contact/phone	Text	*User-supplied point of contact*
Number of Stories Above Ground	Numeric	*User-supplied number of above grade stories*
Number of Stories Below Ground*	Numeric	*User-supplied number of below grade stories*
Approx. Footprint Area (sq.ft.)	Numeric	*User-supplied footprint area*
Type of Construction*	Multiple Choice	Wood light frames;W1 Wood Frames, Commercial and Industrial;W2 Steel Moment Frames;S1 Steel Braced Frames;S2 Steel Light Frame;S3 Steel Frames with Concrete Shear Walls;S4 Steel Frames with Infill Masonry Shear Walls;S5 Concrete Moment Frame;C1 Concrete Shear Wall Buildings;C2

		Concrete Frames with Infill Masonry Shear Walls;C3 Precast/Tilt-up Concrete Shear Wall Buildings;PC1 Precast Concrete Frames;PC2 Reinforced Masonry Bearing Wall Buildings with Flexible Diaphragms;RM1 Reinforced Masonry Bearing Wall Buildings with Stiff Diaphragms;RM2 Unreinforced Masonry Bearing Wall Buildings;URM Unknown Other
Primary Occupancy	Single Choice	Dwelling Other residential Public Assembly Emergency services Commercial Offices Industrial Government Historic School Unknown Other
Year Constructed	Numeric	*user-supplied year built*
Other Building Information	Text	*User-supplied descriptive building information*
Building Evaluation		
General Comments	Text	*User-supplied comments*
Observed Conditions		
Collapse, partial collapse, or building off foundation	Single Choice	Minor/None Moderate Severe
Building or story leaning	Single Choice	Minor/None Moderate Severe
Racking damage to walls, other structural damage	Single Choice	Minor/None Moderate Severe
Chimney, parapet, or other falling hazard	Single Choice	Minor/None Moderate Severe

Ground slope movement or cracking	Single Choice	Minor/None Moderate Severe
Other Hazard (Specify)	Single Choice	Minor/None Moderate Severe
Other Hazard Description	Text	*User-supplied hazard description*
Further Actions		
Detailed Evaluation Recommended	Multiple Choice	None Structural Geotechnical Other
Other Recommendations	Text	*User-supplied recommendations*
Comments	Text	*User-supplied comments*
Data Enrichment and Quality Control		
Data Librarian(s)	Text	*User-supplied name*
DE/QC Stage	Single Choice	0 1 1e 2 2e
DE/QC Notes	Text	*User-supplied notes regarding the DEQC process*

Table S5. Fields in StEER Hazard Indicator App		
** indicates field priority* *Note: These are user-facing fields that can be adjusted/populated by the user, other non-editable metadata is generated for each record automatically by Fulcrum, e.g., user who created the record.*		
Field Name	**Format**	**Response Choices/*Description***
Metadata		
Record ID	Text	Auto-populated
Damage State	Single Choice	0=No Damage 1=Minor 2=Moderate 3=Severe 4=Destroyed
Project	Single Choice	<Auto-populated list of all StEER Projects in Fulcrum>
Latitude	Decimal	Auto-populated
Longitude	Decimal	Auto-populated
Basic Information		
Photos*	Photos	*user-supplied photos*
Audio	Audio	*user-supplied audio*
Hazard Type	Single Choice	Flood Flood-borne debris Surge Wind Wind-borne debris Other
Notes	Text	*user-supplied general notes*
Wind Hazard		
Wind Indicator Class	Single Choice	Tree Tower Sign Other
Tree		
Tree Species*	Text	*user-supplied tree species*
Tree Height (ft)	Numeric	*user-supplied tree height*
Tree Projected Area	Numeric	*user-supplied tree projected area*

Tree Damage State	Single Choice	Undamaged Small branches torn off Large branches torn off Partially uprooted Uprooted Trunk snapped
Tree Damage Distribution	Single Choice	No nearby trees Isolated (<15%) Common (15% - 50%) Typical (50% - 75%) Uniform (80%-100%) Other
Tree-fall Direction	Numeric	*user-supplied tree fall direction (Degrees, 0=North & 90=East)*
Tower		
Tower Use	Text	*user-supplied tower use*
Tower Structure Type	Single Choice	Solid Trussed Open Other
Tower Material*	Multiple Choice	Steel Wood Aluminum Concrete Other
Tower Height (ft)	Numeric	*user-supplied tower height in feet*
Tower Damage State	Single Choice	Undamaged Leaning, straight Leaning, plastic hinge Collapsed, anchorage failure Collapsed, member failure
Tower Projected Area	Numeric	*user-supplied tower projected area*
Tower Failure Direction	Numeric	*user-supplied tower failure direction*
Sign		
Sign Use	Text	*user-supplied description of sign use*
Sign Structure Type	Single Choice	Solid Trussed Open Other
Sign Material*	Multiple Choice	Steel Wood

		Aluminum Concrete Other
Sign Height (ft)	Numeric	*user-supplied sign height*
Sign Damage State	Single Choice	Undamaged Leaning, straight Leaning, plastic hinge Collapsed, anchorage failure Collapsed, member failure Other
Sign Projected Area	Numeric	*user-supplied sign projected area*
Sign Failure Direction	Numeric	*user-supplied sign failure direction in degrees (0=North, 90=East)*
Surge or Flood Inundation		
Site Description	Text	*user-supplied site description*
Datum		
Horizontal Datum*	Single Choice	NAD27 NAD83 WGS84 Other
Horizontal Datum Source*	Single Choice	Digital map GNSS handheld GPS Mobile device
Vertical Datum Source*	Single Choice	Differential Levels GNSS (Network) GNSS (Rapid Static) GNSS (RTN) GNSS (Static) Hand Level Tapedown Total Station Other
Vertical Datum*	Single Choice	Arbitrary NAVD'88 NGCD'29 PRVD'02 Other
HWM Objective Point*	Single Choice	GNSS BM NGS BM RM RP Other

HWM		
HWM Elevation*	Numeric	*user-supplied hwm elevation*
HWM Elevation +/-*	Numeric	*user-supplied hwm elevation uncertainty*
HWM Elevation Units*	Text	Inches Meter
Elevation Source*	Single Choice	Differential Levels GNSS (Network) GNSS (Rapid Static) GNSS (RTN) GNSS (Static) Hand Level Tapedown Total Station Other
HWM Type*	Single Choice	Debris line Debris snag Mud line Present at peak Seed line Wash line Other
HWM Marker*	Single Choice	Chiseled mark Marker Nail Nail and HWM tag Not marked Paint Stake Tape other
Tranquil/Stillwater HWM*	Yes/No	Yes No
HWM Height above Ground*	Numeric	*user-supplied hwm height above ground*
HWM Description	Text	*user-supplied hwm description*
Wind or Water-borne Debris		
Hazard Source	Single Choice	Wind Flood Surge Other
Debris Type	Single Choice	Sheet Block Pipe

		Disc Fragment Other
Distance from Source	Numeric	*user-supplied distance from source*
Distance from Source Units	Text	*user-supplied distance from source units*
Method of Distance Estimate	Single Choice	*Digital map measurement* *Ground-based measurement device* *Visual approximation* *Other*
Debris Description	Text	*User-supplied debris description*

Table S6. Participants in Illustrative Case Study Event Responses				
Member Name	**Affiliation**	**Team**	**Mission**	**Role**
David Roueche	Auburn University	FAST	Nashville Tornado	Lead
Richard Wood	University of Nebraska Lincoln	FAST	Nashville Tornado	Lead
Keith Cullum	Simpson Strong-Tie	FAST	Nashville Tornado	Participant
Brett Davis	Auburn University	FAST	Nashville Tornado	Participant
Mariantonieta Gutierrez Soto	University of Kentucky	FAST	Nashville Tornado	Participant
Sajad Javadinasab Hormozabad	University of Kentucky	FAST	Nashville Tornado	Participant
Yijun Liao	University of Nebraska Lincoln	FAST	Nashville Tornado	Participant
Frank Lombardo	University of Illinois Urbana-Champaign	FAST	Nashville Tornado	Participant
Mohammad Moravej	Walker Consultants	FAST	Nashville Tornado	Participant
Stephanie Pilkington	University of North Carolina Charlotte	FAST	Nashville Tornado	Participant
David O. Prevatt	University of Florida	FAST	Nashville Tornado	Participant
Tracy Kijewski-Correa	University of Notre Dame	VAST	Nashville Tornado	Mission Coordinator
Wilfrid Djima	Independant Consultant	VAST	Nashville Tornado	Participant
Ian Robertson	University of Hawaii at Manoa	VAST	Nashville Tornado	Participant
Justin Marshall	Auburn University	FAST	Hurricane Dorian	Lead
Andrew Lyda	University of Washington, NHERI RAPID Experimental Facility	FAST	Hurricane Dorian	Participant
Daniel Smith	James Cook University (Australia), University of Florida & NCAR	FAST	Hurricane Dorian	Participant
Andrew Kennedy	University of Notre Dame	FAST	Hurricane Dorian	Lead
James Kaihatu	Texas A&M University	FAST	Hurricane Dorian	Participant
Doug Allen	Simpson Strong-Tie	FAST	Hurricane Dorian	Lead

Davon Edgecombe	Caribbean Coastal Services	FAST	Hurricane Dorian	Participant
Terran Brice	Caribbean Coastal Services	FAST	Hurricane Dorian	Participant
Kevin Brown	Caribbean Coastal Services	FAST	Hurricane Dorian	Participant
Richard Wood	University of Nebraska, Lincoln	FAST	Hurricane Dorian	Lead
Henry Lester	University of South Alabama	FAST	Hurricane Dorian	Participant
Mike Vorce	Site Tour 360	FAST	Hurricane Dorian	Participant
David Roueche	Auburn University	VAST	Hurricane Dorian	Lead
Brett Davis	Auburn University	VAST	Hurricane Dorian	Participant
Wilfrid Djima	Independent Consultant	VAST	Hurricane Dorian	Participant
YeongAe Heo	Case Western Reserve University	VAST	Hurricane Dorian	Participant
Tracy Kijewski-Correa	University of Notre Dame	VAST	Hurricane Dorian	Mission Coordinator
Mohammadtaghi Moravej	Walker Consultants	VAST	Hurricane Dorian	Participant
Brandon Rittelmeyer	Auburn University	VAST	Hurricane Dorian	Participant
Abdullahi Salman	The University of Alabama in Huntsville	VAST	Hurricane Dorian	Participant
David O. Prevatt	University of Florida	VAST	Hurricane Dorian	Participant
Ian Robertson	University of Hawaii at Manoa	VAST	Hurricane Dorian	Participant
Prethesha Alagusundaramoorthy	University of Kentucky	VAST	Hurricane Dorian	Participant
Mohammed Alsieedi	University of Florida	VAST	Hurricane Dorian	Participant
Shane Crawford	National Institute of Standards and Technology	VAST	Hurricane Dorian	Participant
Mikael Gartner	Consultant Humanitarian Engineer	VAST	Hurricane Dorian	Participant
Mariantonieta Gutierrez Soto	University of Kentucky	VAST	Hurricane Dorian	Participant

Henry Lester	University of South Alabama	VAST	Hurricane Dorian	Participant
Justin D. Marshall	Auburn University	VAST	Hurricane Dorian	Participant
Laura Micheli	Catholic University of America	VAST	Hurricane Dorian	Participant
Harish Kumar Mulchandani	Birla Institute of Technology & Science	VAST	Hurricane Dorian	Participant
Tori Tomiczek	United States Naval Academy	VAST	Hurricane Dorian	Participant
Khalid Mosalam	University of California, Berkeley	VAST	Hurricane Dorian	Participant
Ian Robertson	University of Hawaii at Manoa	Both	Palu Earthquake & Tsunami	Mission Coordinator
Hendra Achiari	Bandung Institute of Technology (Indonesia)	FAST	Palu Earthquake & Tsunami	Participant
Miguel Esteban	Waseda University (Japan)	FAST	Palu Earthquake & Tsunami	Participant
Clemens Krautwald	Tech. University of Braunschweig (Germany)	FAST	Palu Earthquake & Tsunami	Participant
Takahito Mikami	Tokyo City University (Japan)	FAST	Palu Earthquake & Tsunami	Participant
Abdul Gafur Marzuki	State Institute for Islamic Studies Palu	FAST	Palu Earthquake & Tsunami	Participant
Muhamad Fadel Hidayat Marzuki	Bandung Institute of Technology	FAST	Palu Earthquake & Tsunami	Participant
Ryota Nakamura	Toyohashi University of Technology (Japan)	FAST	Palu Earthquake & Tsunami	Participant
Yuta Nishida	Waseda University	FAST	Palu Earthquake & Tsunami	Participant
Tomoya Shibayama	Waseda University (Japan)	FAST	Palu Earthquake & Tsunami	Participant
Jacob Stolle	University of Ottawa (Canada)	FAST	Palu Earthquake & Tsunami	Participant
Tomoyuki Takabatake	Waseda University (Japan)	FAST	Palu Earthquake & Tsunami	Participant
Tracy Kijewski-Correa	University of Notre Dame	VAST	Palu Earthquake & Tsunami	Participant

Harish Kumar Mulchandani	Birla Institute of Technology & Science	VAST	Palu Earthquake & Tsunami	Participant
David Prevatt	University of Florida	VAST	Palu Earthquake & Tsunami	Participant
David Roueche	Auburn University	VAST	Palu Earthquake & Tsunami	Participant
Eduardo Miranda	Stanford University	FAST	Puerto Rico Earthquakes	Mission Coordinator
Jorge Archbold	UC Berkeley	FAST	Puerto Rico Earthquakes	Participant
Pablo Heresi	Stanford University	FAST	Puerto Rico Earthquakes	Participant
Armando Messina	Stanford University	FAST	Puerto Rico Earthquakes	Participant
Isamar Rosa	Stanford University	FAST	Puerto Rico Earthquakes	Participant
Tracy Kijewski-Correa	University of Notre Dame	VAST	Puerto Rico Earthquakes	Participant
Khalid Mosalam	University of California, Berkeley	VAST	Puerto Rico Earthquakes	Participant
David O. Prevatt	University of Florida	VAST	Puerto Rico Earthquakes	Participant
Ian Robertson	University of Hawaii	VAST	Puerto Rico Earthquakes	Participant
David Roueche	Auburn University	VAST	Puerto Rico Earthquakes	Participant
David Roueche	Auburn University	FAST	Hurricane Laura	Lead
Justin Marshall	Auburn University	FAST	Hurricane Laura	Participant
Sabarethinam Kameshwar	LSU	FAST	Hurricane Laura	Lead
Naqib Mashrur	LSU	FAST	Hurricane Laura	Participant
Kevin Ambrose	Auburn University	VAST	Hurricane Laura	Participant
Hadiah Rawajfih	Auburn University	VAST	Hurricane Laura	Participant
Lily Rodriguez	University of Notre Dame	VAST	Hurricane Laura	Participant
Tracy Kijewski-Correa	University of Notre Dame	VAST	Hurricane Laura	Mission

				Coordinator
Kurt Gurley	University of Florida	VAST	Hurricane Laura	Participant
Irina Afanasyeva	University of Florida	VAST	Hurricane Laura	Participant
Graham Brasic	PES Structural Engineers	VAST	Hurricane Laura	Participant
John Cleary	University of South Alabama	VAST	Hurricane Laura	Participant
Dmitrii Golovichev	University of Florida	VAST	Hurricane Laura	Participant
Oscar Lafontaine	University of Florida	VAST	Hurricane Laura	Participant
Frank Lombardo	University of Illinois Urbana-Champaign	VAST	Hurricane Laura	Participant
Laura Micheli	Catholic University of America	VAST	Hurricane Laura	Participant
Brian Phillips	University of Florida	VAST	Hurricane Laura	Participant
David Prevatt	University of Florida	VAST	Hurricane Laura	Participant
Ian Robertson	University of Hawaii, Manoa	VAST	Hurricane Laura	Participant
John Schroeder	Texas Tech University	VAST	Hurricane Laura	Participant
Daniel Smith	James Cook University | University of Florida	VAST	Hurricane Laura	Participant
Stephen Strader	Villanova University	VAST	Hurricane Laura	Participant
Meredith Wilson	University of Notre Dame	VAST	Hurricane Laura	Participant