Resilient Housing Planning Guide

SMART HOME AMERICA

MISSISSIPPI STATE UNIVERSITY™
GULF COAST COMMUNITY DESIGN STUDIO

GULF of AMERICA ALLIANCE

MISSISSIPPI DEPARTMENT OF MARINE RESOURCES

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FINAL DRAFT

1. Introduction to the Guide

1.1 Background and Acknowledgments

Smart Home America (SHA) was awarded a US EPA Gulf of Mexico Program Cooperative Agreement to develop the "Community Resilience Housing Guide: Creating a Stronger Post-Disaster Housing Framework for the Gulf Coast." The product of the Cooperative Agreement is the Resilient Housing Planning Guide, which has been prepared to help municipalities, counties and parishes in the Gulf Coast Region create their own Resilient Housing Plans.

Typically, post-disaster housing progresses from sheltering to temporary housing, to housing repair and replacement, at the speed of private insurance and federal funding. Often, jurisdictions succumb to their lack of capacity and rely on consultants to manage the rebuilding of their residences and businesses. Without a plan for disaster housing work, jurisdictions are unprepared to apply for federal and state grants. Furthermore, the recovery work proceeds without realizing opportunities to make the community's housing stock more resilient by informed land-use planning and improved building standards. By empowering communities to create their own Resilient Housing Plan, municipalities, counties and parishes will be able to better pre-plan instead of relying solely on federal assistance to dictate their temporary housing, retrofit, rebuilding needs and schedule. The Community Resilience Housing Guide work aims to mobilize and bring together jurisdictional leaders, community partners and the private sector into the planning and recovery process to result in more resilient communities that are better prepared for climate related risks.

Three pilot jurisdictions were selected from a competitive application process to be awarded a grant to use the draft of the Resilient Housing Plan Guide to create a resilient housing plan for their jurisdiction. The three jurisdictions are the City of Foley, Alabama, St. John the Baptist Parish in Louisiana and Willacy County in Texas. The three jurisdictions are notably different in size, population and demographics. However, they all share similar flood and wind hazards as well as housing demands that are impacted by climate related risks. Each of the three jurisdictions hired consultants to do much of the plan. In all three jurisdictions the head of the planning department was the project lead and point of contact. The Guide Project Team maintained close communication with the three project leads with regular check-in meetings and attended many of the planning activities and presentations. The goal of working with the pilot jurisdictions was two-fold: first, to use the Guide to produce a Resilient Housing Plan that will be used by the jurisdiction; and second, to 'test drive' the Guide and provide feedback and suggestions for improving and refining the Guide. Lessons learned from the pilot jurisdictions shaped the development of the Guide. Some of the lessons learned are included in the side-bar notes of the Guide and a summary of the planning documents are included in the Guide's Appendix.

A key part of the Community Resilience Housing Guide work is the creation of the Gulf Housing Committee (GHC), an advisory committee that provides input and direction to the Community Resilience Housing Guide project. The Committee is facilitated by Smart Home America and the Gulf of Mexico Alliance. The GHC leverages the public and private sectors' expertise to increase the Gulf of Mexico region's resilience and bolster its ability to recover after a disaster. GHC's role is to inform the Resilient Housing Planning Guide's creation and provide recommendations for the project based on gathered data. The GHC also served as the selection committee to identify communities to pilot the Guide.

Members of the Gulf Housing Committee are listed in the appendix.

The Project Team led the coordination and implementation of the Community Resilience Housing Guide project. Smart Home America is the project lead supported by the Mississippi State University Gulf Coast Community Design Studio (GCCDS), Mississippi Department of Marine Resources (MDMR), and the Gulf of Mexico Alliance (GOMA). Additional partners include Mississippi-Alabama Sea Grant Consortium, Louisiana Sea Grant, Texas Sea Grant, Texas A&M Agrilife Extension Service (TCWP), and AllenES.

1.2 Using the Resilient Housing Planning Guide

Jurisdictions are certainly well experienced with planning efforts. Therefore, much of the direction and recommendations provided in the Resilient Housing Planning Guide will be familiar and will supplement the experience and knowledge of jurisdictional planning officials. Nevertheless, the Resilient Housing Plan that will result from this planning effort will be a new tool and the approach given in the Guide knowingly aims to stretch a jurisdiction's way of working with the hope of creating a progressive and innovative plan that promises to have a positive impact on the residents and property owners of the jurisdiction. Therefore, please accept the challenge of expanding the planning team as explained below in order to get the diverse, multidisciplinary input that promises to strengthen the Plan.

This Guide is a template for the Resilient Housing Plan. Each municipality, county and parish that does the work to create their own Resilient Housing Plan will produce a Plan that is unique and specific to their residents, geography, economy and storm hazards. However, in order to create a community of practice among separate jurisdictions in the region, each striving to become more resilient, please follow the Guide to include the Plan components as given. The conceptual consistency along with the localized differences will provide useful comparisons and lessons learned that will be transferable to other jurisdictions. Though the work of resilience depends upon local leadership, the impact and benefits of resilience are regional, because our economy, ecology and climate risks are all regional.

The Guide follows the planning process outlined in FEMA May 2020, *Planning Considerations: Disaster Housing,* and uses a diverse, multi-valued planning team to lead to decisions that prioritize the existing community, strive to retain, and rehouse people on their own property, and promote equity in both the process and the outcomes of housing planning. The planning process follows a logical path of analyzing the existing situation, defining goals and objectives, determining the course of action (COA) for each objective, and giving practical consideration to COAs to make realistic and supportable recommendations. The aim of the Resilient Housing Planning Guide is to empower municipalities, counties and parishes to go through a planning process that is transformative and results in actions that make their community more resilient.

2. Introduction to a Resilient Housing Plan

2.1 Need for Resilient Housing Plans

The need for a Resilient Housing Plan is dramatically revealed each hurricane and storm season. Unfortunately, for communities that find themselves dealing with the aftermath of a destructive storm, the need for a plan can't wait for the next disaster for a plan to be completed. The motivation to help municipalities, counties and parishes produce a Resilient Housing Plan is apparent in the too often repeated situation of a jurisdiction being unprepared for a disaster and thousands of people being left without the leadership, assurance and financial assistance that they need in the challenging work to repair and rebuild lost and damaged housing. The goal of the Resilient Housing Plan can be simply explained in three statements: reduce damage and loss of current housing; effectively apply for, receive and use funding after a storm; and, improve planning and building standards for new and renovated housing to reduce damage and loss in future storms.

2.1 Two Lockport complexes, half a mile apart (see sidebar).

The images above show two multi-unit housing projects in the same community after the same destructive hurricane. The housing project that withstood the destructive winds of Hurricane Ida was built with FORTIFIED Construction Standards and is obviously resilient from a structural point of view. The full resilience benefits, however, may not be as obvious, but are just as important. Both projects are rental housing. The household that rented the FORTIFIED unit was able to return to their home and belongings as soon as power was restored to be able to stay at the same job, in the same school, etc. The household in the destroyed units most likely did not have renters' insurance and the loss of much of their belongings, combined with the cost and effort to relocate, could be the devasting loss that might make the difference as to whether they are able to pay their rent going forward. In addition, the FORTIFIED house was already providing benefits by reducing the cost of insurance, which helps keep housing affordable in the first place.

As this example illustrates, structural solutions to achieve housing resilience, such as FORTIFIED Construction, already exist. The challenge for communities is overcoming the barriers that get in the way of applying such well-tested structural solutions. These

CASE STUDY: LOCKPORT

Exposed to the eyewall of Hurricane Ida, Lockport, LA, saw the worst of Hurricane Ida. These two complexes are half a mile apart but worlds away because FORTIFIED Commercial™ changed how families living in the units on the right would recover.
Les Maisons de Bayou Lafourche was funded through a partnership led by the Louisiana Office of Community Development (OCD) in coordination with the Louisiana Housing Corporation (LHC) and the Louisiana Land Trust. It is one of over ten multifamily developments funded using nearly $60 Million in HUD Community Development Block Grant, Disaster Recovery (CDBG-DR) money.

This funding is just the start and is tagged to recovery dollars from the 2016 Baton Rouge floods. Disaster funding follows years behind the actual disasters themselves. FORTIFIED is pre-positioned to be the dominant hurricane and wind-resilient construction method used going forward. If Alabama was the test case, Louisiana is the proof point. Additional FORTIFIED projects underway include another $60 Million for the enormous residential relocation projects of Isle de Jean Charles in Terrebonne Parish and Pecan Acres, soon to be Audubon Estates, outside Baton Rouge. Both will meet FORTIFIED Home™ standards.

barriers include lack of knowledge, outdated land-use and building code policies and practices, financial limitations, as well as a general resistance to change or to policies that regulate or restrict the activities of developers and private property owners. The work of a Resilient Housing Plan is to create strategies to overcome such barriers in order to create community resilience by applying well-understood structural and land-use solutions.

Jurisdictions do not build housing. But they do have an important role in getting housing built. Municipalities, counties and parishes establish and enforce zoning regulations and building codes to ensure the public that housing built will be safe and strong. They also often provide financial assistance and incentives to both nonprofit housing providers and private developers. Therefore, even though the jurisdiction is the *author* of the Resilient Housing Plan, housing providers are important *end users* of the Plan. Educating housing providers, other stakeholders and the general public is a key activity of the Resilient Housing Plan to reach these end users. The education activities will take place both as part of the planning process and as ongoing efforts to promote resilient housing planning, design and construction. The Stakeholder and Community Education section of the Guide outlines activities for such outreach.

A jurisdiction's Resilient Housing Plan should consider the National Disaster Housing Goals given in FEMA May 2020, *Planning Considerations: Disaster Housing.* The goals listed below are directed at housing recovery and are supported by the aims of the Resilient Housing Planning Guide. However, these goals do not advance the work of rebuilding into the work of resilience nor do they address community concerns of rebuilding gentrification and the need for decision-making diversity and resource equity. To address such gaps, two more goals have been added to the six national goals.

NATIONAL DISASTER HOUSING GOALS

1. Support individuals and communities in returning to self-sufficiency as quickly as possible.
2. Define and fulfill fundamental disaster housing responsibilities and roles.
3. Increase our collective understanding and ability to meet the needs of disaster survivors and affected communities.
4. Build capabilities to provide a broad range of flexible housing options, including sheltering, temporary housing, and permanent housing.
5. Better integrate disaster housing assistance with related community support services and long-term recovery efforts.
6. Improve disaster housing planning to better recover from disasters, including catastrophic events.

ADDITIONAL RESILIENCE AND EQUITY GOALS

7. Improve housing during rebuilding and with normal housing development by resilient land-use policy and improved construction standards.
8. Prioritize the existing community to retain and rehouse people on their own property and promote equity in both the process and the outcomes of housing planning.

SEE ALSO

FEMA Planning Considerations: Disaster Housing, May 2020. Guide for housing resiliency, community education, and other government funding and assistance options.

2.2 Lessons from the Pre-Test Instrument

The creation of the Resilient Housing Plan Guide began with a Pre-Test Instrument, which was administered in the summer of 2020 by Allen Engineering and Science. The questionnaire was distributed to 320 stakeholders throughout the Gulf Coast region. These stakeholders were a wide range of state, municipality, county and parish officials, along with leaders of various nongovernmental organizations. Eighty-seven of those invited responded to the questionnaire. Several conclusions can be made from responses to a few of the 26 questions asked.

Question 4 and 5 taken together shed light on a gap in expectations regarding planning, housing and resilience. Question 4 asks: ***Do you think disaster housing should be addressed in the following standard plans?***

Comprehensive Plan	**76% yes**
Consolidated Housing Plan	51% yes
Emergency Response Plan	**87% yes**
Independent Stand-Alone Document	36% yes

Question 5 asks: ***Is disaster housing currently addressed in your Comprehensive Plan, Consolidated Housing Plan, or Emergency Response Plan?***

22% Yes	22% No	56% Not sure

A takeaway from these two related questions is that there is a gap between expectations and the current conditions regarding plans. For example, three-quarters answered that disaster housing should be included in Comprehensive Plans, but only 22% were sure and a large majority do not know if such is the case. The conclusion relevant to the Resilient Housing Planning Guide is disaster housing should be integrated into standard plans. However, the usefulness of a Resilient Housing Plan should not be dependent upon a jurisdiction's Comprehensive Plan or Emergency Response Plan. Therefore, as a stand-alone plan, a Disaster Housing Plan should be designed to be able to plug into and should at least correlate with other jurisdictional plans.

Question 12 asks: ***Do you feel you have the capacity to adequately enforce standards beyond your building code requirements?***

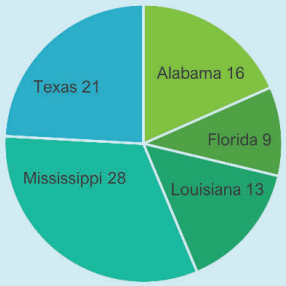
20% Yes	33% Somewhat	27% No	15% Not part of my work

Question 14 asks: ***Would you be willing to adopt standards beyond current code policies that would make your jurisdiction more able to resist damage from the next storm?***

73% Yes	14% No	13% Not part of my work

The takeaway from these two related questions is encouraging for the aims of the Resilient Housing Plan. A large majority (73%) expressed interest in adopting more resilient standards. And a smaller but encouraging majority of 53% claimed to have the capacity to enforce higher standards. It should be noted that the pre-test instrument was not a random survey, since those who responded chose to do so and therefore, are probably more progressive than the average planning or building code official. Nevertheless, the Resilient Housing Plan will help fill a need for any jurisdiction to bridge the gap between the realization that housing can and should be more resilient and create a plan to make it so.

LOCATIONS OF RESPONDENTS



FROM THE QUESTIONNAIRE

Nearly all of those who answered the questionnaire were familiar with FORTIFIED Construction. When asked to rate their knowledge of FORTIFIED Construction, most rated their knowledge at 70%.

FORTIFIED: BUILDING RESILIENCE IN DESIGN AND CONSTRUCTION STANDARDS

FORTIFIED HOME™ is a voluntary, beyond-code construction program designed to help people protect their home from severe weather. FORTIFIED provides standards for High Wind (Appendix 2-2) and Hurricane (Appendix 2-3) resilience.

FORTIFIED MULTIFAMILY™ is designed to reduce damage to apartments and other complexes.

FORTIFIED COMMERCIAL™ focuses on community-based and light to moderate commercial structures.

For more information about FORTIFIED Commercial, see Appendix 2-4.

Learn more about all the FORTIFIED programs at ***fortified.org***

2.3 Expectations of a Resilient Housing Plan

Each municipality, county and parish that do the work to create their own Resilient Housing Plan will produce a plan that is unique and specific to their residents, geography, economy and storm hazards. The Plan will have specific land-use recommendations with maps to delineate proposed changes in development priorities designed to lead to more resilient housing. The Plan will show gaps in the jurisdiction's current work to require and enforce current building standards, give direction to housing providers to build to more resilient standards, and create a possible path forward for the jurisdiction to adopt more resilient building standards. Considering different housing markets, a jurisdiction's Resilient Housing Plan will require more or less work to address the economic challenges of various neighborhoods. These concerns range from problems of disinvestment and undervalued property in some neighborhoods to problems of rapidly rising housing costs and gentrification happening in other neighborhoods. However, regardless of the expected differences in the localized housing markets, the Resilient Housing Plan for any jurisdiction should be shaped by the following expectations:

EXPECTATIONS OF

A RESILIENT HOUSING PLAN

1. Informatively factors the social and economic costs of climate risk into housing decisions. For coastal regions climate risk is damage and loss of housing from wind, storm surge, river flooding, and rain flooding.
2. Considers the fact that risk is associated with location. Flood risk is directly associated with topography. Wind risk is less precisely associated with location but can be predicted based on factors such as closeness to water and degree of exposure.
3. Considers the fact that damage and loss of buildings can be reduced with well-informed, resilient design and construction practices.
4. Includes a disaster housing plan with specific actions for the four phases of housing relative to a disaster: storm shelters, temporary housing, repair to existing housing, and replacement housing.
5. Prioritizes the existing community, strives to retain, and rehouse people on their own property, relies upon current property owners to make informed decisions, and promotes equity in both the process and the outcomes of housing planning.
6. Strives to educate community leaders, government officials, developers, building industry professionals and the general public regarding best practices to increase housing resilience.
7. Strategically targets federal and other funding opportunities and is kept current and modified as needed to pursue, receive, and make good use of available funding before and following a disaster.

2.4 How Will a Resilient Housing Plan be Used?

A Resilient Housing Plan will be used in several ways. As explained above, those who responded to the questionnaire expressed the opinion that disaster housing should be included in a jurisdiction's Comprehensive Plan, Consolidated Housing Plan and Emergency Response Plan. But at the same time, because such standard plans are so extensive, many people who work in jurisdictional offices do not use them often enough to know for sure what they include. Therefore, the Resilient Housing Plan created from this Guide is designed to be a stand-alone plan, with the option of a municipality, county or parish inserting it or referring to it in their other standard plans.

Regardless of how the Resilient Housing Plan is situated relative to a jurisdiction's other plans, the decisions made should lead to recommendations to change such plans. For example, a jurisdiction's zoning is typically authorized by a Land Development Ordinance, with an associated proposed land-use map, which is, in turn, shaped by the agreed-upon goals of the jurisdiction's Comprehensive Plan. The Resilient Housing Plan is expected to recommend changes to land-use in order to shift housing development from high-risk areas to lower risk areas, along with changes in housing density and housing types to accomplish such a shift. The Land-Use Damage and Loss Reduction Plan explained in the Guide will include a detailed housing land-use plan that will, by design, be different than the current zoning of the jurisdiction. The jurisdictional leadership should commit to do the work to incorporate the recommendations of the Resilient Housing Plan into their current Land Development Ordinance. Of course, since the Resilient Housing Plan is focused only on housing, the process to incorporate the Plan's recommendations is one of negotiation and compromise in light of other land-use interests. But the Resilient Housing Plan will have limited impact to create a more resilient community if the Plan's recommendations are not eventually incorporated into the jurisdiction's land-use ordinance.

In the meantime, as the recommendations of the Resilient Housing Plan are making their way through the process to update a jurisdiction's land-use ordinance, and even afterwards, the complete recommendations and their justification should be used as a guide for future development. Many jurisdictions will figure out how to make incremental changes to their land-use ordinance at first, to allow some of the recommended changes, such as increased density in lower risk areas, without regulations that require higher density. As explained in this Guide, the Resilient Housing Plan should be progressive and set high standards so that it can carry the momentum needed to bring about incremental changes in a system that is conservative by design. A jurisdiction should clearly communicate the aspirations of the Resilient Housing Plan and help residents and stakeholders understand that such aspirations do not need to completely agree with the authorized land-use ordinance. As experienced jurisdictional planners understand, change happens when a progressive developer brings a proposed project to the jurisdictional leadership. The project might require changes in the current zoning. Hopefully, such changes will align with the Resilient Housing Plan. If so, jurisdictional leadership will see the alignment, which might factor positively for both the proposed development and for the longer-term changes to the official land-use ordinance. In this way, the Resilient Housing Plan functions as a leadership tool to encourage more resilient development which will lead to eventual changes in land use.

In addition to expected changes to land use policy, the Resilient Housing Plan will have an impact on a jurisdiction's building code administration. The Housing Construction Damage and Loss Reduction Plan will include recommendations for improved construction standards such as FORTIFIED Construction. As explained above, the questionnaire shows that those who responded are not only interested in their jurisdiction having higher

RESILIENCE STANDARDS IN JURISDICTIONAL CODES

Many jurisdictions have begun integrating FORTIFIED into their building codes. ***Over 70%*** of the jurisdictions in Mobile and Baldwin counties in Alabama have adopted the Coastal Construction Code Supplement. The Construction Code Supplement uses FORTIFIED Home beyond-code recommendations to provide improved protection and added benefits for communities and residents. *smarthomeamerica.org/resources/code-supplement*

Fairhope, Alabama, has adopted the Code Supplement. Because the municipality's building codes included FORTIFIED technical recommendations, Construction and Demolition Debris (C&D) after Hurricane Sally was **only 3%** of the total debris generated by Hurricane Sally, or $243,008 out of 8.1 M.

Adoption has many benefits, including the reduction of losses during severe weather events, significantly reduced damage, and lowered insurance costs. A study was sponsored by the Alabama Center for Insurance Information and Research (ACIIR), Culverhouse College of Commerce, and The University of Alabama. This study focused on FORTIFIED's impact on home resale value. It was found that having a FORTIFIED designation increases the value of a home by **nearly 7%.**

building standards, but they also judge that their jurisdictional officers have the capacity to enforce or at least support such standards. As with the land-use recommendations discussed above, improved building standards might be incrementally incorporated into the jurisdiction's building code administration. For example, several jurisdictions in the Gulf Coast region have included FORTIFIED Construction as an alternative to their established residential building code. In this way, a building inspector understands what to look for when inspecting a more resilient house and does not counteract the higher standards by requiring changes to match the jurisdiction's existing lower standards. A necessary activity to implement the Resilient Housing Plan is to educate jurisdictional building code administrators and inspectors so they can complement the work of engineers and FORTIFIED Evaluators in their joint effort to design and construct stronger houses.

In addition to educating and coordinating with jurisdictional building code officials, the Resilient Housing Plan will be used to promote resilient construction practices of engineers, architects, developers and other stakeholders working to provide housing. The planning process and the recommended outreach activities are vital to using the Resilient Housing Plan to make changes in the practices of housing providers. Such advances in construction standards are certainly easier to accomplish than the land-use changes explained above since jurisdictional leaders will always be in favor of housing that exceeds the minimum standards of the established building code. In fact, progressive developers might take advantage of such higher standards to market housing that is more resilient. An effective communication campaign will help create a market for such higher standards as the general public learns about insurance savings and the protection and assurance that can be theirs from owning a resilient house. When it comes to changing the market, the lessons of energy efficiency are instructive. An entire "green" market evolved once the general public understood that they could save money over time by choosing more energy efficient fixtures, houses and automobiles. The economic logic of energy efficiency - that a little extra cost upfront for a more energy efficient product that will save money in the long-run - is a valuable lesson learned. The same type of economic logic needs to occur with resilience. However, because the savings over time are tied into hard-to-predict future events, such as a hurricane or a flood, the calculations are more statistical than with energy savings and are not as easily understood by the general public. Nevertheless, the path forward to an economic logic for resilience is becoming clear. It is a path through the cost and management of risk, which is the work of insurance. A Resilient Housing Plan has the purpose and opportunity to advance the evolution of a "risk" market economy with the aim to follow the model in the way the desire for energy efficiency created a green market. In the short term, until the market can make the upfront extra costs pay off over time, resilience will need progressive leadership, demonstration projects, grant funding, incentives, and other subsidies that, with work, will eventually lead to a market solution the way energy efficiency has done.

A critical use of the Resilient Housing Plan is to prepare for a destructive storm event. The Resilient Housing Plan includes a brief section on disaster recovery as it specifically applies to housing. This section should coordinate with a jurisdiction's Emergency Response Plan, which is assumed to cover many aspects of emergency response but might not address all of the phases of disaster housing. The phases of disaster housing identified by FEMA are storm shelters, temporary housing, repair to existing housing, and replacement housing. The Resilient Housing Plan section on disaster housing should not be seen as an emergency response plan. Instead, it should be seen as an emergency preparedness plan. As a preparedness plan the Resilient Housing Plan Disaster Recovery Housing section will help a jurisdiction better understand their disaster housing needs to prepare for a destructive storm.

CASE STUDY: COASTAL CONSTRUCTION CODE SUPPLEMENT

Orange Beach, Alabama, was one of the first communities to adopt Smart Home America's Coastal Construction Code Supplement in 2012. The Code Supplement is adopted, in full, as part of their building code ordinance. Since adoption, over 2,000 designated FORTIFIED homes (December 2023) have been built in Orange.

The Code Supplement ensures all new construction and re-roofs are built to the FORTIFIED Home standard and have greater resilience to severe weather. However, it is voluntary to designate (certify) a home as meeting the FORTIFIED Home standard using a third-party FORTIFIED Evaluator. A designation allows property owners to take advantage of insurance premium reductions and tax incentives.

To further incentivize FORTIFIED and other cost-saving construction methods, such as Energy Star, the municipality will reimburse permit fees for properties that meet these standards.

The Resilient Housing Plan will also help jurisdictional leaders, grant administrators and housing providers see the work to repair and replace housing following a disaster as an especially crucial time to be ready to take full advantage of opportunities to bring about more resilient housing. Unfortunately, the need for a jurisdiction to have a Resilient Housing Plan is too often seen after the fact by realizing what could have been done better. A huge opportunity is missed when, following a hurricane, thousands of roofs are repaired and all of them could have been made more resilient, helped the property owner save on insurance cost, and reduce loss for future windstorms with affordable and well-understood roof upgrades.

A true test of the jurisdiction's leadership and effective use of a Resilient Housing Plan following a disaster will be whether or not property owners are given the information and resources needed to repair and rebuild to a higher, more resilient standard. The Resilient Housing Plan should be seen as a road map to rebuild to a resilient standard, transforming the trauma and loss of a destructive hurricane into a forward-looking chapter for the community to become more resilient.

The final use included here for the Resilient Housing Plan is to put the jurisdiction in a position of readiness and strength to receive and effectively use federal, state and philanthropic funding. Helping municipalities, counties and parishes be ready to seek, receive and use grant funding is at the heart of the motivation to create the Resilient Housing Plan Guide. For this reason, as explained below, one of the participants in the planning process for any jurisdiction should be the person who helps seek and administer federal funds. The landscape of federal funding is always changing with new funding opportunities made available that often require a quick response. Certainly, following a disaster, federal and state funds are typically made available, not as quickly as most property owners need, but often more quickly than a jurisdiction can put together a plan to use the funds. One aim of the Resilient Housing Plan is to have a plan on hand, ready to use, to get a jump start on the effort to make use of available funding.

3. Planning the *Work* of the Plan

3.1 A Planning Process That Leads to Change

The planner's beginning task is to plan the planning process. The planning process is not just a means to produce a plan document. The planning process should be thought of as a conversion process. The plan's "work" should be thought of as the work needed to be done by decision makers to change the way they think, in order to change the way things are being done, to achieve the goal of resilient housing. Therefore, forming the planning team is not just the task of dividing up the work to be done and creating a work plan. When the planning process is thought of as a conversion process the planning team will be seen as the decision makers that need to work together to come to an agreement on how things could be done better.

The word 'resilient' expects that things be done better. Strictly speaking, to say 'more resilient' is redundant but such language might be necessary to underscore the aspirations of this work. The final planning document should be seen as a tool to record and advance the decisions that were made during the planning process. But the work to bring about changes to achieve resilient housing will be done along the way: in the process of analyzing the existing housing of the municipality, county or parish; in the process of understanding the wind and flood hazards that impact housing; and, in the process of determining what can be done to improve current housing and plan future housing to be resilient in the face of those risks.

A well-made plan is the result of a well-organized and well-executed planning process. An *impactful* plan is the result of good leadership. Good leadership motivates others to decide to do things better. Most often such decisions require overcoming biases that favor doing things the way they have been done in the past. Such a bias generally stems from the tendency for people to avoid the discomfort that comes with change. A housing plan that doesn't lead to better housing is not only a wasted effort but might reinforce the way things are currently being done, making it even harder to change how things are done in the future. Therefore, plans should be aspirational because such plans will clear the way to do things better in the future.

Because most jurisdictions typically hire consultants to do this type of planning project, it is essential to include the role of consultants in planning the work of the plan. In a way, a consultant can't do the work of the plan. Because, as explained above, the work of the plan is the conversion of the municipality, county or parish leaders and stakeholders to be able to make changes to do things better. Often, for efficiency's sake, the interaction between the consultant and the relevant jurisdictional employees is kept to a minimum. Obvious incentives are built-in for such a practice. Understandably, both the jurisdictional staff and the consultants are busy. After all, the consultant is hired to reduce the work load on the jurisdictional employees, and the consultant's profit is a product of the amount of time they put into the project. However, minimizing the interaction between the consultant and the jurisdictional officers has well-known drawbacks. An all-too-common complaint about planning work is that the completed plans don't bring about the desired impact and 'just sit on the shelf.' Such a complaint is especially relevant for an innovative plan such as a Resilient Housing Plan, which is not already part the establish governing procedure as is a jurisdiction's Comprehensive Plan.

Too often, an innovative plan fails to bring about the plan's desired changes. Why is such the case? Minimizing the involvement of jurisdictional employees and other stakeholders

in the planning process does, in fact, minimize the opportunity for these decision makers to do the work needed to be converted to think differently. When a planning project is run with minimal interaction with decision makers, whether in-house by the jurisdiction's planning department or by an outside consultant, the end result is most likely a plan document that might 'just sit on the shelf.' Regardless of the polish of the plan document, the work to bring about changing the way things are done, or in other words, the work to convert decision makers, has not happened yet. When the planning work is done by a consultant, the finished plan is delivered, the consultant is paid and the consultant can walk away, leaving the work to 'get buy-in,' or in other words, the work to educate and convert decision makers, up to the head of the planning department. There is a practical reality that is somehow too often ignored: if a plan is to bring about change, the work to educate and convert decision makers needs to happen one way or another. If the work to convince decision makers to think differently doesn't happen as part of the planning process, it will either not be done at all or it will be left up to the head of the planning department to be done without the framework of the planning process and without the help of the consultant.

3.2 Defining the Planning Participants

The participants in the planning process can be divided into three interrelated groups:

1. PROJECT TEAM	2. DECISION MAKERS	3. STAKEHOLDERS
Those getting paid to create the plan, which most likely includes the consultants.	The jurisdictional employees, elected officials and others responsible to approve, adopt or in some way implement the plan.	The people that have something 'at stake' to gain or lose from the plan.

The three planning groups, the project team, the decision makers and the stakeholders are described below:

3.2.1 Project Team

Simply stated the Project Team consists of those getting paid to run the planning process and to produce the plan. Every municipality, county or parish will identify the Project Team Leader who will undoubtedly either be or directly report to the one accountable to complete the Resilient Housing Plan. Doing as much of the Resilient Housing Plan as feasible with the ability and availability of the jurisdictional staff will lead to a plan that will have the most impact because the planning process will involve the people with the current roles in planning and housing work. A consultant can, however, be part of the project team to supplement the jurisdictional staff in order to help facilitate the process or provide technical and production assistance to create the plan.

The possible roles for a consultant are described on the following page and highlighted throughout the Resilient Housing Plan Guide to help jurisdictional officers understand how to best qualify and utilize consultant services. The aim of the Guide is to equip jurisdictional leaders and officers with the information they need when working with a consultant to ensure that the jurisdiction gets what they need at the right cost.

POSSIBLE ROLES FOR A CONSULTANT IN THE PLANNING PROCESS

Facilitate the planning process. The process suggested in this Guide will require a lead person to organize, execute and facilitate the meetings and discussions that will lead to decisions for the Plan. The lead person could be a municipality, county or parish staff person or a consultant. Using a consultant to facilitate the planning process can offer the advantage of helping all the members of the decision-making group participate effectively without the influence of established hierarchical relationships that might get in the way of open and equitable discussions.

Gather, analyze and present relevant housing, risk and land-use data. Creating the existing housing assessment and producing the working maps needed to explore alternative land-use strategies requires GIS skills. If the municipality, county or parish staff do not have the technical skills needed, or if they do not have the time to do the mapping work within their current workload, a consultant would be a good solution. The specific tasks and expertise required for a consultant to do the housing assessment and scenario land-use planning are explained in the Existing Housing Assessment section.

Produce the Resilient Housing Plan document. Producing a professional planning document is a specialized task that might be better done by a consultant. Most jurisdictions use consultants to produce their Comprehensive Plans. It might make sense to consider using the consultant who produced your most recent comprehensive plan to work with the material for the Resilient Housing Plan. The importance of coordination between the Resilient Housing Plan and a jurisdiction's other plans is discussed below.

LESSONS LEARNED FROM PILOT JURISDICTION CONSULTANTS

All three of the pilot jurisdictions hired a consultant to do most of the work of the plan. In fact, one lesson learned was that all three of the jurisdictional planning directors were already stretched thin and were accustomed to having consultants do the majority of the work for this type of project.

For St. John the Baptist Parish and Willacy County, the consultants already had well-established working relationships with the planning director, which gave the consultants a head start and helped the plan focus on the jurisdiction's most important housing and climate-risk issues.

Such a relationship helps offset the inherent limitation of consultants working too independently and leaving the work to engage other jurisdictional departments and elected leaders to be done by the planning director after the plan is completed.

3.2.2 Decision Makers

A Resilient Housing Plan is by design innovative. It aims to bring about changes in land use and construction policy and practice. Such changes will only happen when decision makers - who might be jurisdictional employees, elected officials, developers or community stake holders - understand and are willing to do things differently. These decision makers can be educated and given the opportunity to provide feedback on the Resilient Housing Plan at different times in the planning process. The most ambitious approach is to form a committee made up of these decision makers and schedule meetings with them at formative times in the process as shown in the example work plan below. A more limited inclusion could be planned as a two-part involvement, with an introductory meeting at the beginning of the planning period and a detailed report when the plan is completed.

The specific plans and objectives of how and when to involve decision makers should be shaped by the expected implementation of a Resilient Housing Plan. For example, if the Resilient Housing Plan is being considered to be a stand-alone plan with recommendations and actions that will be officially approved by a governing council or board, the established procedures and meetings of the governing council will shape the engagement plan and the recommendations that will eventually be voted on for adoption will be considered accordingly. Alternatively, if the Resilience Housing Plan is being considered to inform other existing jurisdictional plans, such as a Comprehensive Plan, Hazard Mitigation Plan, or an existing housing plan, the recommendations could be more aspirational, knowing that future planning work will take the information and recommendations of the Resilient Housing Plan to revise and update such legally adopted plans. Finally, for some jurisdictions, the Resilient Housing Plan might be best seen as

a tool to guide future actions and not to dampen the innovation needed to make changes by expecting that the plan be voted upon and adopted as is done for a Comprehensive Plan. As a planning tool a Resilient Housing Plan would be ready for future grant applications, especially in the event of a disaster, to have a plan on hand to use, apply for and make best use of available Federal Funds. A Resilient Housing Plan can also be used to motivate and guide efforts to make progress with improving housing construction standards, such as supporting FORTIFIED Construction, or creating alternative standards above the current building code. In short, the specific plan for engaging decision-making stakeholders should align with the expected use of the plan.

The list of decision makers will be specific for each municipality, county and parish. However, here are some general suggestions.

PLANNING AND ZONING	Very likely, the person responsible for the plan is the head of the planning and zoning department, or an equivalent person, depending upon how the jurisdictional staff is organized around community development. Whether the person with responsibility for planning and zoning is the head of the department or works under the head of a more general department will vary. In any configuration, the group of decision makers should include the person who has the knowledge of the jurisdiction's land use and zoning plans that regulate the jurisdiction and also has authority to make decisions.
BUILDING CODE	An important aspect of the Resilient Housing Plan is understanding the current standard of building and knowing the jurisdiction's system of code review, building permitting and building inspection to be able to see opportunities to improve the jurisdiction's construction standards. Therefore, a key person to include is the person with the knowledge of the jurisdiction's building code administration and the authority to make decisions regarding recommendations to make changes to increase the resilience of construction standards.
FLOOD MANAGEMENT	Jurisdictions will vary regarding the person responsible for flood management. In some cases, a city's flood plain management might be done at the county or parish level. In smaller municipalities, the flood plain management official might also be the building inspector. Regardless of the various administrative approaches, it is important to include the person with the flood management knowledge and decision-making ability.
FEDERAL AND STATE GRANTS	Most jurisdictions have a staff person with the job to manage grants. Because one of the purposes of the Resilient Housing Plan is for a jurisdiction to be ready to apply for and use federal and state grants, it is important to include that person.
PUBLIC OR NON-PROFIT HOUSING PROVIDER THAT SERVES FAMILIES THAT NEED HOUSING ASSISTANCE	For some jurisdictions, the obvious public housing provider will be a local housing authority. For other jurisdictions there are other non-profit housing providers that serve low-income households.
PRIVATE HOUSING PROVIDER	A private housing developer will bring a needed market perspective to the Plan. Because the majority of housing in most jurisdictions is single-family it makes sense to include a developer that builds single-family housing. The main reason for a market perspective is to be able to consider how higher standards of building would be received and how the additional cost of higher standards would be factored into the development of housing.
COMMUNITY ADVOCATE ORGANIZATION(S)	Every jurisdiction has organizations with a mission to serve and advocate for under-served communities. In order to get the geographic and demographic representation of the jurisdiction it might make sense to include more than one community advocacy organization.

3.2.3 Stakeholders

Stakeholders, as the name defines, are those who have as 'a stake' in the outcome of the planning project. The stakeholder group is open-ended and inclusive. Involving stakeholders in several meetings will help educate the community and build support for the plan.

3.3 Compiling Existing Related Plans

A useful Resilient Housing Plan should coordinate with a jurisdiction's existing plans and with the plans of jurisdictions that interrelate with the jurisdiction. Relevant existing plans should be identified and compiled. Analysis of these existing plans should be done, and a summary report completed so that all those on the project team will be well informed. The report should summarize the housing related information in the existing plans and identify gaps and potential alignments.

3.4 Establishing the Project Timeline

The project timeline will depend completely on the jurisdiction's workplan and coordination with other ongoing and expected projects. Even though the specific time frame for a jurisdiction's timeline will vary the steps along the timeline will be the same. A general timeline guide is shown on the following page.

ALIGNMENT ACROSS PLANS

Plan integration can improve local resilience. The ***Plan Integration for Resilience Scorecard (PIRS) Method,*** developed by Department of Homeland Security Science and Technology Coastal Resilience Center of Excellence partner, the Institute for Sustainable Communities at Texas A&M University, provides a strategy for evaluating integration across plans. To learn more, visit: *mitigationguide.org.*

Contact your local Sea Grant agent for guidance.

The planning timeline below shows a fully-integrated planning process, which formalizes the Decision Makers into a Decision-Making Group. Such a group can be seen as an executive committee that help to determine the goals of the plan, reviews findings of the existing housing assessment and is engaged in a workshop to create the Housing Land-Use Vision Plan. The Decision-Making Group would also review and provide input on the recommendations of the plan. The Stakeholders are included at the beginning and end of the planning process and at one or two key points of review, with the goal to create general awareness and support for the Resilient Housing Plan.

Obviously, the Project Team, including the consultants, will create a planning timeline that fits the capacity and expectations of the jurisdiction. Working with the key decision makers to educate and get input might be accomplished more informally. However, regardless of the particular time-line, the success of the plan to bring about changes in the jurisdiction's housing resilience will depend upon broad-based understanding and support for the goals and recommendations of the plan.

PROJECT TEAM	DECISION-MAKING GROUP	STAKEHOLDERS	WORK
			Create the Planning Team with three groups
			Compile existing related plans
			Project kickoff, planning team orientation, first community education effort
			Establish workplan, determine overall goals, plan community outreach
			Produce Existing Housing Assessment
			Review findings of Existing Housing Assessment
			Create the Housing Land-Use Vision Plan
			Create drafts of Damage and Loss Reduction Plans
			Review and get input on Damage and Loss Reduction Plan
			Organize expanded planning team for Disaster Recovery Housing Plan
			Produce draft of Disaster Recovery Housing Plan
			Review and get input on Disaster Recovery Housing Plan
			Produce Strategic Funding Plan
			Initiate long-term Community Education Activities
			Develop and compile Resilient Housing Plan Recommendations
			Review and get input on Resilient Housing Plan Recommendations
			Complete Final Plan
			Present Final Plan

Figure 3.1. Template Timeline Guide

3. PLANNING THE *WORK* OF THE PLAN
PROMPTING QUESTIONS

3.1 Who in your jurisdiction is or could be the plan champion? It might help to ask: who is already promoting resilience; who suggested doing a Resilient Housing Plan?

3.2 Who is the plan leader? Who has the authorized position to speak for the merits of the plan and to move the plan forward? The plan leader might not be the plan champion at first. He or she might need to be engaged in the planning process to understand and take ownership of the goal to achieve resilient housing so he or she can effectively promote the plan into the future.

3.3 In recent years what was the jurisdiction's most successful planning effort? What lessons can be learned from such previous planning efforts?

3.4 What opposition to planning in general has come up in recent planning activities?

3.5 What opposition might come up to resilient planning, especially with land-use policies that affect development?

3.6 What other planning projects will be going on concurrent with the Resilient Housing Plan?

3.7 Are there any overlaps in activities or decisions with such other planning projects?

3.8 What is your jurisdiction's plan to appoint or organize members to oversee the Resillient Housing Plan?

3.9 What is the expected involvement of elected officials? At what point and how often would the jurisdictional elected officials need to be informed and updated on the plan?

3.10 What is the process of review and approval if the Resilient Housing Plan is expected to be officially adopted at the same level of authority of other jurisdictional plans such as a jurisdiction's Comprehensive Plan?

3.11 What is your jurisdiction's plan to better inform and advocate for areas of high social vulnerability?

3.12 Will there be changes to the elected officials during the planning period? What is your jurisdiction's plan to inform and update any new elected officals?

3.13 Will your jurisdiction maintain the Resillient Housing Plan Committee(s) after the completion and implementation of the plan?

3.14 Does your jurisdiction have a plan in place to further grow and adapt the Resilient Housing Plan after the completetion and implementation of the plan? What does this plan look like to your jurisdiction?

3.9 Will the jurisdiction hire a consultant to be part of the project team? If so what will be the role of the consultant?

3.10 In considering a consultant, is the consultant already experienced in resilience related work?

3.11 In considering a consultant, what is the GIS capability of the consultant? Will the jurisdiction provide relative housing data to the consultant or will gathering data be included in the consultant's work?

3.12 In considering a consultant, is it possible to use a consultant that is already familiar with the jurisdiction? For example, who was the consultant that worked with the jurisdiction on the most recent Comprehensive Plan?

3.13 In considering a consultant, will it be the role of the consultant to plan, organize and run community and stakeholder outreach activities? If so, how will they decide who to include?

4. Overview of the Resilient Housing Plan

4.1 The Plan Components

The seven sections of the Resilient Housing Plan are listed below. The Existing Housing Assessment provides information for the plan. The Housing Land-Use Vision Plan is a planning tool to be used for the land use components of the Damage and Loss Reduction Plan. The other five sections are the planning components.

1. Existing Housing Assessment
Assess the existing housing stock of the jurisdiction, overlaid by flood and wind hazard zones, to categorize, map, quantify and visualize housing density, estimate wind and flood resistance based on building code application and foundation type, and produce an analysis tool to estimate the probable damage and loss from various storm scenario.

2. Housing Land-Use Idealization
Create a housing land-use idealization map that shows the desired location and types of housing to meet predicted housing needs more resiliently, working with two sets of variables: density and housing type. The land-use idealization map will be used as a planning tool to create the land-use damage and loss reduction plan.

INVENTORY

3. Housing Land-use Damage and Loss Reduction Plan
Produce action plans to reduce damage and loss with changes to land use policies that aim to bring about decreased and/or more resilient housing types in high hazard areas and increased housing density in low hazard areas.

4. Housing Construction Damage and Loss Reduction Plan
Produce action plans to improve to construction practices to increase the resilience of day-to-day housing renovation and of new construction as well as increase the resilience of housing that is repaired and built following a disaster.

5. Disaster Recovery Housing Plan
Compile a plan for housing recovery following a disaster including sheltering, temporary housing, repair, and replacement housing

6. Community and Stakeholder Education Plan
Plan short term outreach activities to educate the community and stakeholders about the Resilient Housing Plan, along with long-term, ongoing programs to promote resilient land use and construction practices.

7. Strategic Funding Plan
Create a strategic recovery plan kept current and modified as needed to be ready to pursue, receive, and effectively use federal funds before and following a disaster.

PLANNING COMPONENTS

4.2 The Planning Process

The last five sections of the plan - Housing Land-Use Damage and Loss Reduction Plan, Housing Construction Damage and Loss Reduction Plan, Disaster Recovery Housing Plan, Community and Stakeholder Education Plan, and Strategic Funding Plan - make up the component parts of the Resilient Housing Plan. The standardized planning process used in the Guide follows the process used in *FEMA May 2020, Planning Consideration: Disaster Housing*. Consistently following the steps in the planning process will align the work of these four sections in order to arrive at coordinated goals, objectives and recommendations.

FOR MORE INFORMATION

Refer to ***FEMA's May 2020, Planning Consideration: Disaster Housing*** for important information relating to Disaster Recovery.

Analysis: Analyzing the topic for each section is in essence asking the question 'What is wrong here?' in the way a physician or a car mechanic begins a diagnosis. As with the diagnostic work of a physician or a car mechanic, that first question leads to multiple related questions such as 'How is this put together? What has happened in the past? What symptoms do I see? What does my experience tell me about what might be wrong? , etc.
A list of prompting questions is included for each section to help with the analysis.

Goals: Goals are broad, general statements that indicate the intended solution to the identified problems. Goals are what people and resources are supposed to achieve.

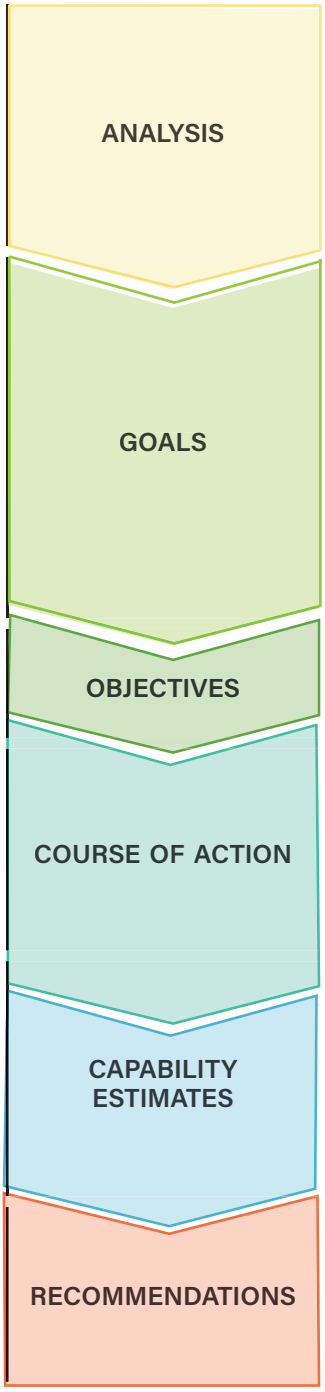
The analysis creates the context for the goals. Because the analysis is synthetic and complex the goals more or less grow out of the analysis and do not have the type of direct relationship that goals and objectives have to each other. The goals should be general and shaped by several lists discussed in the Guide: The National Disaster Housing Goals, the Expectations given in this Guide, and the general aims of resilience to adapt and become stronger in the context of change and uncertainty. The goals should come from the full, multi-valued power of the Decision-Making Group working with the Project Team.

Objectives: Objectives are specific and measurable and focus on actions carried out during the operation. They lead to achieving the goals and determining the actions that participants in the operation must accomplish.

Course of Action (COAs): The planning team will develop operational COAs to achieve each objective. The COAs should refer to a projected timeline and identify decision points and actions required to achieve the objective. When developing COAs the planning team should determine which organization(s) have responsibility for which actions and whether those actions depend on any decisions, authorizations, or the completion of other tasks.

Capability Estimates: After determining the COAs the planning team develops capability estimates to identify the abilities and resources that are needed to accomplish the objectives. As the objectives are matched up with responsible organizations, the capability of the organizations within the timeline and expected resources is considered. In most cases the capability estimate will require discussions with the responsible organizations and serve as a check to decide if pursuing the COA is realistic and supportable.

Recommendations: The capability estimates will reveal gaps or shortfalls in personnel, resources, authorities or funding. Recommendations adjust the COAs to the capability estimates. Or, on the other hand, a recommendation can describe how a gap or shortfall might be solved to overcome a barrier to a COA to achieve the associated objective.



MORE ON GOALS AND OBJECTIVES

The effectiveness of planning work that will lead to actionable recommendations depends upon advancing a plan from goals to objectives. Goals are broad, general statements to describe the intended solutions to identified problems. Objectives are specific and measurable and lead to actions to be carried out. The following examples are given to illustrate the progress from goals to objectives.

Consider two goals that might be determined as part of the Housing Land Use Damage and Loss Reduction Plan:

For a high flood-risk, old neighborhood a **goal** could be:

'Reduce vulnerable housing in high flood-risk, old neighborhoods increasing public green space and replacing single family housing with stronger multi-unit housing.'

And an associated **objective** could be:

'Over the next ten years gradually reduce vulnerable housing in high flood-risk, old neighborhoods by utilizing the buyout program in partnership with the local community land trust to create public green space, and by creating a new 'green neighborhood' zoning classification that enables compact, low-rise multi-unit housing with increased green space.'

For a low flood risk, downtown area a **goal** could be:

'Significantly increase housing in low flood-risk, downtown neighborhoods while maintaining a commercially vibrant, walkable business district mixed with both market rate and affordable housing.'

And an associated **objective** could be:

' Increase Downtown housing from the year 2022 average of 12 units per acre to a target of 30 units per acre while creating affordable housing opportunities by incentivizing the development of efficiency units, considering the allowance of density transfer with projects that include historic buildings, and adding maximum parking limits to eliminate excessive parking.'

FOR MORE INFORMATION

Building Resilience Through Plan Integration, a publication from the American Planning Association (2021), describes methods for planners to ensure their communities' plans are consistent and aligned.

See: Plan Integration for Resilience Scorecard (PIRS) at *planning.org.*

Contact your local Sea Grant agent for guidance.

5. Existing Housing Assessment

5.1 Purpose

Simply stated, the purpose of the existing housing assessment is to better understand the jurisdiction's current overall and geographically defined housing resilience.

The assessment will provide two key understandings for the Resilient Housing Plan. First, the assessment will predict flood and wind damage risk delineated by geographic districts, which will guide the Housing Land-Use plan. Second, the assessment will factor in housing structural vulnerability to predict damage and loss, which will guide the Damage and Loss Reduction Plan. The key understandings will also inform the Disaster Recovery Housing Plan. In addition to providing base information for the planning work, the existing housing assessment will provide data needed to apply for federal grants and other financial assistance programs.

5.2 Product

The product is two-fold: first, a summary of the overall conditions and vulnerabilities of the jurisdiction's current housing stock; second, a GIS map dividing the municipality into layered districts. For each layer and district, the map should include the predicted flood and wind hazard, the approximate number of existing housing units, the average structural vulnerability of the houses, and the houses' average size. The information from the existing houses and the predicted hazards will be used to geographically delineate the risks to housing and guide future plans.

CHARM workshop in Willacy County, Texas

5.3 Process

In order to visualize housing density, a map of the jurisdiction should be overlaid with a small-scale grid, recommended to be at 2.5 acres (so that four squares make ten acres). The GIS analysis used should be able to determine the number of housing units in each 2.5-acre square as a numerical density factor.

VARYING APPROACHES OF PILOT JURISDICTION CONSULTANTS

The GIS work to produce the Existing Housing Assessment for each of the three Pilot jurisdictions differed.

The Project Team for Willacy County was assisted by Texas A&M AgriLife Extension staff from the Texas Community Watershed Partners to put on a CHARM (Community Health and Resource Management) workshop. The CHARM model works from a 2.5-acre grid, and the output of the workshop was used for the housing assessment.

The consultants for St. John the Baptist Parish, Desire Line LLC, used their own GIS capability to create a 2.5-acre grid, following the CHARM model, to map the distribution of housing, which was overlaid with flood zones and other GIS information.

The consultant for Foley Alabama, Allen Engineering and Science, had GIS assistance from Mississippi State University's Geosystems Research Institute. The CHARM model was chosen in the Resilient Housing Plan Guide pilot phase as the GIS standard because of the fine-grain housing analysis made possible from the 2.5 acre grid base map. See Appendix 4 for more information about the CHARM program.

The Existing Housing Assessment should use the GIS resources of the jurisdiction or of the consultants to compile, map and analyze relevant hazard, housing and community data. The data should include the following factors, which are explained below:

- Housing distribution
- Simplified flood hazard zones
- Wind hazard zones
- Housing wind vulnerability based on building code adoption
- Housing flood vulnerability based on foundation types
- Social and economic resilience
- Other factors relevant to the jurisdiction

The usefulness of the assessment will likely come from the layering of factors to be able to define sections of the jurisdiction based on common hazards and vulnerabilities. With a better understanding of the high risks and vulnerability of some sections, compared to the relative lower risk and vulnerabilities of other sections, more informed decision makers will be able to determine where housing density should increase or decrease and decide the types of housing that are well suited to accomplish the desired densities and distribution.

DEVELOPING THE EXISTING HOUSING ASSESSMENT

There are many online mapping tools and resources that can be used to inform your housing assessment (e.g. NOAA's Sea Level Rise Viewer, Social Vulnerability Index).

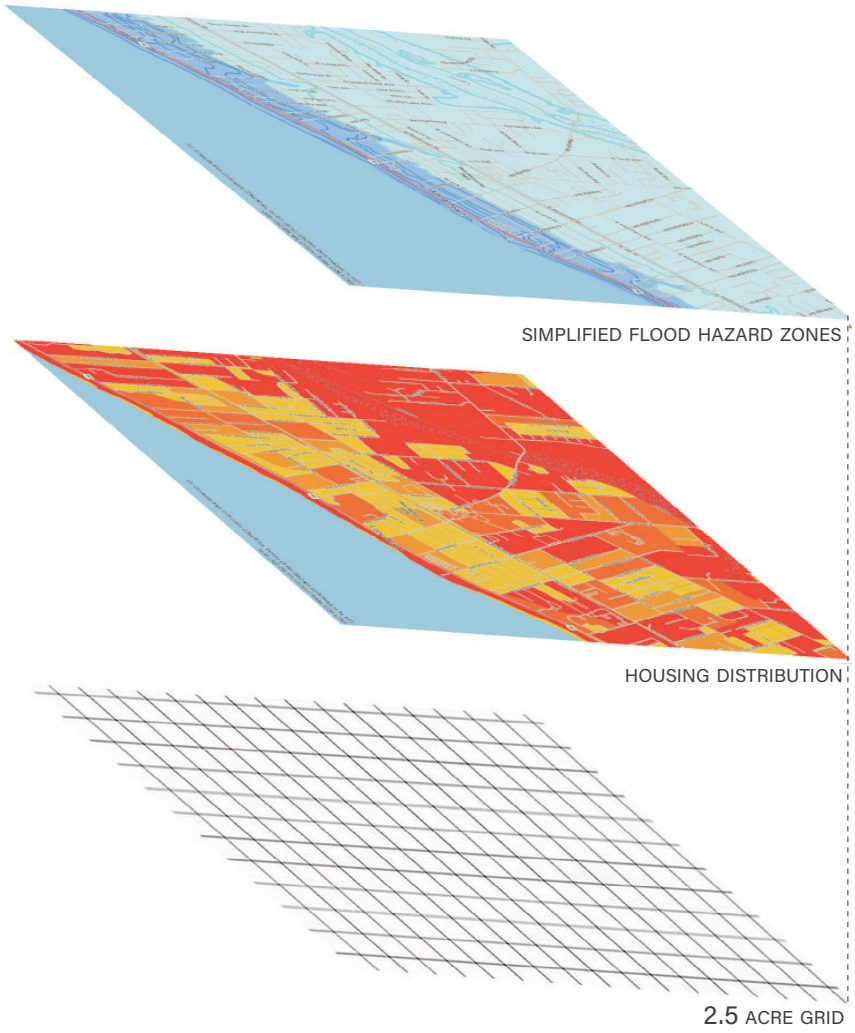
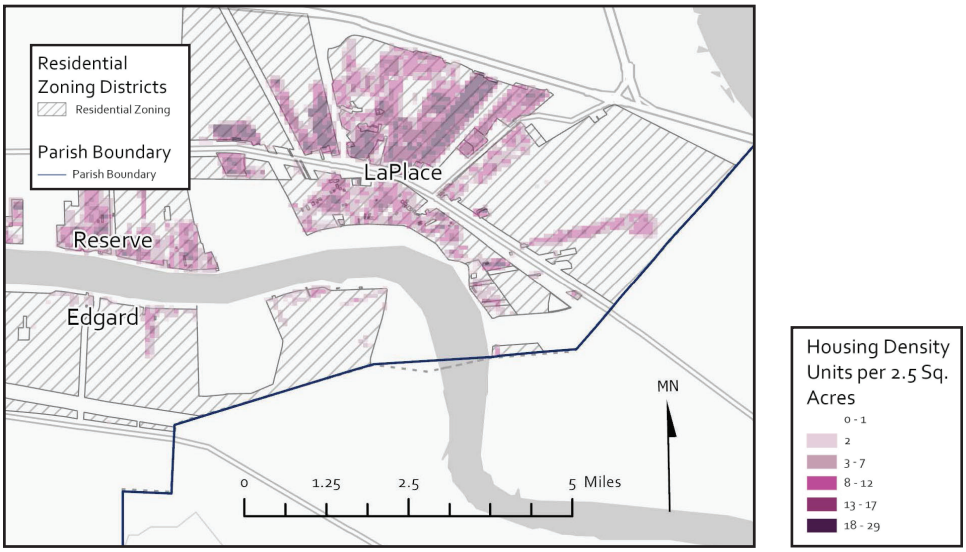


Diagram of the layered basemap for the Existing Housing Assessment.

Housing Distribution

The base layer for the Existing Housing Assessment is a fine-grain mapping of the jurisdiction's distribution of housing. In order to visualize the distribution of housing a map of the jurisdiction should be overlaid with a small-scale grid, recommended to be at 2.5 acres (so that four squares make ten acres). The GIS analysis tools used should be able to determine the number of housing units in each 2.5-acre square. For example, the consultant for St. John the Baptist Parish, Desire Line LLC, assigned density groups with units per acre (0-1, 2, 3-7, 8-23, 13-17, 18-29) and mapped the density from least dense to most dense with color gradation as shown in the map below. Such a map offers a clear depiction of the distribution of housing.



Housing distribution in St. John the Baptist Parish

Simplified Flood Hazard Zones

FEMA Digital Flood Insurance Rate Maps are a necessary and familiar part of the day-to-day flood management work of jurisdictions. However, these detailed maps are not well suited for planning work for two obvious reasons. First, they are too complicated. Second, the dividing lines between flood zones do not align well with the practical aspects of flood resilience. For example, the line between an AE zone and X zone, which for many people is the line between being 'in' or 'out' of the flood zone, is misleading because areas in an X zone have flooding, and will have more flooding with sea level rise. Also, in practice, there is a big difference between the AE zone near the shoreline and the AE zone further inland.

For building construction, the most significant flood factor is the difference between the ground elevation and the base-flood elevation, or in other words, how high the floor level needs to be above grade. For land use planning, it is helpful to determine a practical line within the AE zone between the highest hazard area in which any building should be questioned as whether the risk is justified, and areas with less hazard, in which the buildings still need to be elevated and built to withstand a flood, but can be justified for other economic and community reasons.

FLOOD HAZARD MAPPING

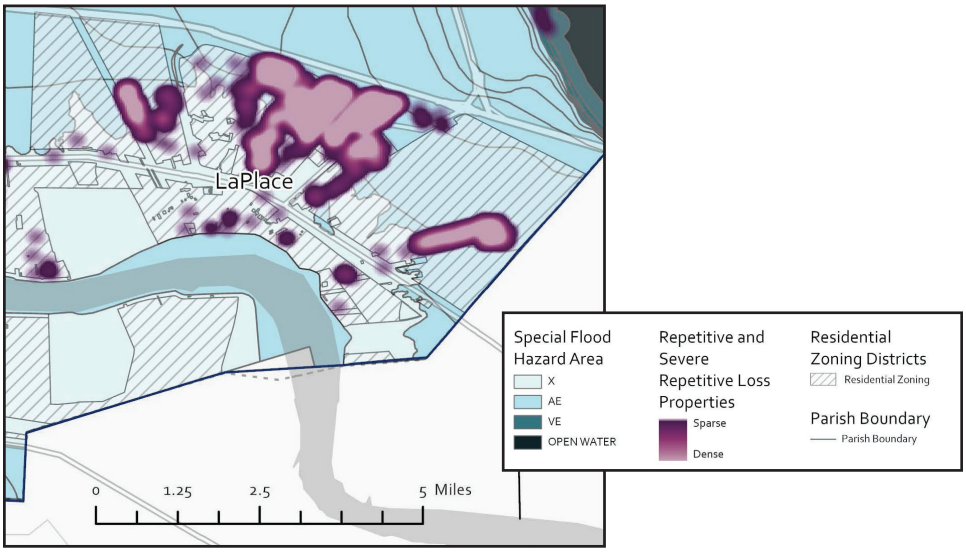
Flood Insurance Rate Maps (FIRMs) are available online at FEMA's Map Service Center.

msc.fema.gov

FLOOD PLANNING

NOAA Atlas 15 is a New National Precipitation Frequency Standard, see Appendix E for more information.

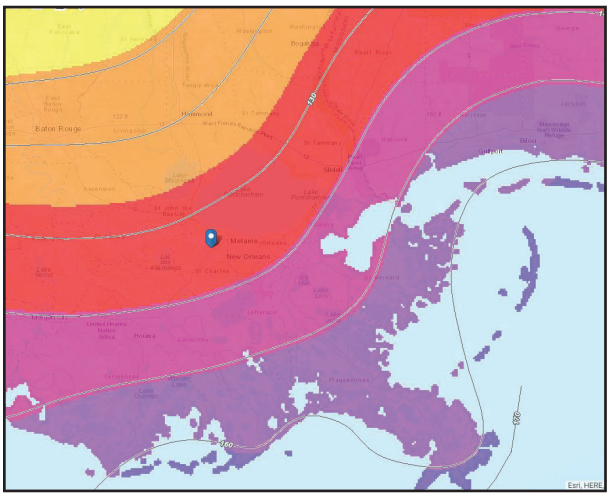
Such a line can also be thought of as dividing areas in which the elevation requirement has a primary impact on how the building is designed and areas in which the floor level above grade can be worked out with a more normal foundation. Since flood risk corresponds with topography such a practical line can be delineated by selecting a ground level above sea level as it relates to the base flood elevation. For example, a jurisdiction might decide the practical line is where the difference between the base flood elevation and grade is three feet, or some other number that helps delineate the impact of flood factors on housing.



St. John the Baptist Parish Flood Risk mapping

Wind Hazard Zones

FEMA's accepted standard for determining wind force is the ASCE-7 Minimum Design Loads for Buildings and Other Structures. The Basic Wind Speed maps are used in practice. It is important to note that the Basic Wind Speed maps used to calculate the design winds loads for buildings is not measured the same as the wind speeds associated with the familiar Saffir-Simpson Hurricane Categories.



Wind hazard mapping using the ASCE Hazard Tool (*ascehazardtool.org)*

SAFFIR-SIMPSON HURRICANE WIND SCALE VS. ASCE WIND STANDARDS

Hurricane intensities are reported by the National Hurricane Center, according to the Saffir-Simpson Hurricane Wind Scale. This scale is used by hurricane forecasters, local and federal agencies responsible for evacuation of residents, long-range disaster planners, and the news media. The scale contains five (5) categories of hurricanes and distinguishes them based on wind speed intensity. The wind speeds used in the Saffir-Simpson Hurricane Wind Scale are defined in terms of a sustained wind speed with a 1-min averaging time at 33 ft over open water. The ASCE-7 standard uses a 3-s gust speed at 33ft above ground in Exposure C (defined as the basic wind speed and shown in the wind speed maps).

Housing wind vulnerability based on building code adoption

Each jurisdiction has a particular history of building code adoption. There are two key years of building code adoption that can be used to approximate the structural vulnerability of existing housing stock. The key first year is the adoption of a building code. The second key year is the adoption of a building code that applies the High Wind Requirements specified in ASCE-7. If the International Building Code (IBC) was the first building code to that was adopted - most likely after 2006 - the ASCE-7 requirements were already included. If the jurisdiction adopted a building code before the IBC became the national standard, the code was most likely the Standard Building Code and did not yet have the ASCE Standards that were developed in 1985 but not adopted into the code until the late 90's. Knowing the years of building code adoption and aligning the average age of the houses in different part of the jurisdiction is a way to approximate the structural strength of the houses in that neighborhood.

Housing flood vulnerability based on foundation type.

The obvious flood factor of a house is the height of the floor above the ground around the house. There are three basic foundation types as far as floor height is concerned: slab-on-grade, pier, or elevated. Pier is not a clear descriptor but matches with a house that is off the ground, typically between two and three feet, with a crawlspace. However, the house could have a foundation wall (often called a chain wall) and the space under the floor could either be an open crawl space or filled with soil. In either case, the flood factor is the fact that the floor is above the ground. Elevated foundations were built above the typical porch height of a traditional pier foundation house to a height set by the base flood elevation. For flood vulnerability the all too common foundation type is slab-on-grade. In the typically flat land of the Gulf Coast Region, from a resilience view point, the fact that slab-on-grade houses have been the common foundation type for the past fifty years is unfortunate.

Slab-on-grade foundation

Pier foundation with crawlspace

Elevated foundation

WIND HAZARD MAPPING

ASCE-7 Minimum Design Loads for Buildings and Other Structures are FEMA's accepted standard for determining wind force.

ascehazardtool.org

RISK AND CAPABILITY ASSESSMENT BY FEMA

FEMA Floods & Maps webpage for Managing Floodplain Risk Site falls under Floods & Maps category, accessing brief background and helpful resources for managing floodplain risks. Resources including Community Engagement Prioritization and Community Assistance for State, and Intergovernmental Collaboration are provided.

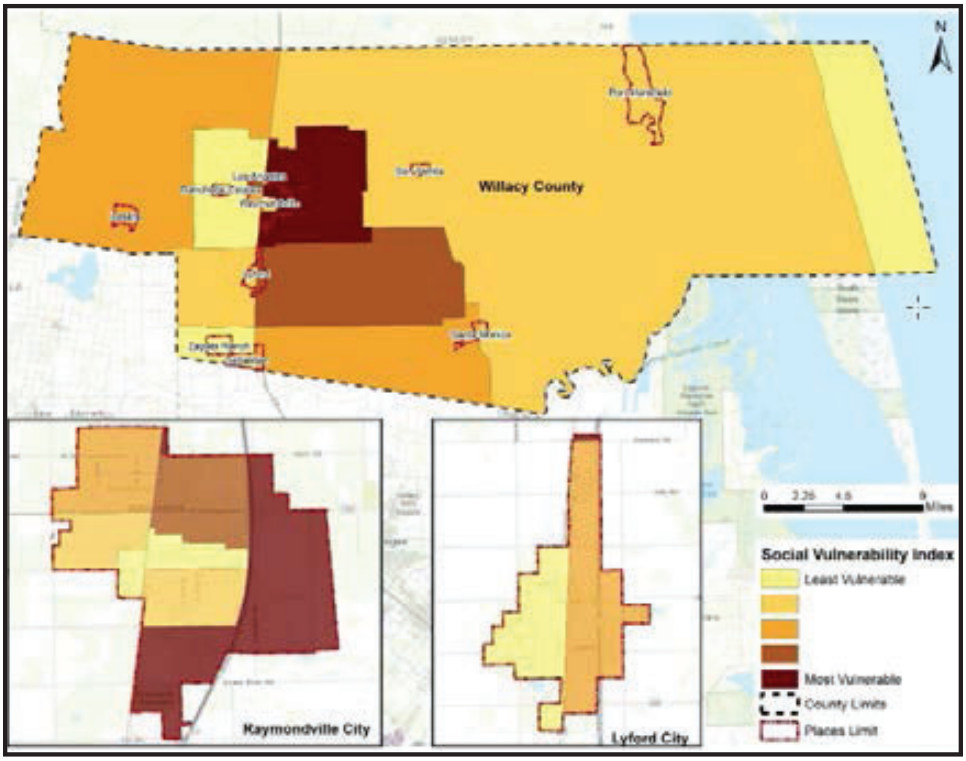
FEMA guide on Floods & Maps, including Floodplain Risk Management, located at:

https://www.fema.gov/emergency-managers/national-preparedness/goal/risk-capability-assessment

Social and economic vulnerability factors.

Social vulnerability is a term describing how resilient a community is when confronted by external stresses on human health. These stresses can range from natural or human-caused disasters to disease outbreaks. By reducing social vulnerability, we can decrease both human suffering and economic losses.

The Social Vulnerability Index (SVI) employs U.S. Census Bureau variables to help users identify communities that may need support in preparing for hazards or recovering from disasters. The tool is particularly useful for emergency response planners and public health officials, as it can identify and map the communities that are most likely to need support before, during, and after a hazardous event.



Social Vulnerability Index 2016 for Willacy County. Created by Texas Target Communities under Texas A&M University.

SOCIAL VULNERABILITY INDEX

The SVI uses U.S. Census Bureau data to determine the social vulnerability of every census tract (census tracts are subdivisions of counties for which the Census Bureau collects statistical data). The SVI ranks each tract on 14 social factors, including poverty, lack of vehicle access, and crowded housing, and groups them into four related themes. Each tract receives a separate ranking for each of the four themes, as well as an overall ranking.

Other factors.

The Project Team should be familiar with other housing factors that should be included in the Existing Housing Assessment. These factors could include mobile homes, rental vs. homeowner, market trends and changing property values, which either indicate gentrification or disinvestment.

5. EXISTING HOUSING ASSESSMENT

PROMPTING QUESTIONS

5.1 HAZARD / LAND USE MAPPING

1.1 What would simplified flood boundaries look like for your jurisdiction that clarify the hazard into high, medium and low risk?

1.2 What areas of your jurisdiction that are not in FEMA flood zones have a history of flooding?

1.3 How will sea level rise affect future flooding?

1.4 Are there isolated areas of flooding that are not caused by tidal or river flood but are caused by rain and inadequate storm drainage infrastructure that are not included in FEMA flood maps?

1.5 How has increased development affected flood hazards?

1.6 What do the Basic Wind Speed Maps in ASCE-7 show for your jurisdiction? For example, you may choose to map areas in the wind hazard zone at or above basic wind speeds of 110 mph, or above 130 mph.

1.7 Identify areas at higher risk for any other hazards that may affect your jurisdiction (e.g. wildfires, hail).

5.2 HOUSING VULNERABILITY

2.1 What is the history of building code implementation for your jurisdiction? For example, what was the year a basic building code was implemented? What was the year high wind requirements were implemented (generally the use of ASCE-7)?

2.2 Has your jurisdiction implemented building standards with requirements above high wind requirements? If so, what year were such standards implemented?

2.3 With the years of code implementation in mind, what is the average age of the housing units in different parts of the jurisdiction, which correspond to the house's expected wind resistance?

2.4 Considering flood vulnerability, what is the typical house foundation for different parts of the jurisdiction? i.e. slab on grade, conventional pier foundation that raises the house around 30 inches, or elevated foundation to meet FEMA base flood elevation?

2.5 Considering the economic impact of housing loss, what is the average size of the houses in different parts of the jurisdiction? i.e. small, medium, large?

2.6 What parts of the jurisdiction allow manufactured homes?

2.7 Are some areas or subdivisions at a greater risk for tree hazards? For example, in newly developed neighborhoods that have been recently cleared of forest while conserving more mature specimens (which are at greater risk of falling due to the clearing of the surrounding forest).

5.3 HOUSEHOLD VULNERABILITY

3.1 What does a map of household social and economic vulnerability show for your jurisdiction?

3.2 Are there vulnerable communities that exist within your jurisdiction that may not be represented in Census tract based mapping applications?

6. Housing Land-Use Vision Plan

6.1 Purpose

The purpose of the Housing Land-Use Vision planning work is to create a housing land-use vision map or multiple scenario maps that show the desired location and types of housing to meet predicted housing needs more resiliently. A more resilient land-use plan can come by working with two sets of variables: density and housing type. Regarding density, the aim is to decrease housing density in high-risk areas and increase housing density in lower-risk areas. Regarding housing type, stronger structures are typically more economically feasible with the larger buildings associated with multi-unit housing.

EXISTING HOUSING ASSESSMENT

HOUSING LAND-USE VISION PLAN

6.2 Product

The product is a map, or several scenario maps, showing the distribution of desired density of housing for increased resilience for the entire jurisdiction. Because density is directly related to housing type the density map will automatically define different housing types. Even though the map is idealized, actual on-the-ground factors should be considered. Such existing factors include historic neighborhoods, proximity to downtown, waterfront districts, dominant non-housing land uses, areas considered as conserved open spaces and other particular land-use considerations. Such land-use factors can be identified by working on top of a base map of an aerial image as well as a current zoning and land-use map.

The map will utilize a 2.5-acre grid for the entire jurisdiction layered onto the map of the hazard districts defined in the Existing Housing Assessment. The map will allow comparison between the idealized housing density and the existing housing density to show where housing density should increase and where it should decrease.

CHARM workshop in Willacy County, Texas

PROCESS NOTE

An effective way to make sure the land-use vision planning work does not get bogged down in overly specific concerns is to make the decision-making move quickly by doing the work as a planning charrette.

For example, the charrette could utilize a sort of game activity in which the members of the Decision-Making Group are given a stack of tokens to place on the map, where tokens represent a target number of housing units to distribute throughout the jurisdiction. These numbers would be compared to the existing numbers of units to determine where added housing is desirable and where reduced housing is better.

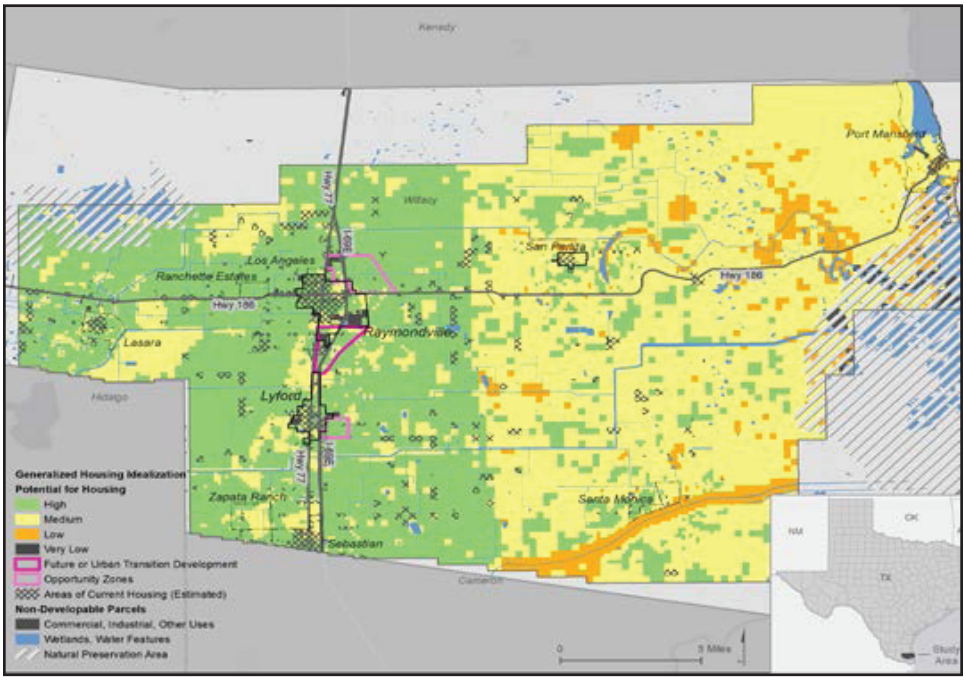
6.3 Process

The housing land-use vision planning work cannot be done by consultants working on their own or even effectively done with just consultants and the planning director. To be effective and to provide input for the land-use work to follow, the land-use vision planning work should happen as a group effort with an inclusive, well-informed, and forward-looking team approach. This is the work of the group of decision makers that was described in

The vision map should be seen as a planning tool and not a final plan. Pitfalls of broad-stroke, land-use planning should be kept in mind. However, as a planning tool, a visioning analysis will provide a way to more clearly see options that might not be considered with a more conservative approach. The vision map will be used in the more critical and deliberate planning work to follow.

The thinking for this work should be '**where** should housing be located?' not '**how** would a change in density be brought about?' Questions of **how** will be addressed in the land-use action plan to follow.

6.4 Pilot Jurisdiction Application: Willacy County's Land-Use Vision Plan



US CLIMATE RESILIENCE TOOLKIT

"It is critically important for planners, public officials, and the community at large to understand the mechanisms of destruction embodied in the multi-hazard risks that affect their area, and to take the appropriate land-use planning steps to minimize vulnerability and maximize resilience...Planners also need to be cognizant of situations where preserving open space at a site may be a better alternative than allowing development." Visit the website below for more information about Land Use and resilience.
https://toolkit.climate.gov/topics/built-environment/planning-and-land-use

Over 500 hazard mapping tools and datasets are also available within this site.
https://toolkit.climate.gov/tools

6. HOUSING LAND-USE VISION PLAN

PROMPTING QUESTIONS

6.1 What lessons were learned from the Existing Housing Assessment?

6.2 What land elevations are the approximate dividing lines between high, medium and low flood risk?

6.3 What is the projected increase in housing described in the jurisdiction's comprehensive plan?

6.4 What parts of the jurisdiction are currently growing?

6.5 Are there planned infrastructure projects that might change the current development environment?

6.6 What part of the jurisdiction has the highest housing density?

6.7 Has your jurisdiction adopted a policy that allows Accessory Dwelling Units (ADU's) to be placed on individual parcels of land?

6.8 Has your jurisdiction adopted a policy that allows for more-mixed use structures to be placed in a more centralized area of the community?

6.9 How can your jurisdiction promote or incentivize the community to build a more dense, neighborhood placemaking, resilient community?

6.10 Are there plans to change any boundaries that will affect the jurisdiction?

6.7 Where is the land with the lowest flood risk?

6.8 What undeveloped land has been or perhaps should be designated as protected natural environment?

6.9 How does your jurisdiction envision using this plan to correspond with your current and future comprehensive plans?

7. Housing Land-Use Damage and Loss Reduction Plan

7.1 Purpose

The purpose of the Housing Land-Use Damage and Loss Reduction Plan work is to create a plan to reduce damage and loss with changes to where and what type of housing is built. The Plan will be used to inform the jurisdiction's established plans such as their Comprehensive Plan and Land Development Ordinance. The Plan will also be used to lead other stake holders to use land more resiliently.

7.2 Product

The product is a prioritized plan based on the work of the Housing Land-Use Vision Plan with recommended actions, identified responsibilities and next steps.

7.3 Process

The Land-Use plan works from the Housing Land-Use Vision Map, along with other factors to translate the idealized density to reduce damage and loss into specific land-use actions to increase resilience. The lens of resilience will be expanded to include social, environmental and economic factors that will lead to holistic community resilience.

The Damage and Loss Reduction plan for Land-Use will consider the specifics of the jurisdiction such as looking at different housing types to bring more housing into existing commercial zones in low-hazard areas. Higher density in low-hazard areas could mean a change of housing type from single-family housing to multi-family housing. Or it could mean infill housing or smaller lots or the use of accessory-dwelling-units to add density into low-density, low-hazard single-family housing neighborhoods.

Missing Middle Housing Types. Source: Opticos Design, Inc (2020). Missing Middle Housing. *missingmiddlehousing.com*

Lower density in high-hazard zones can be accomplished in a variety of ways as well. Such as relocation and house-moving programs and green space creation. Also, there are advantages of multi-unit housing in medium and high-hazard zones because elevating a larger building is more economical than elevating a single house. Such actions that are specific to the municipality will be included in the land-use plan component.

The comparison of the Existing Housing Map and the Housing Land-Use Vision Plan is the primary means of analysis for the Housing Land-Use Damage and Loss Reduction Plan. In other words, the analysis is comparing the existing location, density and housing types with the desired distribution of housing projected in the future. The primary question of the analysis is 'What land-use changes will lead to the desired housing density?' The Housing Land-Use Vision Plan took full liberty to rearrange housing with the sole aim

EXISTING HOUSING ASSESSMENT

HOUSING LAND-USE VISION PLAN

HOUSING LAND-USE DAMAGE AND LOSS REDUCTION PLAN

THE COST OF INCREASED RESILIENCE

The land-use plan is probably the most controversial work of the Resilient Housing Plan, because it has direct impact on current property owners, future developers and residents in the community. Any plan that leads to relocations, increased density, and the change of housing type will impact the existing residents and will lead to a change in the demographic makeup of the community. The process should include open and considerate discussions about property value and gentrification.
The challenging reality is that increased resilience will increase the cost of construction so without financial assistance housing affordability will suffer and gentrification will occur.

of decreasing density in high-risks areas and increasing density in low-risk areas. The analysis for the Housing Land-Use component now considers all of the non-risk related factors, such as current land use, vacant property, current zoning, market activity, and special districts such as downtown, waterfront, and historic districts, etc. As the reality of the layers of non-risk factors are considered it will be important to keep in mind that the analysis is not a critique of the Vision Plan. In other words, the planning team should not take the approach of saying, 'The non-risk factors bring into question the Vision Plan. Therefore, we should back away from the change in density that we initially set.' Instead, the approach should be, 'How can we accomplish the change in density that we initially set?' Such a faithful effort to hold true to the risk-related decisions will undoubtedly lead to creative solutions and a more progressive land-use plan.

7.4 Pilot Jurisdiction Application: St. John the Baptist's Land-Use Damage and Loss Reduction Plan Recommendations

RESILIENCE FACTOR	GOAL	POLICY / PLAN / INTERVENTION	RESPONSIBLE ENTITY
Flood retention	Preserve vital retention areas	Identify nonprofit entities to purchase retention areas	Planning and Zoning Dept.
Flood retention	Preserve vital retention areas	Facilitate transfers and purchases of retention sites	Planning and Zoning Dept. and Nonprofits
	Note: LWI program has funded similar projects in East Baton Rouge Parish		
Flood retention	Build retention areas	Construct retention areas along the East-West Canal and pumps into the wetlands north	Public Works Dept., DOTD, CPRA, LDWF, DEQ, USACE, EPA
Development of low-risk sites	Rehabilitate aging housing in Reserve and Edgard	Direct grant funding toward rehabilitating aging housing that is outside of the SFHA in Reserve and Edgard	Grants Dept.
Development of low-risk sites	Improve the transportation to the West Bank	Pursue the reinstatement of ferry services to the West Bank of the Parish	Planning and Zoning Dept. and State DOTD
Development of low-risk sites	Promote development of new housing stock on the West Bank	Amend the zoning map to add medium and high-density residential districts on the West Bank	Planning and Zoning Dept.
Development of low-risk sites	Transportation on the West Bank	Expand connectivity between Hwy. 3127 and Hwy. 18	Capital Projects Dept + State DOTD
Development of low-risk sites	Provide Transportation Infrastructure to the West Bank	Expand bus services within areas on the West Bank	Capital Projects Depart + State DOTD
Development of low-risk sites	Encourage in-fill development in Reserve and Edgard	Conduct land use studies to consider if zoning districts in Reserve and Edgard could reduce lot width, depth, or area requirements	Planning and Zoning Dept.
Development of low-risk sites	Encourage multi-family residential development	Conduct a zoning study to consider allowing 2-family through 6-family multifamily sites or larger unit sites to be constructed "by-right" in existing commercial zoning districts.	Planning and Zoning Dept.
Development of low-risk sites	Conduct West Bank zoning and infrastructure assessment	Conduct a zoning study and infrastructure assessment of the West Bank industrial sites and undeveloped non-residential sites	Planning and Zoning Dept., Utilities Dept., Public Works Dept., and Economic Development Dept.
Development of low-risk sites	Increase commercial amenities on the West Bank	Conduct a market study to support targeting commercial sites to Highway 3127	Economic Development and Planning & Zoning Depts.
Drainage system improvements	Improve ditch and channel conveyance	Attain funding for a ditch and channel maintenance program	Public Works and USDA NRCS
Drainage system improvements	Require development to fund infrastructure improvements	Adopt an impact fee ordinance	Public Works and Planning and Zoning Depts.
Drainage system improvements	Raise revenue for drainage system improvement projects	Repeal ITEP tax exemptions	Economic Development and Finance Depts.
Drainage system improvements	Reduce impoundment in the drainage system	Coordinate directly with rail lines to clear culverts	Public Works Dept.
Drainage system improvements	Build retention areas	Build retention areas in Garyville and install pumps to retention areas	Public Works Dept., DOTD, CPRA, LDWF, DEQ, USACE, EPA
Drainage system improvements	Conduct Repetitive Loss Area Analyses and consider which RLAA areas will have remaining flood risk post-WSLP levee construction	Produce additional Repetitive Loss Area Analyses in the vicinity of Marigold St. in Mt. Airy, Homewood Place in Reserve, and Riverland Heights in LaPlace	Planning and Zoning Dept.
	Note: Points will support higher Parish CRS score and improved classification		
Limit development in high-risk areas	Preserve high risk areas from development	Repeal "paper subdivisions" in high-risk areas	Parish Council, leadership, and Planning and Zoning Depts.
Limit development in high-risk areas	Preserve wetlands from development	Expand ECD zoning to areas that are functioning as wetlands	Planning and Zoning Dept.

7. HOUSING LAND-USE DAMAGE AND LOSS REDUCTION PLAN

PROMPTING QUESTIONS

7.1 Where does current zoning exclude or limit housing? Does such exclusion limit housing from places that are low flood risk?

7.2 Are there undeveloped areas that are low flood risk and would be good for housing development? Do these undeveloped areas have natural environments that should be conserved either for storm water management of natural habitat preservation?

7.3 For newer, partially developed districts, how does current density relate to the degree of build-out? How much housing would be added with complete build-out following the current typical lot size and housing type? How much housing could be added with a change in lot size or housing type?

7.4 For older districts that have lost housing, how does current density relate to vacant lots? How much housing would be added with infill redevelopment following the current typical lot size and housing type? How much housing could be added with infill redevelopment of a change in lot size or housing type?

7.5 For established single-family housing districts, are accessory dwelling units (ADU) allowed? If so how many lots have more than one dwelling unit. How many more ADUs could be added to increase density?

7.6 If the density of districts that are built out is low due to large lots, where can new, multi-unit housing be introduced within or adjacent to the district, perhaps in mixed-use, commercial corridors?

7.7 In areas zoned with both commercial and housing, what is the mix of uses? How much more housing can be added in commercial zones?

7.8 How much housing is currently in downtown? What is the make-up of down-town housing? How does the amount of downtown housing compare to the market demand?

7.9 What is the extent of waterfront districts? What is the makeup of housing in waterfront districts? Can more be added?

7.10 How will existing communities be impacted by the plan? Is there an indirect outcome of gentrification that may occur as a result of the plan? What is the market value of target areas in the plan?

8. Housing Construction Damage and Loss Reduction Plan

8.1 Purpose

The purpose of the Housing Construction Damage and Loss Reduction Plan work is to create a plan to reduce damage and loss with changes to building construction practices. The Plan will both inform and aim to improve the jurisdiction's building standards and the enforcement of building standards as well as provide direction and incentives for more resilient housing construction, including FORTIFIED Construction.

8.2 Product

The product is a prioritized plan to increase the resilience of renovated and new housing with recommended actions, identified responsibilities and next steps.

8.3 Process

The Housing Construction Damage and Loss Reduction Plan will be informed by the housing assessment to consider the vulnerability and opportunities that are specific to different parts of the municipality based on the type, size and age of the structures.

Figure 7.1 Willacy County, Texas (Demonstrating how different building codes fair during a storm)

Opportunities to increase resilience will be considered for both the renovation of existing structures and the construction of new structures. For both cases, strategies for decreasing damage and loss are well understood. For wind hazards FORTIFIED Construction is a well-established standard. For flood hazards, meeting and exceeding FEMA base-flood elevation requirement in regard to the height of the floor level and using flood resistant building materials are a recognized standard.

The housing structure component will focus on actions to increase the resilience of housing structures by recommending outreach and education activities to inform

EXISTING HOUSING ASSESSMENT

HOUSING LAND-USE DAMAGE AND LOSS REDUCTION PLAN

HOUSING CONSTRUCTION DAMAGE AND LOSS REDUCTION PLAN

FEDERAL AGENCIES THAT RECOGNIZE FORTIFIED

- US Department of Housing and Urban Development - HUD
- US Department of Homeland Security - FEMA: FORTIFIED is directly referenced in ***FEMA P-804 Wind Retrofit Guide for Residential Buildings***
- US Small Business Administration - SBA
- US Department of Agriculture - USDA
- Fannie Mae
- Freddie Mac
- Federal Home Loan Bank

developers, architects and people in the construction industry, by incentives and grant programs to assist property owners to renovate or build to a higher standard, as well as recommendations to improve the municipality's building code system to include or require more resilient building standards.

The analysis for the structural component of the plan to reduce loss and damage to housing has two general considerations: the vulnerability of the jurisdiction's existing housing structures, and the effectiveness of the current building code standards and their administration for new and renovated structures. The Existing Housing Assessment provides information regarding the vulnerability of existing housing structures for both flood risk and wind risk. Helping the planning team understand the effectiveness of the current building code administration will be accomplished from learning from the jurisdiction's building code and inspection staff.

8.4 Pilot Jurisdiction Application: St. John the Baptist's Housing Damage and Loss Reduction Plan Recommendations

RESILIENCE FACTOR	GOAL	POLICY / PLAN / INTERVENTION	RESPONSIBLE ENTITY
Structural mitigation	Elevate homes at risk of flooding	Provide funding for home elevations	Grants Dept.
Structural mitigation	Elevate homes at risk of flooding	Administer home elevation programs with no homeowner match required	Grants Dept.
	Note: 1) Identify CDBG no-match funding available OR combine FEMA HMGP or BRIC application with a non-federal or CDBG source to fund the match, 2) Maintain a running list of sites where property owners have expressed interest in the program		
Structural mitigation	Elevate homes at risk of flooding	Create a revolving fund to provide parish-administered home elevations to RL, SRL, and below BFE sites in the SFHA	Planning and Zoning Dept. and Grants Dept.
	Note: 1) Pilot use of funds for the Parish to State and Federal partners before an active disaster, 2) Draft program policy highlights and identify program administrative duties, and coordinate such offices with State or Federal partners.		
Building practices	Implement additional low impact development standards	Adopt a fill limitation	Planning and Zoning Dept. and Council
	Note: Points will support higher Parish CRS score and improved Classification		
Building practices	Replace aging mobile homes with resilient housing	Implement a program to replace aging mobile homes with new FORTIFIED construction homes	Grants Dept. and State OCD
Building practices	Permit new housing units via ADUs	Amend ordinances to enable the construction of accessory dwelling units in appropriate residential districts	Planning and Zoning Dept.
Building practices	Promote public education on wind standards	Hold a training and education session featuring SCPDC to educate elected officials about wind standards and enforcement of the building code	Planning and Zoning Dept.
Building practices	FORTIFIED Construction Training	Coordinate with the State of Louisiana or Regional entities to host workforce development programs that result in more licensed contractors who are trained in FORTIFIED construction	Economic Development Dept. and Planning and Zoning Dept., and Home Builders Association
Building practices	Train contractors in pier and piling foundation methods	Coordinate with the State of Louisiana or Regional entities to host workforce development programs that result in more licensed contractors specialized in pier and piling home foundation methods	Economic Development Dept. and Planning and Zoning Dept.
Building practices	Train and license more contractors in home elevation	Coordinate with the State of Louisiana or Regional entities to host workforce development programs that result in more licensed contractors with specialized licensing in home elevation	Economic Development Dept. and Planning and Zoning Dept.

8. HOUSING CONSTRUCTION DAMAGE AND LOSS REDUCTION PLAN

PROMPTING QUESTIONS

8.1 EXISTING HOUSING

1.1 What percentage of your houses are in the 100-year flood zone? Of those in the flood zone, what percentage do not meet the FEMA base flood elevation requirements?

1.2 What is the age of your existing housing compared to the years for changes in the jurisdiction's building code?

1.3 What vulnerabilities were revealed in the most recent storm event?

1.4 Are there neighborhoods that suffer from repeated flood from rain events?

1.5 What common housing issues are the concern of the jurisdiction's flood plain manager that could have an impact of the Community Rating System score?

1.6 Are there neighborhoods in your jurisdiction that have low property value and are showing the effects of disinvestment?

8.2 BUILDING CODE CONCERNS

2.1 Are your building safety and hazard risk reduction standards and codes supported by law and enforced?

2.2 How well or often are the building safety codes updated or adopted?

2.3 What building code is currently used by the jurisdiction?

2.4 Would an updated building code result in stronger and more protected structures?

2.5 Do local builders understand the high-wind design requirements of the ASCE-7 referenced in the building code?

2.6 Do your code officials and building inspectors understand the high-wind design requirements of the ASCE-7 referenced in the building code?

2.7 Do your building inspectors know what to look for and enforce for continuous load path framing, anchors and straps?

2.8 Do your building inspectors know what to look for and enforce for roof and wall sheathing layout, nailing, and blocking?

2.9 Does your jurisdiction have a certified flood plain manager?

2.10 Is your jurisdictional leadership familiar with FORTIFIED construction?

2.11 Do you have a roofing permit process? If not, what would it take to establish such a process?

8.3 HOUSING CONSTRUCTION

3.1 Are local or regional builders familiar with FORTIFIED construction? Are local or regional housing developers marketing FORTIFIED Homes or another standard above the building code?

3.2 Do your building inspectors understand the requirements of FORTIFIED construction and the need to coordinate with the FORTIFIED Evaluator?

3.3 Are there local contractors that are experienced at moving houses or raising houses with rebuilt foundations to meet the FEMA base flood elevation requirements?

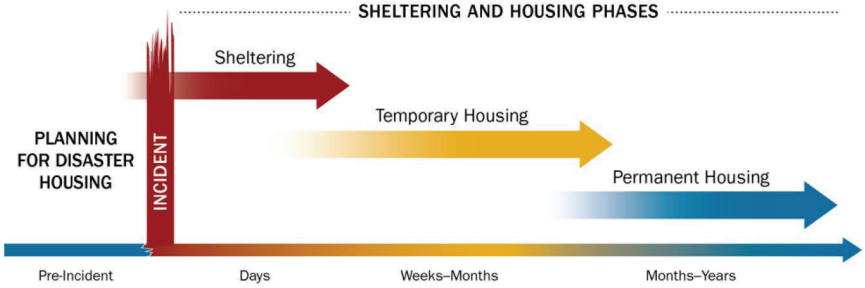
3.4 Do insurance companies that cover the jurisdiction understand FORTIFIED construction and do they offer reduced premiums for FORTIFIED certified houses?

3.5 Do community leaders and policy makers within the jurisdiction understand FORTIFIED construction and what are their questions or concerns as to how it may affect citizens?

3.6 Do your citizens understand FORTIFIED construction and what benefits stem from the program, coupled with the costs they may incur on the front end of construction, and savings on insurance after construction, over time?

9. Disaster Recovery Housing Plan

FEMA's Sheltering and Housing Phases



SEE ALSO

FEMA Planning Considerations: Disaster Housing Guide: a guide for housing resiliency, community education, and other government funding and assistance options.

9.1 Purpose

The purpose of the Disaster Recovery Housing Plan is to have a plan prepared to direct the housing related work of the municipality, county or parish in the case of a disaster. This part of the Resilience Housing Plan might take different forms depending upon the jurisdiction's existing Emergency Response Plan. While there are likely some housing considerations in the jurisdiction's Emergency Response Plan, such considerations are likely limited to storm shelters and temporary housing, and probably do not address the opportunities for improving the resilience of housing that will be repaired, re-roofed or rebuilt.

The plan should include the four stages of disaster housing needs, with the overall goal of achieving resilience while addressing each stage of housing needs and align with FEMA Sheltering and Housing Phases (as shown in the diagram above):

1. Storm shelters
2. Temporary housing
3. Repair to existing housing
4. Replacement housing

9.2 Product

The product is a Disaster Recovery Housing Plan, following FEMA recommendations and utilizing the plan that a jurisdiction might already have developed. The product might improve or replace the housing component of a jurisdiction's Emergency Response Plan.

9.3 Process

Before moving ahead with the work to create a Disaster Recovery Housing Plan as part of the Resilient Housing Plan work, existing disaster recovery plans should be identified and reviewed to determine gaps that should be addressed in this work. The Emergency Response Plan for the jurisdiction probably has some considerations for disaster housing, most likely related to storm shelters. The work for the Disaster Recovery Housing Plan will vary depending upon what is already in place. This Guide will provide recommendations for a completed Disaster Recovery Housing Plan. The planning team should compare what is already in place with the recommendations given here and modify the workplan accordingly.

Even if a jurisdiction has followed recent FEMA guidelines for creating a Disaster Recovery Housing Plan, the needs and opportunities for resilience are almost certainly

SEE ALSO

The ***Community Resilience Planning Guide for Buildings and Infrastructure Systems*** (U.S. Department of Commerce, National Institute of Standards and Technology. 2015.) "offers an approach to help communities integrate all of their community plans through community resilience planning and goals. The NIST Guide is based on the experience and expertise of community officials who have led planning for and responses to hazard events, as well as technical experts actively engaged in improving resilience across the country."

not addressed in the existing plan. As discussed above, the omission of resilience in the repair of existing housing and in the rebuilding of replacement housing is at the heart of the need for a Resilient Housing Plan. Therefore, it is important to evaluate the existing Disaster Recovery Plan not only to identify gaps in the housing needs in general, but to add in plans to improve the resilience of the housing being repaired or built new.

The core planning team should be expanded to focus on disaster recovery in order to create a Disaster Recovery Housing Plan. In addition to the core team, people representing the following organizations should be included:

- Emergency Management officials
- Local and regional ESF#6 (Emergency Support Function) representatives from FEMA, HUD, SBA, USDA, and VA.
- American Red Cross and other Non-governmental disaster response organizations
- Public Housing Authorities
- Rental property representatives that know the make-up of rental property

The expanded disaster planning team should be engaged: first, at the beginning of the planning work to receive and respond to the Project Team report of the existing disaster housing solutions and to work together to determine goals and objectives; second, to receive and respond to the Project Team's suggested course of action for the goals and objectives; and finally, to receive and respond to the draft plan as outlined in the Housing Plan Development Step below.

The Existing Housing Assessment completed for the overall Resilient Housing Plan will provide most of the information needed to understand the disaster housing situation. The Existing Housing Assessment will determine the distribution and number of households in different hazard zones as well as the socioeconomic conditions of the community in general and such conditions of households in high-risk neighborhoods in particular.

INFORMATION THAT WILL NEED TO BE ADDED TO THE EXISTING HOUSING ASSESSMENT

- Location, capacity and limitations of available shelters
- Lessons learned from past disasters regarding shelter needs and issues
- Possible temporary housing resources
- Possible institutional housing such as dormitory rooms that would be available at local or regional colleges and universities.
- Possible short-term commercial housing such as current hotel capacity and added future hotels being developed
- Possible apartment capacity and added apartments being developed
- Projected capacity of local organizations able to help with repair and replacement housing
- Projected capacity of the local private builders to work with housing repair and replacement

Based on the Existing Housing Assessment a 'disaster scenario' should be agreed upon that maximizes the requirements for sheltering and housing. The numbers of people expected to need shelter and the number of houses needed to be repaired or replaced will be a target for making plans.

Using information from the disaster scenario, the expanded planning team considers how displaced survivors' needs will evolve and identifies projected housing requirements. These requirements become the priorities and basis for establishing jurisdiction goals and objectives. The planning team should reference the National Disaster Housing Goals listed below when establishing their housing goals and objectives. However, executives and elected officials of each jurisdiction may have additional goals or objectives based on the unique characteristics and vision of the community.

NATIONAL DISASTER HOUSING GOALS	
1	Support individuals and communities in returning to self-sufficiency as quickly as possible.
2	Define and fulfill fundamental disaster housing responsibilities and roles.
3	Increase our collective understanding and ability to meet the needs of disaster survivors and affected communities.
4	Build capabilities to provide a broad range of flexible housing options, including sheltering, temporary housing and permanent housing.
5	Better integrate disaster housing assistance with related community support services and long-term recovery efforts.
6	Improve disaster housing planning to better recover from disasters, including catastrophic events.

In order to advance the National Disaster Housing Goals to lead to more resilient housing the planning team should add goals to make the repaired and replacement housing more resilient. The added resilient goals should be supported by specific objectives. Given the complexity of disaster housing authorities, the planning team should establish a projected timeline for housing actions, ranging from sheltering through permanent housing. Using this timeline, planners can identify decision points and response actions required to achieve the objective. The timeline also helps determine how much time is available or needed to complete a sequence of actions. This is particularly important to help survivors move out of shelters and to return to some level of normalcy as quickly as possible. When developing action plans and recommendations it is important to determine which organization(s) have responsibility for which actions and whether those actions depend on any decisions, legal authorities or the completion of other tasks. In addition, some housing assistance programs have timelines established in law, regulations or policies that can include deadlines for applications, completion of work, developing administrative plans, program duration or timelines for submitting extension requests or appeals.

9.4 Pilot Jurisdiction Application: Willacy County's Disaster Recovery Community Resource Inventory

Name of Org:	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
Willacy County Housing Authority	X																				
Come Dream Come Build (CDCB)	X																				
Building Community Workshop (bcWorkshop)	X																				
Advocacies, Non-profits, Local Business																					
Food Bank of Rio Grande Valley, Inc.	X											X									
Loaves & Fishes	X										X	X									
Communities Against Substance Abuse (CASA)	X														X						
Willacy County Coastal Literacy Program and Resource Center	X													X	X		X	X			
Texas A&M AgriLife Extension program	X		X (DAR)	X										X	X				X	X	
Area Agency on Aging	X															X					X
It's Time Texas	X											X									X
American Legion			X												X	X				X	
Raymondville Lions Club			X												X	X				X	
Willacy County Veterans Office L. Nejera VCSO	X			X												X					
Rotary Club of Willacy County	X	X	X	X											X		X		X		
HEB Grocery Store	X	X										X		X					X		X
Economic Development																					
Port Mansfield Chamber of Commerce	X									X							X		X	X	
Raymondville Chamber of Commerce	X									X							X		X	X	
City of Raymondville Economic Development Corp	X													X					X	X	
Raymondville Workforce Solutions	X													X	X					X	
Rio Grande Valley LEAD	X													X	X						
Raymondville Facebook Sales	X																			X	
Regional Small Cities	X													X	X		X		X		
Lower Rio Grande Valley Development Council	X			X										X			X	X	X	X	X
Disaster Response/Recovery																					
Habitat for Humanity	X					X	X	X	X				X								
American Red Cross of South Texas	X		X	X		X						X									X
Rio Grande Valley Empowerment Zone	X														X						
Texas A&M Engineering Extension Service (TEEX)	X		X	X										X	X						X
Team Rubicon	X		X	X		X	X								X						
Faith-based																					
First United Methodist			X			X															

Services Offered by Community Organizations, Willacy County

A	Community Outreach and Engagement
B	Disaster Relief ($$)
C	Disaster Response
D	Disaster Education
E	Shelter?
F	Repair/Rehabatation
G	New Build/Rebuild

H	Home Buying Guidance
I	Home Financing
J	Business Financing
K	Rent/Utility Support
L	Food Assistance
M	Grant/low interest loan
N	Job Training/Career Development

O	Youth Education
P	Elder Care/Support Programs
Q	Tourism
R	Data Access
S	Economic Development
T	Marketing/Recruiting
U	Public Health

9. DISASTER RECOVERY HOUSING PLAN

PROMPTING QUESTIONS

9.1 Who are the lead agencies for disaster housing solutions?

9.2 Does such exclusion limit housing from places that are low flood risk?

9.3 What entities have regulatory or legislative responsibilities for disaster housing within the jurisdiction?

9.4 What codes and ordinances (e.g., placement of temporary housing units, distance from roadways, multiple temporary housing units on property, zoning, local flood damage prevention ordinances) may need to be waived or suspended to support temporary housing solutions?

9.5 What is the homeless population in the jurisdiction? Are there plans for sheltering or housing them following a disaster?

9.6 What portion of the community receives pre-disaster housing assistance?

9.7 Does the jurisdiction have temporary housing resources (e.g., temporary housing units, trailers)?

9.8 Are agreements in place for temporary housing solutions (e.g., with neighboring jurisdictions, colleges, hotels)?

9.9 Can building codes or zoning ordinances be waived to create additional temporary housing solutions? If so, what is the process for that?

9.10 Does the jurisdiction have an inventory of potential areas that could support group sites?

9.11 Does the jurisdiction have an inventory of available commercial parks and pads for lease for manufactured housing units and recreational vehicles?

9.12 Has the planning team considered the housing needs of recovery workers and volunteers?

9.13 Can the jurisdiction streamline, simplify and expedite building permit applications and inspections?

9.14 What accessible communications channels have been identified to relay disaster housing information?

9.15 Has disaster-housing-related messaging already been developed within the jurisdiction?

9.16 Who is responsible for releasing information to the public within the jurisdiction?

9.17 What community organizations can help amplify housing-related messaging?

9.18 Does the jurisdiction have a website or social media presence to convey disaster-related housing information? If not, will one be established? Who will establish, maintain and update it?

10. Stakeholder and Community Education

10.1 Purpose

The purpose of the Stakeholder and Community Education work is to plan short-term outreach activities to educate the community and stakeholders about the Resilient Housing Plan, along with long-term, ongoing programs to promote resilient land use and construction practices.

10.2 Products

The outcome of the Stakeholder and Community Education work will be three-fold: First, to engage stakeholders during the Resilient Housing Plan work in order to educate and receive input from those who will be impacted by the plan; second, to determine an effective method to inform the general community about the Resilient Housing Plan once completed; and third, to plan and implement long-term programs to promote resilient land use and resilient construction practices including FORTIFIED Construction.

10.3 Process

10.3.1 Stakeholder participation.

Creating opportunities for stakeholders to participate in the planning process is important to engage the people who will be impacted by the Resilient Housing Plan. The engagement should be thought of as being important to educate the stakeholders concerning the need for changes in the planning and construction of housing and to see the benefits of resilient land use and improved building standards. Such education will, for the most part, result in support for the plan. However, some people are opposed to regulations and zoning in general because of political, or philosophical reasons. Jurisdictions are experienced with anticipating such opposition and know how to run meetings accordingly.

Community meeting in St. John the Baptist Parish

In addition to education, the stakeholders should be asked to provide input on the plan. Such input can come in the form of documentation from questions and comments from meetings; or the input can be received from questionnaires. In any event, an effective method should be used to invite, receive and document input from the stakeholders. A project timeline could include stakeholder engagement meetings at three times. The first engagement activity could be in the initial phase to introduce the purpose and use of a Resilient Housing Plan and to let the stakeholders know about the goals and expected outcomes of the project. The second stakeholder engagement activity could be at the project midpoint, after the existing housing assessment and idealized housing land-use plan is complete and once the jurisdiction has established its specific goals for the plan, but before the work on the Damage and Loss Reduction Plan starts. The stakeholders can be helpful at this key decision point in the process. The third stakeholder engagement

COMMUNITY SURVEY

St. John the Baptist Parish Resilient Housing Plan Team created and administered a digital and paper survey parish-wide and promoted the survey at numerous events to gather residents' input on housing and land-use issues. The events included the use of maps to show flood risk and housing locations, as well as specific questions and examples of housing types to gather insight on cost and challenges of housing. The survey, as part of the community engagement, and the survey results, as part of the planning report, were helpful in emphasizing the public awareness and concerns relative to resilient housing.

SCENARIO PLANNING WORKSHOP

The Willacy County Planning Team collaborated with Texas A&M AgriLife Extension staff from the Texas Community Watershed Partners to put on a CHARM (Community Health and Resource Management) workshop to understand land uses, and work with decision makers to identify ideal locations for new development. The CHARM workshop enabled stakeholders to visualize climate-related land-use factors with a table-top scenario planning activity.

activity could be after the Damage and Loss reduction Plan is completed when the planning document is in draft form. The Plan recommendations can be presented to the stakeholders for their feedback with an opportunity to suggests changes.

10.3.2 Community Information.

The methods that jurisdictions use to inform the general public vary. Whether with a website, mailed newsletter, or regular public meetings, the jurisdiction should determine effective ways to inform the community about the Resilient Housing Plan. Community information requirements might stem from a jurisdiction's established procedure for adopting a Plan. The Guide leaves the particular methods of community information up to the jurisdiction.

10.3.3 Long-term Education and Promotion.

Much of the change that will result in increased resilience will depend upon housing providers and developers adopting higher building standards. As discussed above jurisdictions can do much to incorporate FORTIFIED Construction into their building code. However, the choice to adopt standards above those of the building code is left to the jurisdiction. Therefore, an essential component of the Resilient Housing Plan is long-term education and promotion of resilient housing with programs such as FORTIFIED Construction.

Addressing flood resilience for most jurisdictions on the Gulf Coast is familiar work and is likely tied into the Flood Plain Management work relative to the Community Rating System.

COASTAL RESILIENCE INDEX WORKSHOP

The Coastal Resilience Index (CRI) is a self-assessment tool developed by the Mississippi-Alabama Sea Grant Consortium and NOAA's Coastal Storms Program. To complete the index, community leaders get together and use the tool to guide discussion about their community's resilience to coastal hazards. St. John the Baptist Parish participated in a CRI Self-Assessment exercise as part of the Resilient Housing Plan activities to consider housing within the larger community resilience context of infrastructure and systems such as transportation, business, and social systems.

SMART HOME AMERICA OFFERS TRAINING +CONTINUING EDUCATION COURSES

Learn about disaster resilience, the FORTIFIED construction programs, property mitigation, building codes, insurance, and how they benefit homeowners, businesses, and the community.
Smart Home America is a Continuing Education provider for Insurance Producers, Contractors, Roofers, and Real Estate Agents. In-person, online, and virtual course options are available. CE course options for ICC, AIA, and APA are offered.

smarthomeamerica.org/education

10.4 Pilot Jurisdiction Application: St. John the Baptist's Community and Stakeholder Education Plan Recommendations

EDUCATION AREA	ACTION	RESPONSIBLE ENTITY	TIMELINE
Public Input	Coordinate a meeting with Parish staff to determine relevant questions for the Resilient Housing Plan public outreach survey, including review of the Resilient Housing Planning Guide, discussion of current Parish data and capacity, and the Plan vision.	Planning and Zoning Department	Completed – April 2023
Public Input	Draft a survey to collect public input into housing resilience strategies including issues surrounding flood insurance, housing affordability, types of housing, homelessness, and flood risk.	Planning and Zoning Department	Completed – April 2023
Community-Led Resilient Housing Planning	Issue and publicize digital survey via press release; as part of in-person promotion at Fourth-of-July events on the East and West Banks; publication of the survey in paper form; distribution and placement at civic sites around the Parish, including public libraries; and publication of survey at storm season preparation event.	Planning and Zoning Department	Completed – May through September 2023
Flood Risk Education	Attend CRS Outreach Event at Storm Preparation Event including visual aids of flood maps overlaid on Parish imagery.	Planning and Zoning Department	Completed – June 2023
Resilient Housing Education	Post draft Resilient Housing Plan online and request input through a digital public comment period.	Planning and Zoning Department	November 2023
Stakeholder Implementation	Form a resilient housing supply and demand working group composed of affordable housing experts, community leaders, developers, and Planning and Zoning staff.	Planning and Zoning Department	February 2024
Community Education	Produce an annual resilient housing update report for public release coinciding with a Parish festival or widely-attended event with a booth.	Planning and Zoning Department	Annual
Stakeholder Implementation	Form a poverty working group composed of representatives of the Public Housing Authority, Community Services Department, elected officials, food banks, local nonprofits, and others.	Parish President	April 2024
Language Equity	Consult HUD Language Access Plan tools to research which languages are most frequently spoken in St. John and provide translation services for all communications related to resilient housing or flood risk.	Communications Department	January 2024
Community Education	Identify existing champions for resilience or housing and enlist them to support messaging and public awareness about the Resilient Housing Plan.	Planning and Zoning Department	November 2023

Selected examples of strategies proposed in St. John the Baptist's Community and Stakeholder Education Plan.

10. STAKEHOLDER AND COMMUNITY EDUCATION

PROMPTING QUESTIONS

10.1 Who are the community advocate organizations in the jurisdiction?

10.2 What other community advocate organizations in the jurisdiction can be identified for help?

10.3 What existing policies has your jurisdiction created for community engagement?

10.4 What existing policies has your jurisdiction created for community education?

10.5 What are potential identifiable constraints the jurisdiction may find when working with the community advocate organizations?

10.6 Will the community advocate organizations all see the plan with the same perspective?

10.7 What is your jurisdiction's plan to have these various organizations come to agreement on the general vision?

10.8 Should your jurisdiction have more than the three (3) suggested meetings with the community advocate organizations?

10.9 How does your jurisdiction plan to inform the community and community advocate groups of the project and their participation?

10.10 How will your jurisdiction continue to engage and educate the community and community advocate groups on Housing Resiliency once the project is completed?

10.11 What is the jurisdiction's vision for future assessments and plans regarding resilient housing?

11. Strategic Funding Plan

11.1 Purpose

Jurisdictions should be prepared to pursue and use funding by having plans and needed information ready. The primary aim is for federally funding programs both for mitigation and recovery. However, the plan should also be useful for other housing related funding opportunities.

11.2 Product

The Strategic Funding Plan will initiate and identify sources of funding that have been used for past jurisdiction projects, along with identifying new funding that can help solidify the funding moving the project(s) forward. These funding opportunities will be compiled and found within each plan, to not only assist but recognize the funding partners within each municpality, further, adding aid to the application requirements. The jurisdictions will use this information to better help citizens, developers, shareholders, and municipality officials gather and disperse information along with a funding template for any additional funding that may be relevant to the project.

11.3 Process

Throughout the planning process identify possible funding sources that have already been established in your jurisdiction and other funding resources that may be new and available to your jurisdiction for the recommended actions. During the Strategic Funding Plan process, the person or entity in charge of compiling and maintaining the list available fuinding will keep the list current for citizens, municipality officals and stakeholders to view; the viewer will be guided to an appendix for the full list of funded programs.

FORTIFIED FUNDING OPPORTUNITIES

FORTIFIED is being funded directly and indirectly in multiple ways, including disaster recovery funding, state and regional grants, and non-profit organizations that promote and use resilient construction.

- **Strengthen Alabama Homes grant** strengthenalabamahomes.com/
- **Louisiana Fortify Homes Program grant** ldi.la.gov/fortifyhomes
- **South Carolina Safe Home grant** doi.sc.gov/605/SC-Safe-Home
- **Strengthen Your Roof, North Carolina grant** strengthenyourroof.com/Home/Policyholders
- **Federal Home Loan Bank - Dallas Fortified Fund** fhlb.com/community-programs/fortifiedfund
- **CDBG-DR programs** Lousiana Housing Corporation and the Office of Community Development, Iowa Economic Development [Derechio recovery], Texas GLO, Alabama HRAP program
- **Habitat for Humanity - Habitat Strong program** habitat.org/impact/our-work/home-construction/habitat-strong

11.4 Pilot Jurisdiction Application: St. John the Baptist's Strategic Funding Plan

PROJECT TO FUND	GRANT PROGRAM	GOALS / CONDITIONS OF PROGRAM	APPLICATION TIMELINE
Reconstruction of housing that is in disrepair, on a slab below BFE, or structurally unsound	CDBG-MIT / RESTORE LA *Note: Prepare application documents for Local / Regional program, prepare proposal memo for State Projects / Programs*	• Associated with declared disasters • Goal is mitigation of future risk • Benefits to low- to moderate income families	Ongoing
Reconstruction of housing that is in disrepair, on a slab below BFE, or structurally unsound	USDA Rural Housing Site Loans	• Benefits to low- to moderate income families • Loans must be repaid	Annually - September
Elevation of flood prone homes	FEMA FMA	Advantage to have a BCA	Annually - January
Elevation of flood prone homes	FEMA HMGP	BCA required	Following a declared disaster
Reconstruction of flood prone homes	CDBG-DR program	Tied to declared disaster	Following a declared disaster
Upgrades to utilities or air conditioning systems in aging housing	CDBG or FEMA competitive grants	Should benefit LMI residents or address Justice 40 goals	Recurring competitive allocations
Assistance to residents to pay flood insurance premiums	CDBG or FEMA competitive grants	Should benefit LMI residents or address Justice 40 goals	Recurring competitive allocations
Rehabilitate or replace PHA units	CDBG HOME program	Must benefit LMI residents	Allocated yearly
Construct additional shelter capacity for those experiencing homelessness	CDBG-ESG program	Must be in Consolidated Plan	Allocated yearly
Fund transportation improvements to the West Bank	Transportation Improvement Program	Justification and/or feasibility required	Yearly allocation
Pilot Universal Basic Income program	American Rescue Plan	Requires significant research	Ongoing

Selected examples of sources proposed in St. John the Baptist's Strategic Funding Plan.

11. STRATEGIC FUNDING PLAN

PROMPTING QUESTIONS

11.1 Who in the jurisdiction will oversee the grant and strategic funding processes?

11.2 What federal grants have been successfully used in the past?

11.3 What state grants have been successfully used in the past?

11.4 What foundation or corporate grants have been successfully used in the past?

11.5 What other federal grants are available to the jurisdiction?

11.6 What other state grants are available to the jurisdiction?

11.7 What local advocacy groups can be identified as funding sources for these projects?

11.8 Is your jurisdiction familiar with the following funding mechanisms?

- Community Development Block Grant Disaster Recovery Program (CDBG-DR)
- Building Resilient Infrastructure and Communities (BRIC)
- FEMA Pre-Disaster Mitigation Grant Program (PDM)
- U.S. Department of Agriculture Rural Development (USDA-RD)
- FEMA Public Assistance Grant Program

11.9 What federal or state grants have been out of reach for your jurisdiction in the past? What are the reasons your jurisdiction was not able to apply for or qualify for the grants you did not receive?

11.10 Has a cost-benefit analysis been conducted on current disaster housing strategies?

11.11 Has your jurisdiction been successful coordinating your grant activities with other jurisdictions?

11.12 What other jurisdictions can be identified to coordinate your grant actvities with?

11.5 Federal Resilience Funding Chart from the *National Conference of State Legislatures*

Program Name	Agency	Type	Cost Sharing Agreement	Eligibility*	Description
Assistance for Governments and Private Non-Profits After a Disaster	Federal Emergency Management Agency (FEMA)	Supplemental grant **All hazards*	Yes, federal – non-federal cost share	State governments, territory governments, local governments, tribal governments	This program helps eligible entities address buildings, public work systems, equipment, or other natural features in disaster areas by funding emergency or permanent construction on these structures.
Assistance to Firefighters Grant Programs (AFG)	FEMA	Grant **Wildfire*	Yes, federal – non-federal cost share	Local governments, federally recognized tribal governments	This program provides funds directly to eligible applicants to enhance their response capabilities to, and more effectively protect the health and safety of the public and emergency response personnel from fire and other related hazards. Eligible activities include Wildland Firefighter and Wildland Fire Officer training courses, basic Wildland firefighting equipment, Wildland Personal Protective Equipment (PPE), and Wildland Fire Apparatus.
Building Resilient Infrastructure and Communities (BRIC)	FEMA	Competitive grant **All hazards*	Yes, federal – non-federal cost share	State governments, local governments	This program helps eligible entities that have had a major disaster declaration within the past seven years mitigate extreme weather and natural disaster risks. Specifically, the program incentivizes projects that mitigate risks to public infrastructure and other community lifelines.
Clean Water State Revolving Fund (CWSRF)	Environmental Protection Agency (EPA)	Cooperative agreement / low-cost loan **Flood*	None	State governments, territory governments, local governments, tribal governments	This program helps eligible entities address water quality by providing low-cost financing for infrastructure projects. Previous projects have included those for mitigating stormwater runoff, addressing nonpoint source pollution control, and green infrastructure, among others.
Climate Resilience Regional Challenge	National Oceanic and Atmospheric Administration (NOAA)	Competitive grant / cooperative agreement grant **Flood* **Wind*	None	Coastal state governments, coastal territory governments, coastal local governments, coastal tribal governments	This program helps eligible entities address coastal resilience by funding collaborative projects. These projects can address risk reduction, regional collaboration, equity and help build the entity's capacity to adapt.
Coastal and Estuarine Land Conservation Program	NOAA	Matching funds **Flood*	Yes, federal – non-federal cost share	State governments, local governments	This program helps eligible entities buy threatened lands or secure a conservation easement for coastal and estuarine lands by providing funding.
Coastal Zone Enhancement Program (NCZE)	NOAA	Formula grant **Flood* **Wind*	Unknown	State governments, territory governments	This program provides funding to eligible entities to help them improve their coastal management plans and help ensure coastal communities and resources are protected from and are able to recover after extreme weather.
Community Development Block Grants (CDBG)	United States Department of Housing and Urban Development (HUD)	Grant **All hazards*	Unknown	Local governments **States act as a pass through*	This program provides funding to eligible entities to assist with the improvement of the lives of residents, leverage funds to build community assets, and effectively implement community programs. Projects such as the purchase, construction, or repair of water and sewage systems are eligible.

Program Name	Agency	Type	Cost Sharing Agreement	Eligibility*	Description
Community Development Block Grants – Disaster Recovery (CDBG-DR)	HUD	Supplemental grant **All hazards*	None	State governments, local governments *Administrative/grant distribution role	This program helps eligible entities achieve long-term recovery by helping address unmet needs in communities. Funding is provided to carry out eligible activities that help design and implement recovery programs, address and recover from impacts of disasters, and mitigate future impacts of disasters. Specifically, this program targets infrastructure restoration and disaster recovery after disaster declarations.
Community Development Block Grants-Mitigation (CDBG-MIT)	HUD	Supplemental grant **All hazards*	None	State governments, territory governments	This program provides funding to eligible entities in areas that have been recently impacted by natural disasters and assists these communities with the implementation of activities that help reduce future losses and mitigate risk from natural disasters. Funding can be used for projects that increase community resilience, especially those that address long-term risk to life and property.
Community Wildfire Defense Grant Program	U.S. Department of Agriculture (USDA)	Grant **Wildfire*	Yes, federal – non-federal cost share (waiver requests available)	State governments, local governments, tribal governments	This program provides grants to eligible entities at risk from wildfire to assist in the development or revision of community wildfire protection plans and implementation of the plan's projects.
Disaster Recovery Supplemental	Economic Development Administration (EDA)	Cooperative agreement grant **All hazards*	Yes, federal – non-federal cost share	State governments, local governments, tribal governments **Must have a federal disaster declaration*	This program provides funding to eligible entities to assist with the implementation of projects, including construction, that help communities implement economic recovery strategies over the long term.
Drought Response Program Grants	Bureau of Reclamation (USBR)	Competitive grant / cooperative agreement grant **Drought*	Yes, federal – non-federal cost share	Western state governments, local governments, tribal governments, special district governments	This program provides funding to help eligible entities build resilience to drought by funding activities, such as the development of drought contingency plans, that improve the resiliency of communities and water facilities.
Economic Adjustment Assistance (EAA)	EDA	Competitive grant **All hazards*	Yes, federal – non-federal cost share	State governments, local governments, federally recognized tribal governments	This program provides funding to assist eligible entities in regions undergoing significant adverse economic changes, including those caused by natural disasters, by implementing funding to undertake or complete infrastructure projects. Funding can be used to provide technical, planning, public works, or infrastructure assistance. This program recently awarded $500 million in grants under the American Rescue Plan Act of 2021.
National Coastal Resilience Fund (ECRF)	NOAA / National Fish and Wildlife Foundation (NFWF)	Grant **Flood*	Yes, federal – non-federal cost share	State governments, local governments, federally recognized tribal governments	This program allows eligible entities to use funds to restore, increase, and strengthen natural infrastructure, thus making communities more resilient to extreme weather through the utilization of natural infrastructure to better absorb the impacts and flooding caused by extreme weather. These improvements also help improve wildlife habitats.
Emergency Community Water Assistance Grants (ECWAG)	USDA	Grant **All hazards*	None	Local governments, federally recognized tribal governments	This program assists eligible entities, specifically rural communities, to prepare for and recover from natural disasters that may prevent safe drinking water access.

Program Name	Agency	Type	Cost Sharing Agreement	Eligibility*	Description
Emergency Management Performance Grant (EMPG)	FEMA	Grant **All hazards*	Yes, federal – non-federal cost share	State governments, territory governments	This program helps the emergency management agency of eligible entities with the development and implementation of the National Preparedness System. This support, which includes funding and resources, helps entries address emergency preparedness for all hazards and improves resilience by focusing on the prevention, protection, mitigation, response, and recovery mission areas.
Emergency Operations Center Grant Program (EOC)	FEMA	Grant **All hazards*	Yes, federal – non-federal cost share	State governments	This program helps eligible entities address and improve their emergency management and preparedness capabilities by assisting with the establishment of emergency operation centers. These centers help entities identify and address issues to help ensure the government's continued ability to function during disasters.
Emergency Relief Program (ER)	Federal Highway Administration (FHWA)	Matching funds **All hazards*	Yes, federal – non-federal cost share	State governments	This program helps eligible entities repair or rebuild federal aid roads and highways after damage caused by disasters.
Emergency Watershed Protection Program (EWPP)	USDA	Financial assistance **All hazards*	Yes, federal – non-federal cost share	Private and public landowners **Must be sponsored by a state, local, or tribal government*	This program assists eligible entities with natural disaster recovery by addressing impairments to the watershed. Funding can also be used on resilience activities such as the implementation of floodplain easements or property buy-outs in eligible areas.
Fire Management Assistance Grant (FMAG)	FEMA	Grant **Wildfires*	Yes, federal – non-federal cost share	State governments, local governments, tribal governments	This program assists eligible entities with the management and control of fires that if unchecked would constitute a major disaster.
Fire Prevention and Safety (FPandS) Grant Program	FEMA	Grant **Wildfires*	Yes, federal – non-federal cost share	State governments, local governments, tribal governments	This program provides funding directly to eligible entities for fire prevention programs and supports firefighter health and safety research and development. Eligible activities include Wildland Urban Interface (WUI) projects, such as community risk assessments, adoption, or reinstatement of WUI fire codes, and WUI education/awareness projects.
Flood Mitigation Assistance (FMA)	FEMA	Competitive grant **Flood*	Yes, federal – non-federal cost share	State governments, territory governments, local governments	This program is intended to help eligible entities develop and implement projects that address flood and risk mitigation. The funding can be focused on long-term protections for structures insured under the National Flood Insurance Program.
Hazard Mitigation Grant Program (HMGP)	FEMA	Grant **All hazards*	Yes, federal – non-federal cost share	State governments, territory governments, local governments, tribal governments	This program assists eligible entities with the development of hazard mitigation plans and the implementation and construction of risk mitigation projects, which can include infrastructure projects.

Program Name	Agency	Type	Cost Sharing Agreement	Eligibility*	Description
Hazard Mitigation Grant Program Post Fire	FEMA	Non-competitive grant **Wildfire*	None	State governments, territory governments, federally recognized tribal governments **Must have had a fire management assistance grant declaration*	This program assists eligible entities by providing assistance to help mitigate risks caused by wildfires (e.g., flooding, mudflows, and erosion).
Hospital Preparedness Program (HPP)	U.S. Department of Health and Human Services (HHS)	Cooperative agreement **All hazards*	Yes, federal – non-federal cost share	State governments, territory governments	This program helps eligible entities improve their ability to prepare for and response to disasters, especially large-scale disasters. Community resilience is improved by this program's facilitation of healthcare facility partnerships before disasters strike for effective response.
Joint Chiefs' Landscape Restoration Partnership	USDA	Cooperative agreement **Wildfire*	Unknown	State governments, local governments, tribal governments	This program fosters collaboration between the federal government and non-federal eligible entities to invest in conservation and restoration. This program helps reduce wildfire threats to communities, protect water quality and supply, and improve wildlife habitat for at-risk species. It also applies targeted forestry management practices, such as hazardous fuel treatments, fire breaks, reforestation, and other systems to meet unique forestry challenges.
Landscape Scale Restoration Program	USDA	Competitive grant **Wildfire*	Yes, federal – non-federal cost share	State governments, local governments, tribal governments	This program promotes collaborative, science-based restoration of priority forest landscapes and furthers the priorities identified in State Forest Action plans or equivalent restoration strategy.
National Coastal Wetlands Conservation Grants	U.S. Fish and Wildlife Service (USFWS)/ Department of the Interior (DOI)	Competitive grant **Flood*	Yes, federal – non-federal cost share	State governments (coastal and great lake states only)	This program provides funding to eligible entities to assist with the acquisition of coastal or wetland properties and with ecosystem restoration. Specifically, funds are focused on the protection, enhancement, and restoration of coastal wetland ecosystems and other related environments.
National Earthquake Hazards Reduction Program (NEHRP)	FEMA	Non-competitive grant **Seismic*	Yes, federal – non-federal cost share	State governments, territory governments **Must have a high or very high earthquake risk*	This program is intended to help eligible entities mitigate earthquake risks. Eligible activities under this program include seismic mitigation planning assistance, inventory development, building codes and ordinance updates, and critical infrastructure inspections.
Post-Disaster Recovery Grants	EDA	Competitive grant / cooperative agreement **All hazards*	Yes, federal – non-federal cost share	State governments, local governments, tribal governments, special district governments **Must have a federal disaster declaration*	This program assists eligible entities to develop disaster recovery strategies and plans and implement recovery projects, including those that address climate resilient infrastructure.
Pre-Disaster Mitigation Grant Program (PDM)	FEMA	Congressionally directed **All hazards*	Yes, federal – non-federal cost share	State governments, territory governments, federally recognized tribal governments	This program helps eligible entities develop and implement cost-effective measures to reduce disaster risks and improve resilience. This program's goal is to reduce future reliance on federal funding after future disasters.

Program Name	Agency	Type	Cost Sharing Agreement	Eligibility*	Description
Promoting Resilient Operations for Transformative, Efficient, and Cost-saving Transportation Program (PROTECT)	Department of Transportation (DOT)	Competitive grant **All hazards*	Yes, federal – non-federal cost share	State governments, territory governments, local governments, federally recognized tribal governments	This program provides funding to eligible entities to help them mitigate risks posed to surface transportation by disasters and encourage resiliency. Funding can be used to address planning and resilience improvement.
Public Assistance (PA) Program	FEMA	Supplemental grant **All hazards*	Yes, federal – non-federal cost share	State governments, territory governments, local governments, federally recognized tribal governments	This program assists eligible entities post-disaster by funding emergency assistance and infrastructure restoration. This can include implementing cost effective hazard mitigation measures for damaged facilities.
Public Transportation Emergency Relief Program	Federal Transit Administration (FTA)	Matching funds **All hazards*	Yes, federal – non-federal cost share	State governments	This program helps eligible entities repair or rebuild public transportation operations after disasters.
Rail Line Relocation and Improvement Capital Grant Program (RLR)	Federal Railroad Administration (FRA)	Competitive grant **All hazards*	Yes, federal – non-federal cost share	State governments, local governments	This program helps eligible entities mitigate risks posed to rail infrastructure by disasters and help with the lateral or vertical relocations of rail line sections.
Rebuilding American Infrastructure with Sustainability and Equity (RAISE)	DOT	Competitive grant **All hazards*	Yes, federal – non-federal cost share	State governments, local governments, tribal governments	This program provides funding to eligible entities to build and repair critical infrastructure networks, including multi-modal and/or multi-jurisdictional projects.
Regional Catastrophic Preparedness Grant Program (RCPGP)	FEMA	Competitive grant **All hazards*	None	State governments, territory governments, local governments	This program provides funding and resources to eligible entities to assist with the implementation of the National Preparedness System. Specifically, it focuses on the housing, logistics, and supply chain capability gaps and promotes regional solutions, building upon existing efforts, to disasters.
Regional Coastal Resilience Grants	NOAA	Grant **All hazards*	Yes, federal – non-federal cost share	State governments, local governments, tribal governments	This program assists eligible entities with mitigating disaster risk by funding projects that improve resilience strategies or land use planning, or address disaster preparedness, environmental restoration, hazard mitigation, or other planning efforts.
Regional Conservation Partnership Program	USDA	Grant **All hazards*	Yes, federal – non-federal cost share	State governments, local governments, tribal governments	This program provides funding directly to producers and landowners who implement eligible conservation measures or place conservation easements on private lands.
Rehabilitation Of High Hazard Potential Dam Grant Program (HHPD)	FEMA	Grant **Flood*	Yes, federal – non-federal cost share	State governments, territory governments **Must have an enacted dam safety program*	This program assists eligible entities with addressing risks to local communities posed by high hazard potential dams, by providing funding for technical planning, design, and construction.

Program Name	Agency	Type	Cost Sharing Agreement	Eligibility*	Description
Rural Energy for America Program (REAP) Energy Audit and Renewable Energy Development Assistance	USDA	Grant **All hazards*	Yes, federal – non-federal cost share	State governments, local governments, federally recognized tribal governments	This program helps eligible entities (specifically rural small businesses and agriculture producers) by conducting and encouraging energy audits and renewable energy development.
Safeguarding Tomorrow Revolving Loan Fund Program (STORM)	FEMA	Capitalization grants/matching funds **All hazards*	Yes, federal – non-federal cost share	State governments, territory governments, federally recognized tribal governments	This program helps eligible entities establish revolving loan funds to help local governments mitigate disaster risk.
Section 108 Loan Guarantees	HUD	Loan **All hazards*	None	State governments, local governments	This program helps eligible entities use annual grant allocations to access low-cost financing for infrastructure and development projects that increase community resilience to disasters.
Section 40101(D) Formula Grants to States and Indian Tribes	U.S. Department of Energy (DOE)	Formula grant **All hazards*	Yes, federal – non-federal cost share	State governments, territory governments, local governments, federally recognized tribal governments	This program helps eligible entities improve grid resilience in local communities, and the funding can be targeted at both current and future resilience needs.
Special Evaluation Assistance for Rural Communities and Households	USDA	Grant **All hazards*	Yes, federal – non-federal cost share (on a case-by-case basis)	State governments, local governments, federally recognized tribal governments	This program provides funding to eligible entities (specifically, small and disadvantaged rural communities) to assist with the planning and feasibility of waste disposal projects.
Staffing for Adequate Fire and Emergency Response (SAFER) Grant Program	FEMA	Grant **Wildfire*	None	State governments, local governments, tribal governments	Provides funding directly to eligible entities to help them increase or maintain the number of trained, "front line" firefighters available in their communities.
State Energy Program (SEP)	DOE	Competitive grant **All hazards*	Yes, federal – non-federal cost share *Only in areas of interest 1 and 2	State governments, territory governments	This program provides funding and technical assistance to eligible entities to address a community's energy issues by implementing energy efficiency and renewability projects. These projects can include improving energy security, improving energy affordability, and advancing state-led energy initiatives. This program also promotes state specific energy programs.
State Fire Training Grants	US Fire Administration (USFA)	Non-competitive grant **Wildfire*	Unknown	State governments	This program provides eligible entities with annual predetermined funding to bolster the delivery of National Fire Academy classes to career and volunteer fire and emergency services agencies.
State and National Grants	AmeriCorps	Grant **All hazards*	Unknown	State governments, local governments, tribal governments	This program provides funding to eligible entities to help communities prepare for, respond to, and mitigate disaster impacts.

Program Name	Agency	Type	Cost Sharing Agreement	Eligibility*	Description
Water Infrastructure Finance and Innovation Act Program (WIFIA)	EPA	Competitive cooperative agreement/loan *All hazards	Yes, federal – non-federal cost share	State governments, local governments, tribal governments	This program provides funding to eligible entities to finance water and wastewater infrastructure projects.
Water and Waste Disposal Loan and Grant Program	USDA	Cooperative agreement / low-cost loan *All hazards	None	State governments, local governments	This program provides funding to eligible entities to ensure reliable clean drinking water and operable sewage systems and storm water drainage in rural areas.
WaterSMART Environmental Water Resource Grants	USBR	Competitive grant / cooperative agreement *Drought	Yes, federal – non-federal cost share	Western state governments, local governments, tribal governments, special district governments	This program helps eligible entities improve water efficiency and conservation to sustainably save and manage water, mitigate drought impacts, and manage water resources.
WaterSMART Water and Energy Efficiency Grants	USBR	Competitive grant / cooperative agreement *Drought	Yes, federal – non-federal cost share	Western state governments, local governments, tribal governments, special district governments	This program assists eligible entities improve water use efficiencies by helping increase renewable energy production, mitigate water supply and supply sustainability risks, and improve drought resilience.
Weatherization Assistance Program (WAP)	DOE	Formula grant *All hazards	None	State governments, territory governments	This program helps eligible entities improve low-income household resiliency by improving energy efficiency and decreasing energy costs to ensure continued household health and safety.

Note: This list may not include all eligible entities.

Appendix

APPENDIX A
GULF COAST HOUSING COMMITTEE

Member	Brenda M. Breaux	The New Orleans Redevelopment Authority (NORA)
Member	Chad Carson	Civix
Member	Alex Cary	The Insurance Institute for Business and Home Safety (IBHS)
Member	Lisa Churchill	Climate Advisory
Member	Chandra Franklin-Womack	Aran & Franklin Engineering
Member	Hank Hodde	Jacobs
Member	Anna Keene Miller	Keen Living
Member	Tara Lambeth	St. John the Baptist Parish, LA
Member	Catherine Lee	Green & Healthy Homes Initiative
Member	Kimberly Miller	Black & Veatch
Member	Dr. Lawrence "Lars" Powell	Alabama Center for Insurance Information and Research (ACIIR)
Member	Jessica Rodriguez	Willacy County, TX
Member	Tracie Sempier	Mississippi-Alabama Sea Grant Consortium (MASGC)
Member	Brenda Takahashi	Consultant
Member	Annie Vest	Oklahoma Emergency Management
Project Team	Andrew Barrett	Mississippi Department of Marine Resources (MDMR)
Project Team	Graham Green	Smart Home America
Project Team	David Perkes	The Gulf Coast Community Design Studio (GCCDS)
Project Team	Rhonda Price	Mississippi Department of Marine Resources (MDMR)
Project Team	Julie Shiyou-Woodard	Smart Home America
Project Team - Former	Kelsey Johnson	The Gulf Coast Community Design Studio (GCCDS)
Project Team - Former	Michela Schildts	Smart Home America

APPENDIX B
PILOT COMMUNITY SUMMARIES

Three pilot jurisdictions were selected from a competitive application process to be awarded a grant to use the draft of the Resilient Housing Plan Guide to do a resilient housing plan for their jurisdiction. The three jurisdictions are the Municipality of Foley Alabama, St. John the Baptist Parish in Louisiana and Willacy County in Texas. The three jurisdictions are notably different in size, population and demographics. However, they all share similar flood and wind hazards as well as housing demands that are impacted by climate related risks. The following pages briefly present the three Resilient Housing Plans with a short summary and the table of content for each plan.

APPENDIX B
FOLEY, ALABAMA: EXECUTIVE SUMMARY

This City of Foley Resilient Housing Plan was made possible through a pilot program grant funded through the Environmental Protection Agency in support of Smart Home America's Community Resilient Housing Guide. The purpose of the pilot program is to 'test' the guide through real world applications and to provide the pilot communities with the opportunity to discover and implement strategies to improve the resilience of their housing stock. The project was a collaborative effort that included the City of Foley, Smart Home America, Mississippi State University's Gulf Coast Community Design Studio, the Mississippi Department of Marine Resources, and Allen Engineering and Science, Inc. The overarching objective of this plan is to aid the City of Foley in creating a more resilient housing stock by providing a better understanding of areas of potential risk for housing development. Conversely, the plan seeks to reduce risks associated with housing development by providing a better understanding of areas of the City that present less risk regarding housing development. By gaining a better understanding of the relationship between risk and resilience, this plan seeks to provide residential developers and future homeowners with the tools necessary to invest with confidence in the City of Foley. In the discovery and analysis phases of the planning process, one fact became very obvious. That fact is that the City of Foley does resilience well. Understanding that fact presented clear challenges to the identification of specific strategies as the central focus of the plan. As the planning process continued, three issues of concern became apparent. These issues included:

The existence of residences located within the FEMA-designated floodplain, many of which were built pre-FIRM and not subject to current design standards and regulations.

The existence of residences affected by flooding that are outside the FEMA-designated floodplain.

The absence of a City of Foley-specific Multi-hazard Mitigation Plan.

With the acknowledgment of these three issues, the plan focuses on associated mitigation strategies, funding strategies, and outreach strategies intended to reduce the risks associated with these issues, thereby increasing the level of the City of Foley's housing resiliency.

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FOLEY, ALABAMA: TABLE OF CONTENTS

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APPENDIX B
ST. JOHN THE BAPTIST, LOUISIANA: EXECUTIVE SUMMARY

Through a 2022 US EPA Gulf of Mexico Cooperative Agreement, St. John the Baptist Parish became one of three communities selected to pilot the use of a Community Resilience Housing Guide as a framework for Resilient Housing Plan development. The Guide was developed by Smart Home America and the Mississippi State University Gulf Coast Community Design Studio, with support from the Mississippi Department of Marine Resources. In addition to piloting use of the Guide, this Resilient Housing Plan advances implementation of St. John the Baptist Parish's Louisiana's Strategic Adaptations for Future Environments (LA-SAFE) Adaptation Strategy. Specifically, the Plan comprises data and recommendations addressing two strategies outlined in St. John's LA-SAFE strategy: (1) directing growth to lower-risk areas on higher ground, and (2) providing a range of housing and development types to develop neighborhoods that promote health and help manage stormwater. This Plan covers a broad range of housing issues and can be used as a path from the current state of housing toward a more resilient future. Parish elected leadership and department staff can refer to the Damage and Loss Reduction Plan, Disaster Recovery Housing Plan, Community and Stakeholder Education Plan, and the Strategic Funding Plan to find clear implementable steps to improve equitable housing and disaster preparedness.

Although this plan includes extensive analysis and findings (see below), two of the major themes throughout this plan are (1) St. John has an opportunity to grow as a receiver Parish, providing land that is safer from flood hazards than many surrounding communities, but (2) St. John residents are struggling with acute poverty and widespread social vulnerability, and St. John the Baptist Parish must address these issues immediately to support resilient growth. A summarized list of findings is included below.

1. **Demographic Change**: St. John the Baptist Parish"s population decreased by 7.5% between 2010 and 2020. In the same timeframe, adults above the age of 64 increased by 36% while most other age groups declined. As residents of St. John the Baptist Parish age, they will require assistance to remain in their homes or will need a wider range of housing types, such as an increased number of one-bedroom apartments. Population decline was greater in the western half of the East Bank, where Census Tracts 706 and 707 experienced declines of more than 20% of the population between 2010 and 2020.

2. **Housing Unit Growth**: The total number of housing units in St. John the Baptist Parish increased by only 1.6% in the past decade, more slowly than recent national and regional statistics. Mobile homes comprise an increasing percentage of the housing landscape. The availability of 5+ unit buildings in St. John the Baptist Parish has dramatically decreased, and there is an evident mismatch between demand for affordable housing and the provision of units that are affordable to residents, specifically those with low- to moderate- incomes.

3. **Vulnerable Housing:** There are approximately 17,746 housing units in St. John. FEMA has designated 2,411 Repetitive Loss (RL) and Severe Repetitive Loss (SRL) homes in St. John the Baptist Parish. A total of 3,933 properties are estimated to be below the Base Flood Elevation (BFE) in the Special Flood Hazard Area (SFHA). Some of the densest residential neighborhoods in St. John the Baptist Parish are in the AE Flood Zone, or area designated by FEMA to present a 26% chance of flooding over the life of a 30-year mortgage. Although the West Shore Lake Pontchartrain levee will reduce this risk substantially, it will not eliminate flood risk completely.

4. **Poverty as a Main Driver of Environmental Risk:** St. John has a regionally unique concentration of poverty or near-poverty and social vulnerability.1 This factor, combined with an aging population and a suburban/ rural development pattern that is not thoroughly served by a transportation network, can foster social isolation and exacerbate social vulnerability factors. To this effect, this Plan acknowledges that pervasive poverty in St. John the Baptist Parish is a substantial factor preventing long-term resilience, and supports an approach to hazard mitigation that highly prioritizes addressing poverty, increasing access to financial and supportive services, and community investment. This approach acknowledges that when all members of a community have the resources to adapt, change, and make difficult decisions, resilience to environmental risks increases.

5. **Strategic Opportunities for Residential Growth**

As indicated on flood hazard maps for St. John the Baptist Parish, the land least subject to flood risk lies closest to the Mississippi River on the East and West banks of St. John the Baptist Parish. This is due to the natural ridge from sediment deposition from the river, and because St. John's coastal flood risk sources are Lake Pontchartrain and Lake Maurepas (to the north) and Lac Des Allemands and the Gulf of Mexico more broadly (to the south). Opportunities to increase housing density and spur infill development closest to the riverbank exist on both the East and West Bank.

APPENDIX B
ST. JOHN THE BAPTIST PARISH, LOUISIANA: TABLE OF CONTENTS

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APPENDIX C
FORTIFIED CONSTRUCTION

BECAUSE EVERY FAMILY **DESERVES A STRONG HOME**

FORTIFIED Home is a voluntary, beyond-code construction program designed to help people protect their homes from severe weather. Centered around a standard that requires a series of science-backed construction and reroofing upgrades, the program also includes access to trained contractors and an independent, third-party verification system.

Enhanced Roof Deck Attachment

Doubles the uplift capacity of the roof deck

* Use 8D Ring-shank nails instead of smooth shank
* Nail with tighter spacing than typical code requirements

Sealed Roof Deck

If roof cover is lost, will reduce water-intrusion, by up to 95%

* Using flashing tape plywood over all seams and install 30# roof felt
* Use a self-adhered membrane over the entire deck, **or**
* Two layers of 30# roof felt

Locked Down Edges

Minimizes risk of wind getting under roof edge causing significant roof cover loss

* Use minimum 26 gauge drip edge
* Install drip edge over underlayment and with tighter nail spacing
* Use either a fully-adhered starter strip or set starter in 8” wide mastic

Impact Resistant Shingles (optional)

IBHS research shows these shingles outperform typical Class 4 shingles

* Install shingles rated “Excellent” or “Good” on the IBHS rating scale

All requirements of FORTIFIED Roof plus

FORTIFIED SILVER

Pressure Rated Garage Doors

Keeps storm pressure from breaching garage door and causing significant failures such as blown-out walls and collapsed roofs

* Garage doors must be pressure-rated and installed per the manufacturer instructions

Chimney Bracing

Keeps chimney framing attached, protecting home from significant water-intrusion

* Blocking between roof members around chimney required
* Metal connectors at corners to resist chimney overturning

Gable End Bracing and Sheathing

Reduces chance of gables flexing or collapsing due to storm winds and pressures

* Additional bracing required for gables over 3' tall
* Gable ends must be sheathed with a structural sheathing such as 7/16" wood structural panels

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All requirements of FORTIFIED Roof and Silver plus

FORTIFIED GOLD

Continuous Load Path

Properly designed roof-to-wall, story-to-story, and wall-to-foundation connections keep the home intact while it withstands wind pressures from severe storms

* Design of a continuous load path from roof to foundation required
* Compliance forms must be completed to confirm proper design and installation

BECAUSE EVERY FAMILY DESERVES A STRONG HOME

FORTIFIED Home is a voluntary, beyond-code construction program designed to help people protect their homes from severe weather. Centered around a standard that requires a series of science-backed construction and reroofing upgrades, the program also includes access to trained contractors and an independent, third-party verification system.

Enhanced Roof Deck Attachment

Doubles the uplift capacity of the roof deck

* Use 8D Ring-shank nails instead of smooth shank
* Nail with tighter spacing than typical code requirements

Sealed Roof Deck

If roof cover is lost, will reduce water-intrusion, by up to 95%

* Using flashing tape plywood over all seams and install 30# roof felt
* Use a self-adhered membrane over the entire deck, **or**
* Two layers of 30# roof felt

Locked Down Edges

Minimizes risk of wind getting under roof edge causing significant roof cover loss

* Use minimum 26 gauge drip edge
* Install drip edge over underlayment and with tighter nail spacing
* Use either a fully-adhered starter strip or set starter in 8” wide mastic

Impact Resistant Shingles (optional)

IBHS research shows these shingles outperform typical Class 4 shingles

* Install shingles rated “Excellent” or “Good” on the IBHS rating scale

Wind & Rain-Resistant Attic Vents

These vents are tested and rated to keep both wind and water out

* Roof vents must be TAS 100(A) rated
* Gable end vents must be either TAS 100(A) rated or have removable shutters per FORTIFIED requirements

All requirements of FORTIFIED Roof plus

Impact Protection for Windows and Doors

Protects openings from debris impact and keeps storm pressure from entering a home

* All windows and doors must be impact rated or have a qualified opening protection system

Impact and Pressure Rated Garage Doors

Keeps storm pressure from breaching garage door and causing significant failures such as blown-out walls and collapsed roofs

* Garage doors must be pressure-rated and installed per the manufacturer instructions
* Any glazing must be impact-rated or have a qualified opening protection system

Chimney Bracing

Keeps chimney framing attached, protecting home from significant water-intrusion

* Blocking between roof members around chimney required
* Metal connectors at corners to resist chimney overturning

Reinforced Soffits

Minimizes risk of wind-driven rain entering a home through the eaves.

* Additional bracing required for vinyl or aluminum soffits over 12” in width

Gable End Bracing and Sheathing

Reduces chance of gables flexing or collapsing due to storm winds and pressures

* Additional bracing required for gables over 3’ tall
* Gable ends must be sheathed with a structural sheathing such as 7/16" wood structural panels

All requirements of FORTIFIED Roof and Silver plus

Pressure-rated Windows and Doors

Properly rated windows and doors are more likely to stay intact, keeping storm pressures from entering a home

* Windows and doors must be pressure-rated and tested to meet the requirements of the FORTIFIED Standard

Stronger Exterior Sheathing

Keeps wind, water and debris from penetrating the home during severe weather

* All walls must be sheathed with an impact resistant sheathing such as 7/16” wood structural panels

Engineered Continuous Load Path

Properly designed roof-to-wall, story-to-story, and wall-to-foundation connections keep the home intact while it withstands wind pressures from severe storms

* Design of a continuous load path from roof to foundation required
* Compliance forms must be completed by the engineer and contractor to confirm proper design and installation

A PROGRAM OF IBHS

FORTIFIED

COMMERCIAL

TM

BUILDING RESILIENCE DESIGN AND CONSTRUCTION STANDARDS

In an effort to reduce damage to commercial structures and help businesses re-open more quickly following severe weather, the Insurance Institute for Business & Home Safety (IBHS) developed FORTIFIED Commercial™, a voluntary, superior construction standard and designation/compliance program.* FORTIFIED Commercial employs an incremental approach with three levels of designations available—FORTIFIED Roof™, FORTIFIED Silver™, and FORTIFIED Gold™—so design professionals can work with building owners to choose a desired level of protection that best suits their budgets and resilience goals.

Why FORTIFIED?

- Reduces risk of financial loss that comes from damaged property, lost inventory, and lost revenue due to business interruption; accomplished by strengthening roof systems, elevating vulnerable mechanical systems, and having backup power.
- Helps get your business up and running more quickly following severe weather, which helps protect business operations and livelihoods, and helps retain employees and reduce employee stress; studies show that 1 in 4 small businesses do not recover after closing due to a natural disaster.
- Lowers overall cost of recovery; a 2018 study by the National Institute of Building Science (NIBS) shows that for every $1 spent on FORTIFIED Commercial construction, approximately $4 is saved in disaster recovery expenses.

How Do I Build to FORTIFIED?

1. Visit fortifiedcommercial.org to learn about the standards and how the process works.
2. Determine the level of resilience you want to achieve (FORTIFIED Roof, FORTIFIED Silver, or FORTIFIED Gold).
3. Complete an online application.
4. Work with a third-party evaluator provided by IBHS to verify compliance with the standards.

FORTIFIED Commercial focuses on community-based and light to moderate commercial structures such as:

- Multi-family residential/residential (when not governed by the IRC)
- Template ("cookie-cut") stand-alone buildings
- Franchises (e.g., quick-service restaurants)
- Hotels
- Convenience stores/gas stations
- Pharmacies/retail stores
- Business services
- Schools/municipal buildings
- Mixed use

Excluded occupancies include high-hazard and appurtenances such as barns and sheds. Please see the FORTIFIED Commercial standards for more information.

KEEP WIND AND WATER OUT AND ROOF-MOUNTED EQUIPMENT ON

- Stronger roofing system designed to provide better protection against severe wind
- Gutters and downspouts designed and tested for outstanding performance
- Sealed roof deck required for steep-sloped roofs
- Superior skylights designed and tested to withstand water intrusion and large missile impact
- Roof-mounted equipment must be designed for increased wind pressures

PROTECT THE ENVELOPE AND REDUCE BUSINESS OPERATIONS DOWNTIME

- All FORTIFIED Roof requirements must be satisfied
- In hurricane-prone regions:
  - All windows and glazed openings must be impact-rated or protected to minimize water and wind/wind pressure intrusion
  - Wall systems must be impact-rated
  - Exterior doors must be impact-rated or protected
- Parapets and false fronts must be adequately braced and anchored
- Electrical and mechanical equipment must be protected from flood/water damage
- Electrical connections must be installed to easily connect backup power

KEEP THE BUILDING TIED TOGETHER AND MAINTAIN BUSINESS OPERATIONS

- All FORTIFIED Silver requirements must be satisfied
- Load path must be engineered and verified
- Canopies must be adequately anchored/supported
- Backup power must be provided

FORTIFIEDCOMMERCIAL.ORG

** FORTIFIED Commercial designations are currently only available in Alabama. If you build with FORTIFIED Commercial standards outside of Alabama and you meet the minimum requirements of FORTIFIED Commercial, you will receive a letter of compliance from your FORTIFIED Commercial Evaluator.*

APPENDIX D
COMMUNITY HEALTH AND RESOURCE MANAGEMENT (CHARM)

Exercise Overview

On August 31, 2023, Texas A&M AgriLife Extension Service (TCWP) personnel facilitated an interactive participatory housing exercise for Willacy County in the City of Raymondville. Exercise participants included local, regional, State, and federal stakeholders. Participants used TCWP's Community Health and Resource Management (CHARM) platform to review local data and conditions, with specific emphasis on housing resilience.

This effort supported the development of a resilient housing plan by Halff Associates, which examined housing resiliency issues in Willacy County as detailed in the draft 2023 report, "Willacy County Resilient Housing and Recovery Guide." The development of the resilient housing plan for Willacy County was part of a pilot program being administered by Smart Home America in partnership with Mississippi State University's Gulf Coast Community Design Studio with funding through a US EPA Gulf of Mexico Program Cooperative Agreement.

The CHARM exercise included a dialogue about the community's flood hazard challenges and development planning activities to date, issue areas, and current priorities. Identified issues and recommended action items are summarized in subsequent sections.

Community Health and Resource Management (CHARM) Overview

The CHARM approach supports community decision-making by fostering dialogue around data. CHARM is a GIS-based technology that uses the CommunityViz extension, allowing users to paint new features on a map and calculate impacts of those features. Using the weTable, an interactive hardware platform, CHARM allows users to gather around models of their communities, fostering collaboration and dialogue among stakeholders for more impactful outcomes. Facilitated by AgriLife staff, CHARM workshops aim to increase risk awareness and identify opportunities and approaches for community resilience-building.

CHARM Model Exercises

Texas A&M AgriLife Extension Service created CHARM community models for Willacy County which included all participating communities. Standard CHARM exercises were used and customization was created to add to specific discussion about housing resiliency, which allowed users to analyze factors in flood mitigation, preparedness and response using the provided data.

Standard exercises and data discussed included:

- Housing/building footprint density in flood zones
- Approximate depth of flooding for homes in flood zones
- Locations and level of risk among socially vulnerable populations
    - The Willacy County Smart Home model's social vulnerability exercise is based on a quartile ranking of block groups compared to other block groups in Willacy County, as opposed to the entire State of Texas. This adjustment should account for the relatively high level of social risk in Willacy County as a whole and allow more variation between neighborhoods.
    - Social vulnerability is a standard CHARM exercise, but additional variables, including "rent burden" and "homes without mortgage" were added to account for the burden of housing

costs for lower income households (rent burden); and possible lack of flood or homeowners' insurance, and lack of access to financial assistance or grants (no mortgage combined with lower per capita income).

- Critical facility locations and risk
- Storm surge impact
- Mitigation practices and opportunity areas (i.e. freeboard, open space, buyouts)
- Flood Discovery (known, unmapped flood hazard input)
- Future planning scenario impact

Described below are the customized components of the new exercise developed by the TCWP team for this Smart Home America: Willacy County effort.

Hazard Exposure Score for Housing Stock

Texas A&M AgriLife Extension Service developed a new CHARM exercise designed to determine the vulnerability of homes to 1% or 0.2% percent annual chance flood events, hurricane storm surge (by category), and wind hazards as defined by the American Society of Civil Engineers 7-05 minimum design loads. In this exercise, users identify factors affecting structural risk from flooding, storm surge, and wind, including adoption year of building codes and floodplain ordinances (for each city in the study area and the County), and current freeboard requirements. Scenarios generate a comparative "Hazard Exposure Score" indicating the estimated level of risk such that:

- Homes built before building code adoption are assumed to have twice the wind risk as homes built after code adoption;
- Parcels containing multiple manufactured homes (i.e., mobile home parks) are assumed to have 20 times the wind risk as single-family homes. The exercise does not account for manufactured homes on individually owned lots;
- Homes built before the adoption of the most recent flood damage prevention ordinances are assumed to be slab on grade (higher risk), while homes built after most recent ordinance updates are assumed to meet freeboard requirements (lower risk);
- Different jurisdictions can apply the most relevant freeboard/housing elevation assumption for their area (0 – 8 feet) to gauge their level of flood or storm surge risk more appropriately;
- Homes which are in a 1% annual chance flood zone and constructed after building code and flood ordinance adoption may be calculated as having elevated risk depending on the difference between FEMA 1% annual chance base flood elevation data and the assumed freeboard requirements. The "Screen by Housing" option allows the user to focus on and assess estimated hazard exposures of only existing residential parcels (when on) or to assess hazard exposure in areas that may experience development but are not currently residential parcels (when off).

The exercise analyzes hazard exposures for the entire study area, which encompasses most of Willacy County. As a result, hazards in an inland area of Willacy County are compared to hazards along the coast, and residential structures are not assessed independently of each other. Due to data constraints, the exercise also assumes construction pre- or post-code and -ordinance adoption, and no in-between option, which may limit our ability to evaluate structural vulnerabilities based on adherence to ordinances above the minimum standard but not meeting current standards. Although the exercise assumes risk based on

APPENDIX E
NOAA ATLAS 15: UPDATE TO THE NATIONAL PRECIPITATION FREQUENCY STANDARD

Website: *https://www.weather.gov/owp/hdsc*
Email: *hdsc.questions@noaa.gov*
Locations: *Tuscaloosa, AL – Silver Spring, MD – Chanhassen, MN*

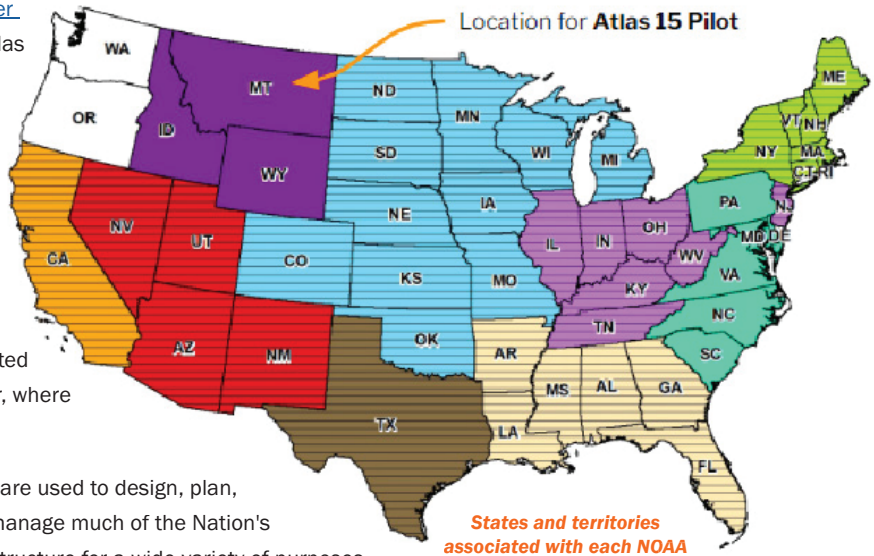
OWP | OFFICE OF WATER PREDICTION

NOAA ATLAS 15:

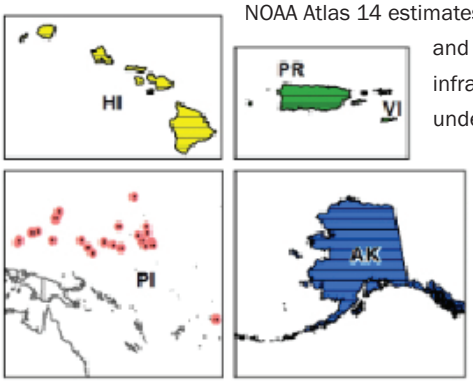
Update to the National Precipitation Frequency Standard

NOAA is recognized by the engineering and floodplain management communities as the authoritative source of precipitation frequency data, and has a long history of generating these data that serve as the foundation for built infrastructure nationwide.

The National Weather Service (NWS) Office of Water Prediction (OWP) has produced an authoritative atlas of precipitation frequency estimates, published as volumes of the NOAA Atlas 14 Precipitation-Frequency Atlas of the United States. These estimates are currently posted on the NOAA Precipitation Frequency Data Server (PFDS), with interactive tables and charts. Precipitation frequency estimates are defined as the precipitation depth at a particular location, for a given storm duration, that has a statistically-expected 1-in-YY chance of being exceeded in any given year, where YY is the statistical annual recurrence interval.



States and territories associated with each NOAA Atlas 14 volume



NOAA Atlas 14 estimates are used to design, plan, and manage much of the Nation's infrastructure for a wide variety of purposes under federal, state, and local regulations.

NOAA Atlas 14 estimates replace estimates previously published by NOAA in the early 1960s and '70s and cover a range of storm durations from 5-minutes through 60-days, for average recurrence intervals of 1-year through 1,000-year. Compared to previous volumes, Atlas 14 estimates benefit from use of better-quality data (e.g. precipitation stations with longer period of record, increased station density, etc.), enhanced quality control methods, consideration of uncertainties, and improved frequency analysis and spatial interpolation methods that account for variation in terrain, proximity to the coastline etc.

First National Precipitation Frequency Analysis Accounting for Climate Change

Historically, NOAA precipitation frequency estimates have been funded by states and other users, on a cost-reimbursable basis, for individual subsets of the U.S. However, with the 2022 Bipartisan Infrastructure Law (BIL), OWP received first-ever direct Federal funding to (1) update the NOAA Atlas 14 precipitation frequency standard while accounting for climate change, and (2) develop precipitation frequency estimates for the entire U.S. and its territories.

These updated precipitation frequency estimates will be referred to as NOAA Atlas 15 and will be presented in two volumes. **Volume 1** will account for temporal trends in historical observations, and **Volume 2** will use future climate model projections to generate adjustment

factors for Volume 1. To account for a changing climate, NOAA worked with the Federal Highway Administration (FHWA) and the academic community to develop a new methodology for Atlas 15, which has undergone broad review by stakeholders and Federal partners over the past year, leveraging state of the art research in extreme value theory and climate model outputs and projections. The Atlas 15 estimates will provide critical information to support the design of state and local infrastructure nationwide under a changing climate.

> *The generation of authoritative precipitation frequency information requires a rigorous development process and extensive quality control with significant stakeholder interaction.*

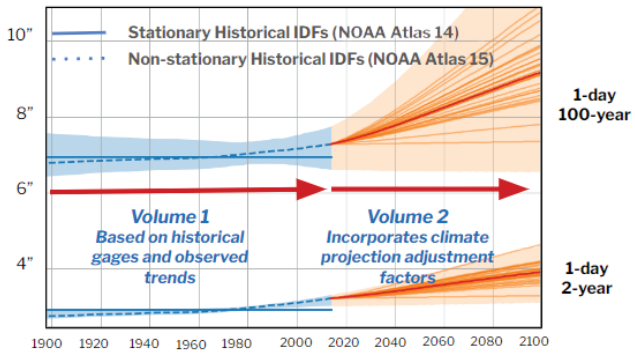
- Developing a seamless national analysis based on historical data and a non-stationarity assumption using the latest precipitation observations and future climate model projections. Storm durations will range from 5-minutes to 60-days and span average annual recurrence intervals of 1 to 1,000 years.
- Enhancing Web visualizations and data services, through NOAA's Service Delivery framework initiative, to better engage stakeholders and users.

The NOAA Atlas 15 update enhances the production and provision of rigorously produced, authoritative precipitation frequency estimates by:

- Leveraging the results and recommendations from the "Analysis of Impact of Nonstationary Climate on NOAA Atlas 14 Estimates" assessment report.

NOAA Atlas 15

New National Precipitation Frequency Standard



Historical and future intensity-duration-frequency estimates (IDFs)

Timeline for the Development and Deployment of Updated Authoritative Precipitation Frequency Estimates Nationwide

2022/2023

- **Feb. - Aug 2022** - Published methodology and briefed stakeholders.
- **Sept. 2022** - Distributed Public Notification Statement (PNS) and collect public feedback.
- **Jan. 2023** - Hosted technical workshop with federal partners.
- **Apr. 2023** - Award contracts and grants and initiate product development.

2024

- **Development** - Evolve framework. Create Quality Controlled National Precipitation Database. Evaluate Climate Model Projections.
- **Pilot** - Deliver Atlas 15 Vol. 1 and Vol. 2 pilot over Montana.

  Collect and adjudicate feedback on preliminary estimates and Web dissemination strategies.

2025

- **CONUS** - Distribute preliminary CONUS estimates for Atlas 15 Vol. 1 and Vol. 2 (lower 48 states).

  Initiate 60-day peer review for Atlas 15 Vol. 1 and Vol. 2.

  Collect feedback and adjudicate comments on product.

2026

- **CONUS** - Complete Atlas 15 Vol. 1 and Vol. 2 and deliver estimates, documentation and supplementary products to stakeholders.
- **oCONUS** - Initiate peer review for oCONUS (e.g. Hawaii, Alaska, Puerto Rico, U.S. Virgin Islands, Guam).

  Collect feedback and adjudicate comments on product.

2027

- **oCONUS** - Complete Atlas 15 Vol. 1 and Vol. 2 and deliver estimates, documentation and supplementary products to stakeholders.

The **FLOODS Act** signed into law in December 2022 and known as Public Law No: 117-316, authorizes NOAA to establish a program, to be known as the *NOAA Precipitation Frequency Atlas of the United States*. This program would compile, estimate, analyze, and communicate the frequency of precipitation in the United States and update these precipitation frequency estimates no less than once every 10 years.

For additional information, please contact OWP at hdsc.questions@noaa.gov.