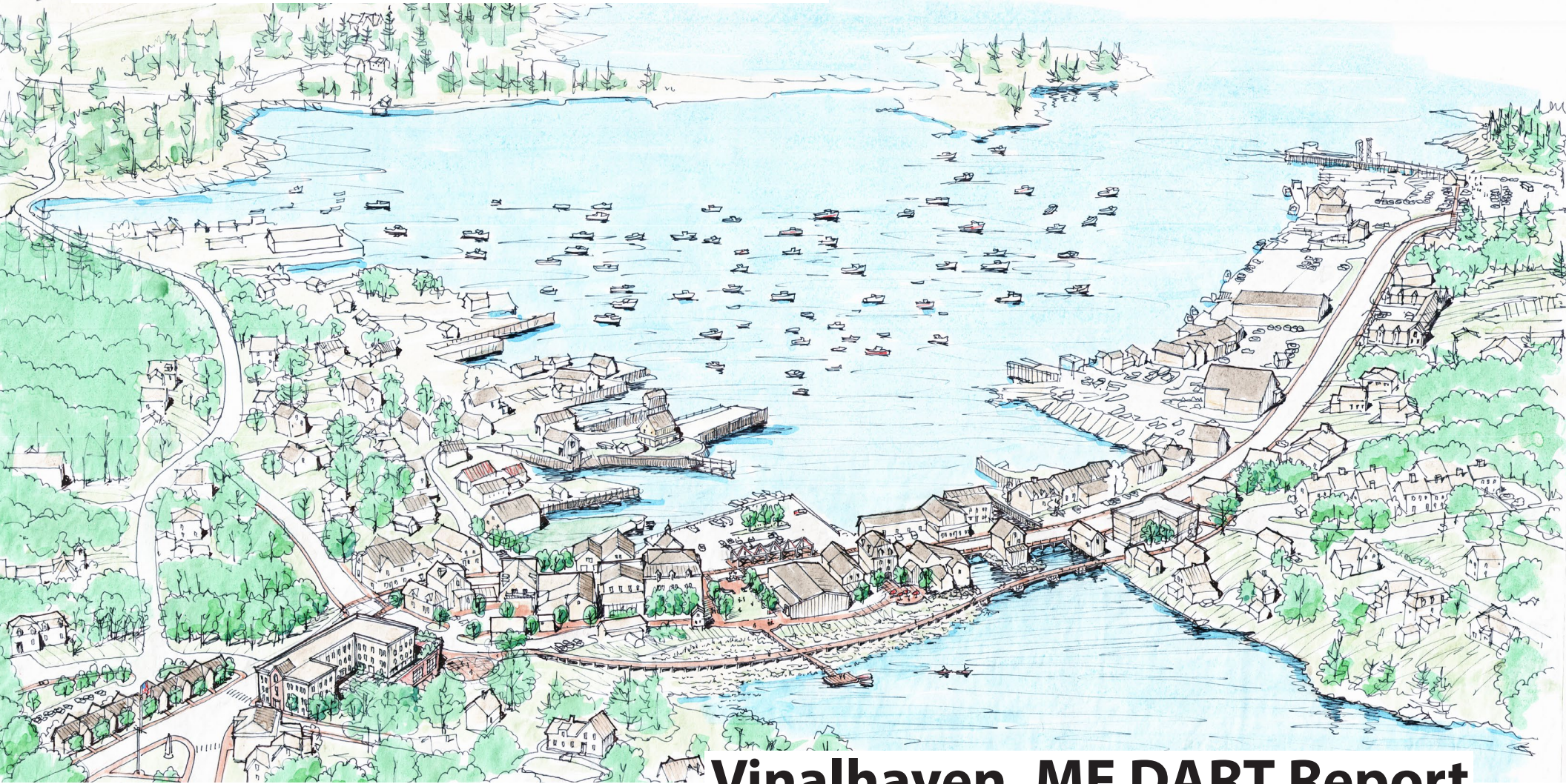


# Vinalhaven: Turning the Tide



**Vinalhaven, ME DART Report**





## Table of Contents

<b>INTRODUCTION- VINALHAVEN SPEAKS</b>	<b>2</b>
<b>SOCIAL RESILIENCY</b>	<b>10</b>
<b>COASTAL FLOODING- ARMOR, ADAPT OR ABANDON</b>	<b>16</b>
<b>CONNECTIONS AND COMPLETE STREETS</b>	<b>24</b>
<b>BUILDING A STRONGER VINALHAVEN</b>	<b>31</b>
<b>MAKING IT HAPPEN- MOVING FORWARD</b>	<b>45</b>
<b>DESIGN AND RESILIENCY TEAM &amp; ACKNOWLEDGEMENTS</b>	<b>50</b>



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## THE DESIGN AND RESILIENCY TEAM PROGRAM

Design and Resiliency Teams (DARTs) provide pro-bono technical assistance to help communities develop a strategic vision and promote community resiliency, usually by focusing on a specific issue and/or geographic area. The DART vision of promoting community resiliency is to empower local communities and systems, and all of the people and institutions they serve, to thrive in the long term even through acute shocks and catastrophes and chronic stresses.

DARTs are multidisciplinary teams of public and private sector experts from fields relevant to the community's need (e.g., sustainability, climate change, planning, architecture, landscape architecture, engineering, economic development, finance, the arts). Each multi-disciplinary team is custom-built to serve local needs and opportunities.

DARTs will work with community, political and administrative decision-makers and stakeholders during an intensive three-day planning process that could otherwise cost tens of thousands of dollars. A DART helps a community advance resilience solutions through public conversation, a final presentation and a final report. In return, communities must demonstrate the capacity and commitment to convene diverse community, staff, political leaders, and stakeholders for an intensive, collaborative resiliency planning process.

DARTs catalyze local action with a community-engagement process using outside perspectives and technical assistance on resilience. The process allows communities to focus for a few days on the resiliency picture without daily demands distracting them from planning for a critically important local issue. There are technical (knowledge base and expertise), political, administrative, and institutional challenges to building consensus on the challenges and needed actions. An outside multi-disciplinary team can galvanize a community by bringing in new expertise, expanding existing conversations, identifying new approaches, and providing support for or refinement of existing approaches. DARTs build the community conversation and advance consensus for the proactive planning, resource allocation, and paradigm shifts needed to address resilience challenges.

In 2016, the DART program earned the APA-MA chapter's Social Advocacy Award. To date, there have been seven DARTs. The program builds on the AIA's five decades of experience fielding 220+ Design Assessment Teams. These programs create design, resiliency and sustainability opportunities building on 1) the multidisciplinary team approach, 2) objectivity of team members, and 3) inclusive public participation and support.

DARTs are sponsored by American Institute of Architects, the New England Municipal Sustainability Network (NEMSN), and the Urban Directors Sustainability Network (USDN). DARTs are supported by the cities of Northampton MA (lead coordinating community), Dubuque IA, Providence RI, and Seattle WA, with some technical assistance from the Boston Society of Architects Foundation and the Boston Society of Landscape Architects. See [www.DesignResiliency.org](http://www.DesignResiliency.org) for more details.









## INTRODUCTION- VINALHAVEN SPEAKS

Vinalhaven applied for Design and Resiliency Team (DART) technical assistance to help it address resiliency challenges, especially resulting from higher tides and storm events threatening downtown, some threats and underinvestment in commercial activity, and concerns about long term threats to the stability of the economy and island way of life. In their application and during an initial site visit, the town discussed some of its opportunities and challenges.

### Initial challenges identified in application and community conversations

Opportunities	Chronic Stress	Potential Acute Stress
Young people stay in the community	Under investment in downstreet buildings and infrastructure	Storm event could severely damage downstreet buildings
Great relaxed island life	Hard to find employees for commercial businesses	Many buildings at risk of flooding are not insured
Strong lobster-based economy	Housing and other services expensive for many residents	Heavily damaged or obsolete buildings might not be rebuilt
Strong social connections and sense of place	Higher tides and storm events creating increased flooding	Profitable lobster industry could be damaged by climate change
Historic population decline has ended	Flood insurance unaffordable	
An unmatched rural and small town quality of life and safety	Leakage of retail spending from the island to the mainland and online shopping	

The DART steering committee was impressed by Vinalhaven's thoughtfulness and willingness to act on opportunities and, in a competitive application round, awarded Vinalhaven a DART at no cost to the local community. The DART preliminary visit was July 24, 2017 and the full DART was October 14-16, 2017. The team collected information in several ways:

- Reviewed past plans and studies compiled by Vinalhaven, from the Flood Risk Vulnerability Study (currently underway), the Vinalhaven Comprehensive Plan (2013) and past plans, such as the Sidewalk Assessment Maintenance Plan (2006).
- Researched demographic and economic information on the community.
- Held focus groups with town staff, board members, and diverse stakeholders during the preliminary visit and the full DART visit.
- Held two open community forums during the DART.

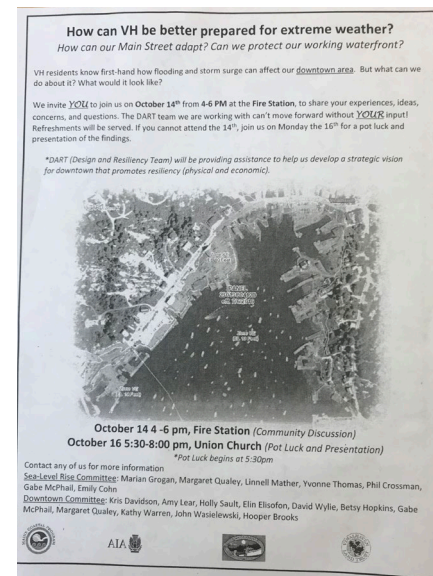
*"Waving is part of the ethic and the way of life. We recognize each other in the grocery store, all over the island. We lose this with many of our visitors."*

*"People go to the mainland to shop."*

*"Amazon Prime is the threat to downstreet."*

*"Many residents would prefer that we hold 10,000 bake sales before any tax hike."*

*"Students want to stay after they finish school."*



We heard consistent love of Vinalhaven across all walks of life and excitement about a future where most of the youth of the island want to stay and a vibrant and well paid lobster industry. At the same time, we heard about threats to downstreet and the island, from rising tides, underinvestment, obsolete infrastructure, leakage of retail dollars off the island, an aging population with inadequate services, social isolation, and a limited labor pool. We also heard concern about how ready the very successful lobster industry is from both cyclical downswings and climate induced longer term threats.

By far, residents identified the greatest threats to Vinalhaven as:

1. Rising tides and related potential storm damage
2. A potential decline in the non-lobster commercial economy
3. The effects of warming waters on the lobster industry.



- OVER POPULATION OF DEER + DEER TICKS. (3)

## DOWNTOWN CHALLENGES / THREATS.

- SURVIVING THRU THE WINTER
- ONLINE SERVICES REPLACING RETAIL
- POOR CONDITION OF WALKWAYS
- NEED WALKABILITY + GREEN SPACES
- WHARFS NEED WORK
- LOSS OF TREES AT STATE BEACH
- DETERIORATING BUILDINGS
- SKYROCKETING COST OF CONSTRUCTION.
- NEED BROADBAND
  - SUPPORT REMOTE WORKING
- NEED BETTER CELL SERVICE
- S.L.R. POTENTIAL IMPACT ON FERRY SERVICE.

## HOT BUTTON ISSUES (5)

### PARKING + TRAFFIC -

- EAST MAIN + WATER STREET DANGEROUS
- KIDS ON BIKES

TOO FAR  
TOO BIG

→ NOT A BIG ISSUE IF PEOPLE BEHAVE

### DOCKING OF BOATS IS AN ISSUE

- INCREASE TAXI SERVICE
- PEOPLE RETIRE HERE BECAUSE WALKABLE IT'S
- NEED AFFORDABLE HOUSING
  - ESPECIALLY FOR LOCAL PEOPLE
- STATE AGENCIES LOCATING FAMILIES HERE WHEN THERE'S NO ROOM ELSEWHERE,
- NEED WORK FORCE HOUSING
- COOPERATIVE HOUSING FOR SENIORS
- NEED TO EXPAND ELDER SERVICES.
- SCATTERED SITE HOUSING.



## MOVE DOWNTOWN ?

(6)

- CONNECTION TO FERRY IS CRITICAL
- MAINTAIN HISTORIC VILLAGES?
- KEEP THE OLD, BUT BUILD NEW OUT OF FLOOD PLAIN
- LET IT EVOLVE NATURALLY
- POSSIBLE TO RAISE BUILDINGS?
- TREES → NOT SO MUCH.
- BICYCLES → YES - NEED OFF-STREET TRAIL

## HOW TO MAINTAIN SOCIAL RESILIENCE?

CLASH BETWEEN WORKING WATERFRONT  
(NOISY, SMELTY, EARLY) AND SUMMER  
FOUR.

4 AM BOAT ENGINES

FROM HERE VS. FROM AWAY

LOOKING BACKWARD VS. LOOKING FORWARD.

WHERE CAN PEOPLE MEET?

- BOARDS, COMMITTEES WELCOME RETIREES
- NORTH HAVEN COMMUNITY CENTER

## WHY DO PEOPLE STAY?

(7)

- EXTENDED FAMILIES
  - COMMUNITY
  - BEAUTY
  - ECONOMIC STRENGTH OF LOBSTERING
  - GENERATIONS OF SEASONAL VISITORS
  - SAFETY FOR CHILDREN
  - NEED TO ADDRESS OPIOID EPIDEMIC  
+ THREATS TO ECONOMY/LOBSTERING
- DOES RESILIENCE = CHANGE?
- FAMILY SUPPORT KEEPS FOLKS HERE
  - VINALHAVEN SURVIVED THE  
COLLAPSE OF FIN FISHING + GRANITE
  - RESILIENT PEOPLE
  - NEED TO BALANCE SUMMER AND  
SEASONAL ECONOMIES
- TENSION ? —



- SUPPORT FOR CREATIVITY.

### CHALLENGES

- SEA LEVEL RISE
- ACIDIFICATION
- GREEN CRAB
- HOUSE PRICE INFLATION
- AFFORDABLE HOUSING SUPPORTS RESILIENCE
- HARD TO MAKE DOWN PAYMENTS.
- NOT ENOUGH YEAR-ROUND RENTALS
- NEED QUALITY MEDICAL SERVICES
  - INCLUDING TRANSPORT TO MAINLAND
- WATER SUPPLY
- SEWERAGE
- AMAZON PRIME - DON'T HAVE TO SHOP HERE

### FLOODING - WHERE, WHEN, TRENDS?

- NORTH HAVEN ROAD - DESIGNING NEW CONCRETE FOUNDATION - BUT HOW TO GET TO (4)
- WINTER TIDES NOTICEABLY HIGHER
  - FEMA REG'S ARE NOT CLEAR.
  - WORST FLOODS 30 YRS AGO - MORE RECENT NUCLEUS FLOODING
  - CAN'T MORTGAGE W/OUT EXPENSIVE FLOOD INSURANCE.  
[NAVEL ACADEMY RAISING NOS 2 FEET]
  - ARMOR - ADAPT - ABANDON
  - SALT WATER INTRUSION IN WELL.
  - DROUGHT IMPACTS?
  - ARE WE PREPARED FOR DISASTERS?

- THEATER AS BONDING.

- ULTIMATELY, EVERYONE HAS HAD TO ADAPT AFTER ARRIVING HERE.

- SCHOOL IS GATHERING PLACE

- COMMUNITY PLAYGROUND

→ DO WE NEED \$500K PLAYGROUND? - PUT MONEY INTO REC. CENTER.  
NEED YEAR-ROUND SPACE

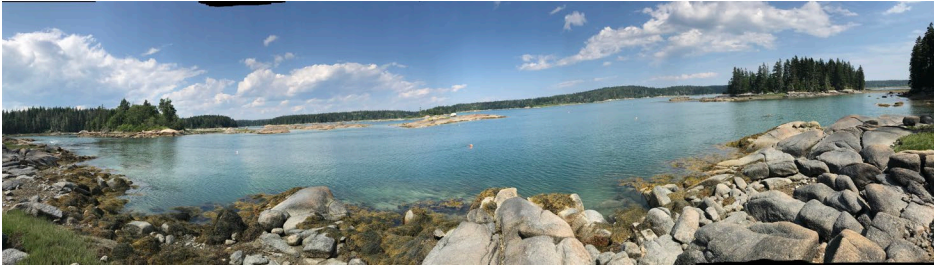
- WELCOMING COMMITTEE

- ISLAND TIME

### ECONOMIC OPPORTUNITIES

- CONNECT WITH ROCKLAND ART SCENE
- VINELHAVEN AS CENTER FOR RETREATS
  - PAINTING, PHOTOGRAPHY, YOGA
- AQUACULTURE
  - KELP, MUSSELS, OYSTERS, ETC.
  - INCLUDE THE FISHING COMMUNITY
- FILM MEETINGS.
- CONTROLLED VISITATION - CORPORATE RETREAT
- EXPAND MARINE SERVICES - ELECTRONICS?





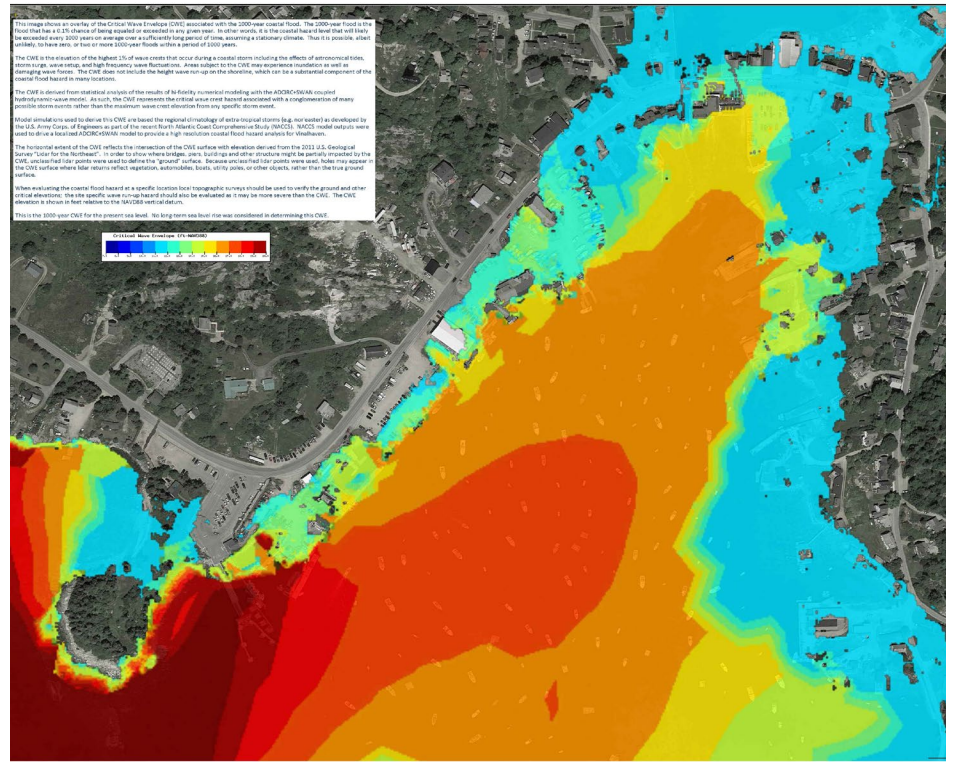
*Vinalhaven's beauty attracts tourists and retirees and is part of the island's high quality of life.*



*Occasional visitors miss that behind that beauty is a working lobster industry that directly and indirectly is well over half the island's economy.*



*Downstreet and the non-lobster economy, however, is still hugely important to the lifeblood of Vinahaven and to its economy.*



*Currently, downstreet is being threatened by rising tides and evolving economic and social trends.*



After reaching its peak population in circa 1880, during the height of its granite extraction days, Vinalhaven's population decreased for almost 130 years, although it appears that the population has stabilized. Given the steady declines in the population of Maine rural communities and unbridged islands and the aging of the population, this stability is alone a good sign. Vinalhaven has a healthy economy and population, in spite of its threats and stresses.

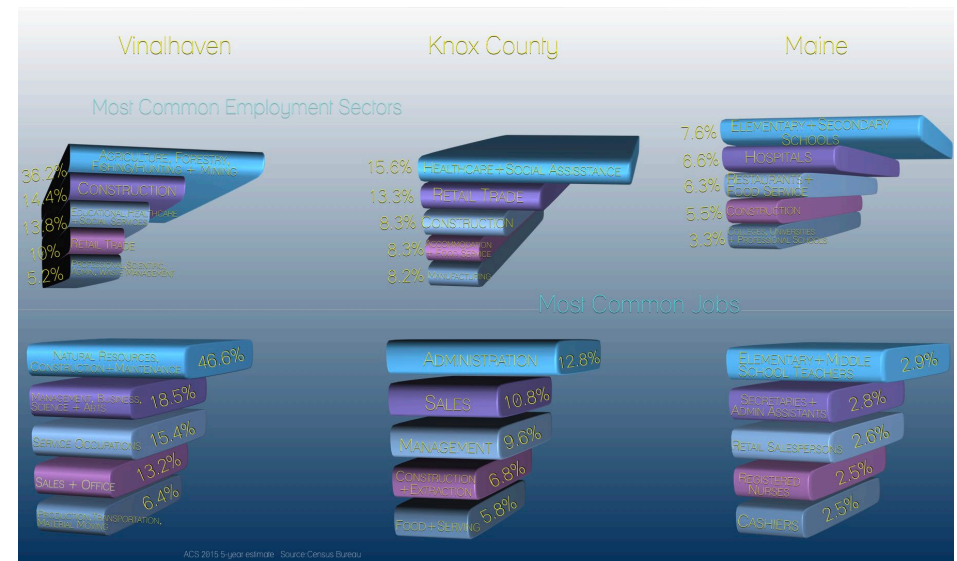
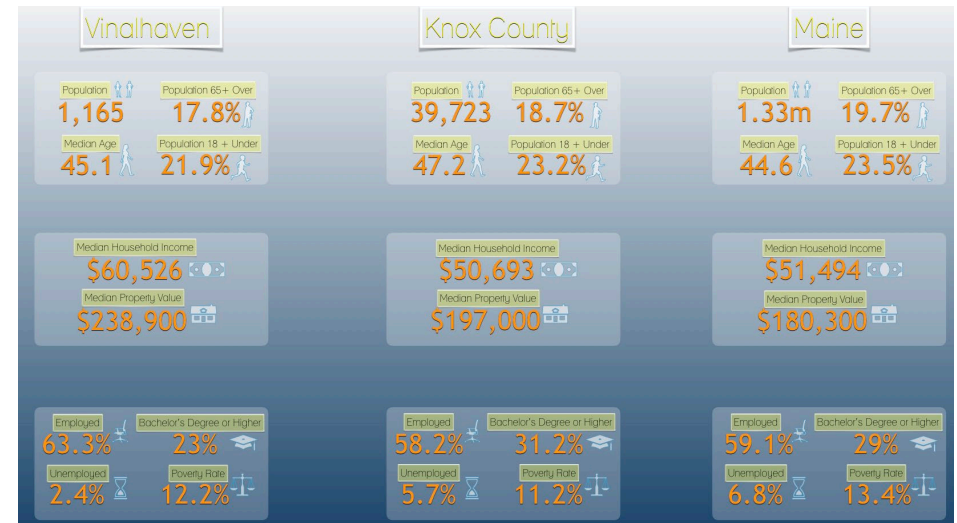


**Downstreet retains its unique identity and charm developed over a century ago.**



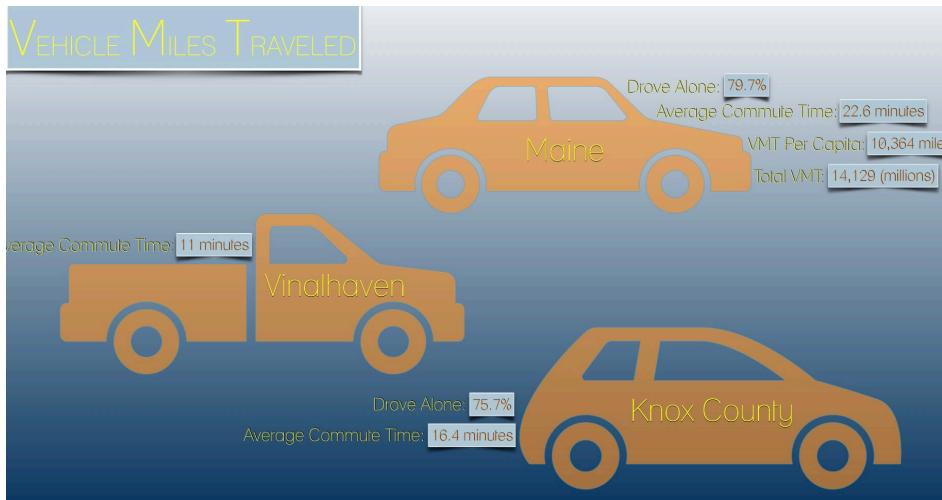
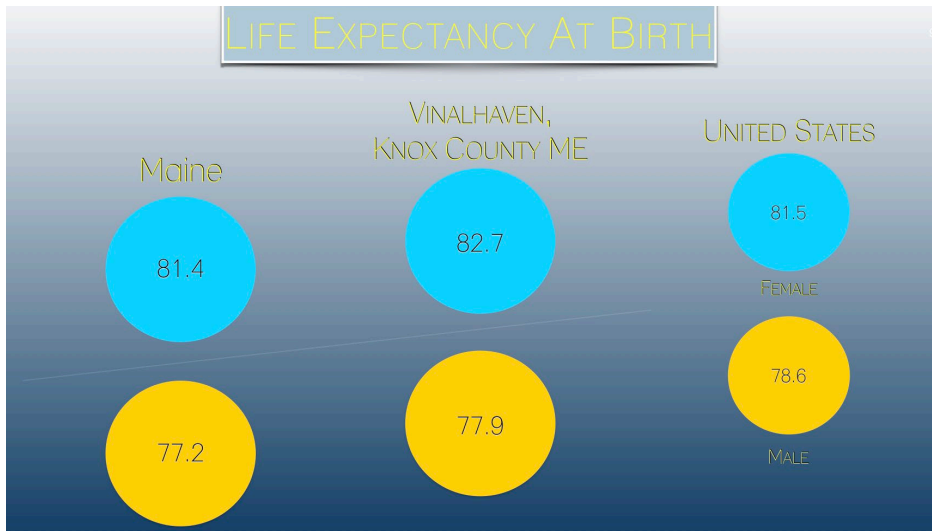
**There are signs of stress in the downstreet infrastructure and buildings.**

Vinalhaven has an aging population compared to the rest of the United States, but its population is still slightly younger, more likely to be employed, and earning higher wages than Knox County and Maine. Its housing prices are higher than the county and the state, which is balanced by its higher incomes. The higher housing prices, higher cost of living, and less educated workforce, however, hits some segments of the population harder and creates some risks in the event of any changes to the dominant lobster industry.

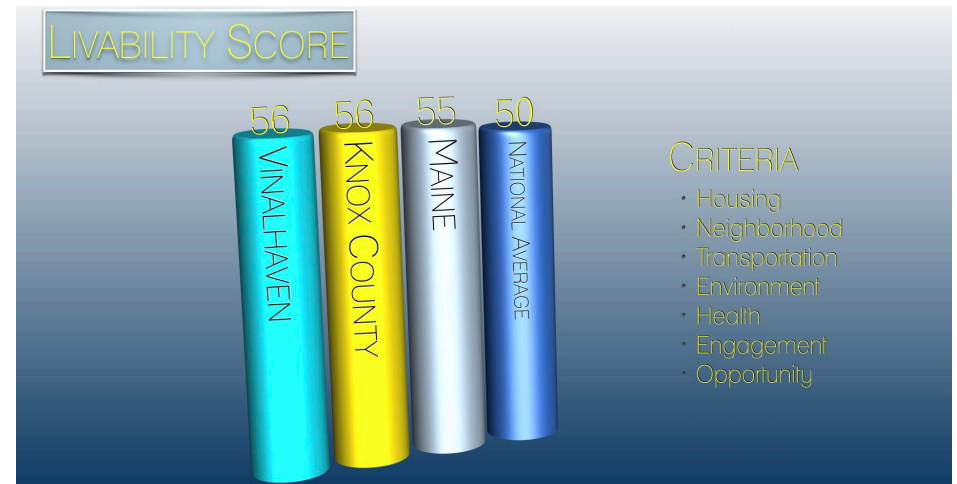


**Not surprisingly, fishing and related construction trades dominate employment on Vinalhaven, other services and retail are still critically important.**





Consistent with the high quality of life, Vinalhaven does well on life expectancy and commutes.



The AARP Livability Index, a basket based on various social resiliency criteria, rates Vinalhaven and Maine in general slightly above the nation, scoring especially well on community engagement and the environment but much weaker on walkability and access.

If Vinalhaven can move to address the risks from higher tides, the threats to downstreet Vinalhaven, and future threats from warmer waters, it can remain an amazing attractive place to live, work, and play.



The DART recommendations are designed to address the threats to Vinalhaven remaining a resilient and vibrant community.





# Social Resiliency



## SOCIAL RESILIENCY: THE RELATIONSHIP OF VINALHAVEN WITH THE SEA

From the minute a visitor steps foot on the island, the relationship of Vinalhaven's residents to the sea is clear. Vinalhaven is first and foremost, a lobster community that has based its economy on the ocean. When residents were asked about what they loved about their community, and what they wanted to keep, they described a strong sense of place, a place where nature shaped their way of life, and a close-knit community. In order to retain existing residents and recruit new individuals and families who could live, work, and play on the island, a combination of environmental, economic, and social resiliency strategies should be implemented.

Many of the physical improvements that will need to be made in order to increase Vinalhaven's resiliency and ability to thrive in the face of sea level rise will require years of planning, financing, design, and construction in order to implement. While the community works to implement these changes, it is important to also consider ways to increase the economic and social resiliency of the community.

The Rockefeller Foundation and Arup developed the City Resilience Framework, a lens to understand the complexity of cities and how different systems affect each other.

Social resiliency is defined in many ways, one of which is "strengthening neighborhood-level relationships and increasing community resilience, specifically in regards to emergency preparedness as well as disaster response and recovery". The following recommendations address the Health & wellbeing and Economy & society components of the framework.

### Accessible, Affordable Housing Choices

During the DART visit, residents identified several concerns related to the availability of housing on the island. Some identified the limited amount of quality, affordable rental housing while others cited a clash between year-round residents and seasonal visitors as issues.

An analysis of data from the American Community Survey from 2010 to 2015 supports some of these concerns. The smallest level that housing cost burden data is available for is Knox County, although the data seems to accurately represent conditions described on the island. Traditionally-accepted standards identify affordable housing as circumstances in which residents pay no more than 30% of their income on housing costs. Burdened residents spend between 30 and 49% of their income on housing, while severely burdened spend more than 50% of income on housing.





Table 1 shows a slight decline in the number of residents owning their own homes who are mildly or severely cost-burdened from 2010 to 2015. Of 12,901 computed owner-occupied units, 31% were cost-burdened.

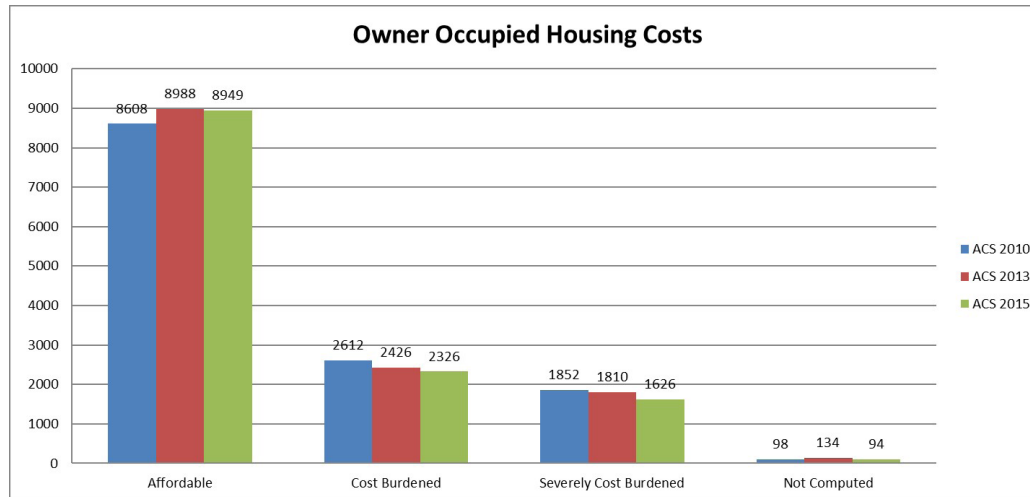
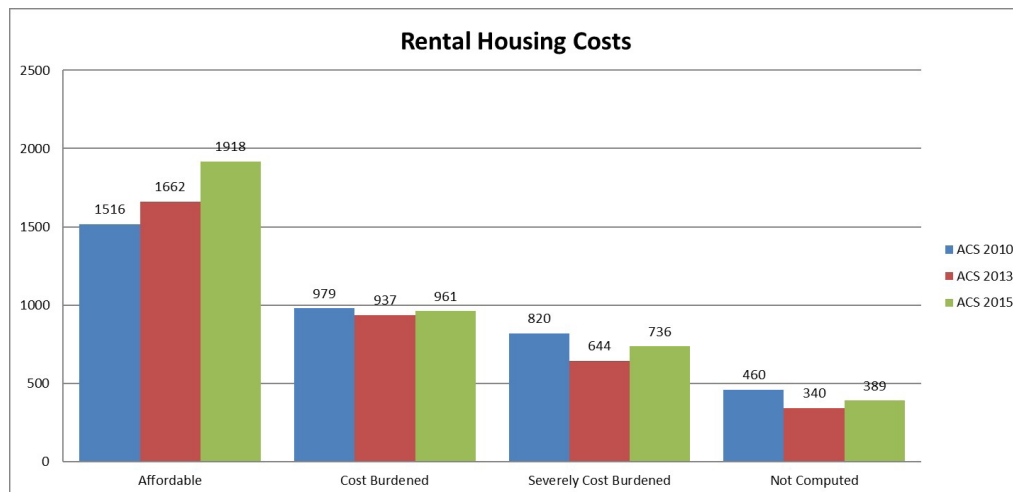


Table 2 describes the condition of the rental housing market. It identifies a slight increase in the number of mildly- and severely-cost burdened households from 2013 to 2015. Of 3,615 computed rental housing units, 47% were cost-burdened.



#### **Recommendation: Physical improvements to existing housing stock**

Cost of new construction on an island can be limiting, and residents indicated that there is a significant

number of existing homes on the island that could be rehabilitated. The City, private financial institutions, and non-profits should consider financial incentive programs that support private rehabilitation of residential properties. Cities across the country have customized incentive programs to address specific geographic or economic conditions in their community. Workforce housing incentives like those in the City of Dubuque, Iowa, for example, may be available specifically to individuals who make between 80 and 100% of area median income. Downtown housing incentive programs may be a strategy to create affordable housing units in currently-vacant second stories on Main Street. Resources such as the Workforce Housing Coalition of the Greater Seacost may be available to assist.

Vinalhaven residents are already making energy improvements. These improvements benefit the environment and reduce the cost of housing. Renters are particularly burdened by energy costs and typically pay approximately 30% more, as a portion of their income, on their utility bills because they live in inefficient units. The City and relevant non-profits should continue to pursue energy efficiency improvements as a way to reduce housing cost-burden on the island.

#### **Dubuque's First-Time Home Buyers Program**

Utilizing HUD funding, the City of Dubuque makes 0% interest loans available to first-time home buyers. \$5,000 loans are available for those making 80% of median income, while \$25,000 loans are available for those making 30% of median income. Participants are required to attend a home ownership workshop facilitated by the City in order to learn valuable skills like home maintenance, financial planning, and insurance basics.

#### **Recommendation: Policy considerations to increase availability**

The City may also consider policy development that will place limitations on the type of rental housing that is allowed in particular areas, or require new development to include a minimum amount of affordable or workforce housing units.

Short term rental zoning provisions have been implemented by communities that have a high number of transient populations or tourists to ensure that an adequate number of year-round rental units remains available. Regulations can require that short-term rentals (e.g. less than 30 days) only exist in certain geographic areas, or that a special use permit must be obtained from the City. Cities that have developed short term rental programs include Charleston, South Carolina and Jackson, Wyoming.



### ***Recommendation: Creative new residential development***

If new housing is created on the island, creative solutions can create affordable units. Bridgeton, Maine recently developed The Cottages at Willet brook, a private community of 600-1800 square foot, energy-efficient homes that share common spaces. The Prairie Hill Cohousing Project in Iowa City, Iowa includes a variety of housing footprints, including small flats and duplexes, as well as shared gardens and community gathering spaces. The small footprint decreases home costs while the design of the project intentionally builds a sense of community.



### **Maintain the Experience of a Close-Knit Community**

The feeling of a connected community was named as one of Vinalhaven's largest assets. The need to maintain that feeling as new individuals moved to the island was also identified as a potential challenge.

### ***Recommendation: Create flexible community gathering spaces***

Residents have considered the need to build a new playground in order to create outdoor space for the young families on the island. Whether in an existing space or in one created by the removal of an existing building on Main Street, community partners should consider the creation of flexible outdoor spaces that can serve the needs of residents and tourists alike. Plazas with flexible furniture like the one in Portland, Maine can create gathering spaces for summer tourists or host small community open mic nights.





A cost-effective way to create play space is to consider purchasing or repurposing a trailer that could be filled with tables, chairs, inflatable movie screen and projector, lifesized board game pieces, and other items that could easily be moved throughout the island. Dubuque recently purchased and outfitted its Rec n Roll trailer for approximately \$16,000.



#### ***Recommendation: Multi-use community center***

A longer-term solution to this need may be the construction of a new community center that houses flexible space to adapt to the needs of local residents. Models like the Key City Creative Center include large open spaces that can be transformed for community workshops, athletic events, or community celebrations and smaller spaces that can be used for startup businesses, classes, or small meetings. The close proximity of rooms within this type of makerspace make it ideal for building community, fostering collaboration between small entrepreneurs, connecting youth to job opportunities, and more. The development of a community center could also include smaller spaces that are made available for private businesses like a laundromat or small coffeeshop, both of which were identified as potential community needs and private sector opportunities.

#### ***Recommendation: Improve opportunities to age in place***

The American Association of Retired Persons (AARP) Livability Index gives Vinalhaven

a 56 out of 100 potential points when scoring the characteristics that make it an age-friendly community. Scores range from a low of 36 when assessing neighborhood amenities to 91 when assessing engagement opportunities for seniors. Several non-profits on the island are already working to make improvements so that seniors have access to the services and amenities they need so that they can age in place.

In addition to improvements to the availability of affordable housing, a major priority, sidewalk improvements in the downtown should be made to increase the walkability of the community for all residents. When seniors are no longer able to drive, the availability of ride-sharing programs or a taxi service will also improve their mobility options.

Seniors must also have access to basic medical care in order to stay on the island. Exploring opportunities for telemedicine and ensuring that pharmacy services are available in a timely manner on the island are critical.

Finally, seniors' social needs are equally important to many of their physical needs. Part-time job and volunteer opportunities can keep seniors connected to their community and also provide steady income sources.

#### ***Innovation & Resiliency***

As Vinalhaven adjusts to changing climate, economic drivers, and demographics, it will be challenged to maintain its resiliency. A resilient community not only bounces back from a threat to the same state it was in, but "bounces forward", creating new opportunities for itself.

One way in which Vinalhaven can do so is to develop a diverse economy that will retain the youth that currently live on the island, training them with the skills they need to fill the jobs located there, and also recruit young entrepreneurs to the community. The City should prioritize investment in technology and other infrastructure so that small business owners are able to meet their basic needs and invest their own capital in business development.

Net-zero residential and commercial development is one way to meet the infrastructure and housing needs identified while minimizing the island's environmental footprint. Net zero buildings create as much or more energy as they need to function, and also include features like water reclamation and composting facilities so that the operation of the structure doesn't leave any lasting impact on the environment around it. Features of a net-zero home like the ones in Abundance Village in Fairfield, Iowa can include energy-efficient components like double insulation, water-efficient fixtures, rain barrels, solar panels, and backyard composters. This concept can be taken a step further to consider a zero-waste community, in which everyone has ample opportunities to divert waste through recycling, reuse, and composting facilities. A



useful first step in movement towards a zero-waste economy would be to conduct a waste audit to identify low-hanging fruit and other opportunities for savings.

### **Creative Economies**

The presence of a co-working space points to the creativity of professionals on the island. If these basic needs are met, Vinalhaven residents will be able to pursue innovative economic development opportunities that can sustain the island.

Sustainable agriculture practices may be one of the best opportunities to explore these innovations while shielding the island economy from the volatility of the lobster market. On land, beginning farmers have some opportunities (although they may be limited by soil quality and availability) to expand agriculture production into shoulder seasons through the use of hoopouses. Investments in edible landscapes are an opportunity to grow fresh, local produce in small spaces given the lack of farm land and also build community around food. Produce and meat that has an opportunity for value-added production should be prioritized, as it maximizes income potential throughout the year. And lastly, the community should continue its exploration of kelp farming and other opportunities to diversify sea-based economies.



# Coastal Flooding



## RESILIENCY TO RISING SEAS

The heartbeat of Vinalhaven is the regular flood and ebb of the tides, with water racing in and out of Carver Pond through the tidal sluice under Main Street. Yet the rise and fall of water in the harbor and Carver Pond are an ever present reminder of the hazards from coastal flooding that can impact the town from both sides of Main Street. These hazards include extreme annual high tides that produce nuisance flooding and severe storm tides (storm surges) that occur every few decades producing major flooding, both of which are made worse over time due to sea level rise.

## EVALUATION OF COASTAL FLOODING

The DART Team performed a rapid assessment of coastal hazards by first collecting elevation data for buildings and infrastructure along Main Street and then comparing these to projected high tides and storm tides for different future sea level rise scenarios.

**Ground Elevations:** Elevation data were taken during the site visit using a laser rangefinder. Methods are approximate as the rangefinder is only rated to 0.5 foot vertical accuracy; so survey results are not a substitute for a more accurate land survey by a licensed professional land surveyor. In addition, no definitive reference elevation could be located along Main Street, so elevations were taken relative to low tide on the date of the survey, Saturday October 14, 2017, and then converted to the approximate level of the North American Vertical Datum of 1988 (NAVD88) via comparisons to tidal levels observed at the same time at Bar Harbor and Portland.

Specific elevations were measured along a transect line cutting south-to-north across Main Street. The transect passed through the parking lot on the south side of Main Street, extending from the harbor across the parking lot to the front of the Carvers Harbor Market, and then was offset along Main Street before continuing north along the side of the market building to Carvers Pond. Additional elevation measurements were made for first floor elevation of buildings along both side of Main Street.

**Water Levels:** No direct tide data exist for Vinalhaven, so values are interpolated using data from Bar Harbor and Portland. Note that results would differ if either Portland or Bar Harbor alone was used. Normal high tides can be represented by Mean Higher High Water (MHHW), estimated to be +5.1 feet above NAVD88. Annual high tides producing nuisance flooding of the parking lot and other areas coincide roughly with the Highest Astronomical Tide (HAT) estimated to be +7.3 feet NAVD88. A notable King Tide from November 2016 reached an elevation of about 7.6 ft NAVD88

Extreme storm tides, produced by large winter storms, can be much higher. The storm of record, from February 1978, produced a storm tide of about +9.7 ft NAVD88. The 2016 Knox County Flood Insurance Study indicates a still water elevation of +8.8 feet NAVD88, for the 1% annual probability or so-called 100-year storm event. With wave effects added to this still water level, the FEMA Base Flood Elevation (BFE) is +10 ft





NAVD88 (Zone AE) for most of Main Street, but is +13 ft NAVD88 (Zone VE) for areas near the Harbor and for the shoreline areas along Carver Pond.

One complicating factor for the town is that the VE zone at +13 feet with wave effects extends across Main Street at the sluice structure and into Carver Pond. As a result, several buildings on the north side of Main Street are in the VE Zone. The VE zone indicates, in FEMA methodology, wave heights greater than 3 feet.

**Existing Flood Threats:** Existing flood threats across the elevation transect are illustrated below.

While normal high tides are below the wharf elevation, nuisance flooding (high tides experienced now about once every few years) flood the parking lot near the wharf, with water rising from the storm drain at the low spot of the parking lot. Flooding may also occur in low portions of the road due to water rising from storm drains. Along Main Street, most first floor elevations are above the nuisance flooding level. On the Carver Pond side, nuisance flooding can extend into the back or basement level of some buildings.

Extreme storms, with a peak elevation of 10 feet (rounded upward from the +8.8 ft FEMA still water level and the +9.7 ft peak for the storm of 1978) would potentially overtop the entire transect from the harbor to Carvers Pond. Water would overtop the wharf and flood the parking lot and Main Street to a depth of 2 to 3 feet. This threatens almost all buildings on Main Street with water level above their first floor elevations. Most wharf elevations along the harbor would also be overtopped.

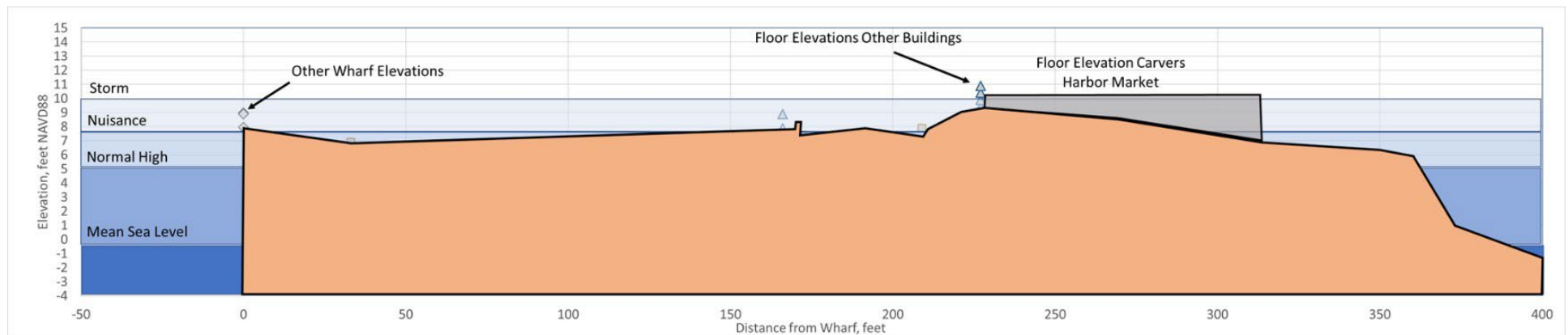
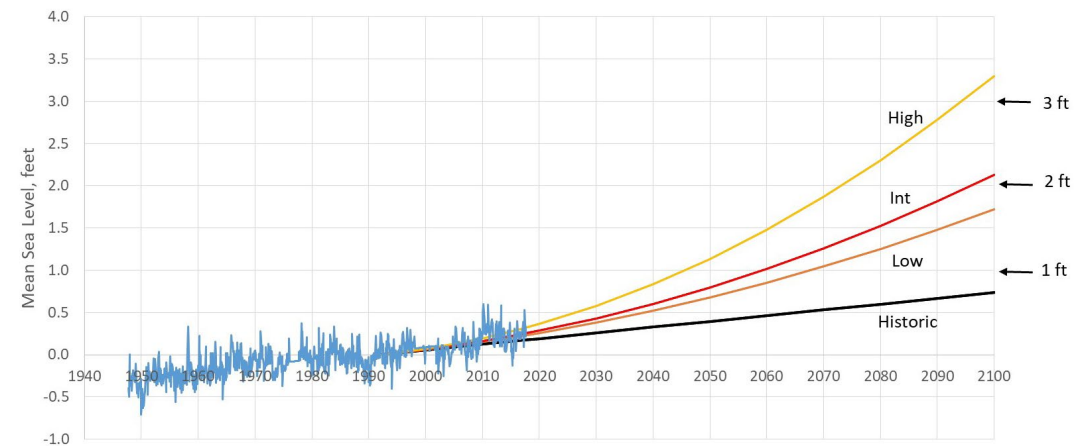
**Future Sea Level Rise:** The Maine Geological Survey suggests that future coastal flooding hazards consider sea level rise of 1, 2, 3.3, and 6 feet. A recent report by NOAA from January 2017 "Global and Regional Sea

Level Rise Scenarios for the United States" confirms the range of 1, 2, to 3.3 ft as highly probable scenarios through the year 2100, but places much lower probability on the 6 foot value. The historic rate of sea level rise for Portland is shown below, with future trend curves following the NOAA report for low, intermediate, and high emissions scenarios. For simplicity, the DART assessment included sea level rise of 1, 2, and 3 feet by 2100 as shown.

**Future Flood Threats:** The 1, 2, and 3 ft future sea level rise scenarios would allow all tidal flood elevations to rise, producing much higher levels of nuisance flooding and storm flooding in the future.

Under 1 foot of future sea level rise, which is similar to the historic trend and therefore highly probable, annual nuisance flooding would cover Main Street and the parking lot with more than 1 foot of water. This would start to occur several times per year. Extreme storm events would overtop the first floor of the Market and all first floor elevations along Main Street.

Under 2 feet of future sea level rise, normal high tides would also start to flood the parking lot and the rear of some buildings along Carver Pond. Nuisance flooding would reach the same level



that currently exists for the most extreme storms, with water depths of 2 to 3 feet over Main Street and with water levels above most first floor elevations. But this could occur hundreds of times per year. Extreme storm events would reach almost 2 feet above the Carver Market first floor.

Under 3 feet of future sea level rise, which would occur under a continuation of high global greenhouse gas emissions, even normal high tides would cause flooding of the parking lot and Main Street, probably hundreds of times per year. Nuisance flood levels (about equal to today's HAT) would overtop most first floor elevations and would cover the area from the harbor across to Carvers Pond. Flood levels in extreme storms could be 3 feet above values experienced in the 1978 storm of record.

## RESPONSE TO COASTAL FLOODING

Vinalhaven, like all coastal communities, has three basic options for responding to elevated flood waters: Abandon, Armor, or Adapt. These three basic options are also sometimes listed as: Retreat, Protect, and Accommodate. The "Abandon" or "Retreat" option generally refers to the option of moving or relocating buildings to another location. The "Armor" or "Protect" option refers to construction of hardened floodwalls, perhaps in conjunction with closing the sluice structure. The "Adapt" or "Accommodate" option encompasses a wide range of other possible responses of living with flood waters, including elevating buildings, raising roads, and wet or dry flood proofing of buildings.

The goal of the DART assessment is to suggest ways that Vinalhaven can improve community resilience. Improved resilience does not mean, however, that floods are eliminated. For flood resilience, the goal would be for the community to take actions to reduce the number and severity of flood events, to reduce flood damages, and to reduce the time to rebuild and recover from a flood event.

**Factors Influencing Community Resilience to Floods:** Several characteristics of the town may influence the Town's resilience to flooding and decisions on future responses.

The town is fortunate that Maine has a low historic rate of relative sea level rise and no long term ground subsidence, putting Vinalhaven in an advantageous position compared to most U.S. east coast communities as far as adjusting to future sea level rise. In addition, the storm surge potential is low and the elevation of storm tides above normal high tides is quite small compared to many locations that must contend with much larger storm surge. Still, these factors are of little comfort when a large storm occurs or, in the future, when a storm occurs on top of elevated mean sea levels.

In terms of infrastructure, there is only one major road (Main Street) impacted by flooding in the study area (other impacted roads exist around the island, outside of Main Street), and stormwater can drain in two directions, either to the harbor or to Carvers Pond, both of which simplify the considerations of response alternatives.

In contrast, however, Vinalhaven's situation is potentially made worse by the fact that the Main Street area is effectively a peninsula surrounded by water on three sides – the harbor, Carver Pond, and the sluice structure. As a result, the total length of floodable shoreline is fairly large relative to the enclosed land area.

The porous nature of the granite "grout" used to fill the land area is also problematic, as it may be so porous as to allow a nearly free flow of water through the ground under Main Street and under existing buildings. The team was not able to investigate the porosity of the grout fill but heard concerns from the residents.

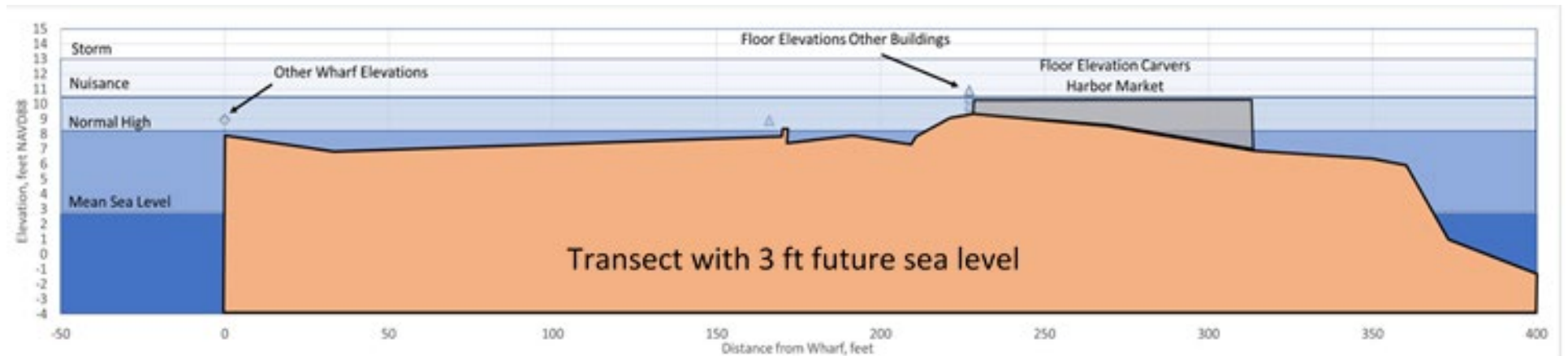
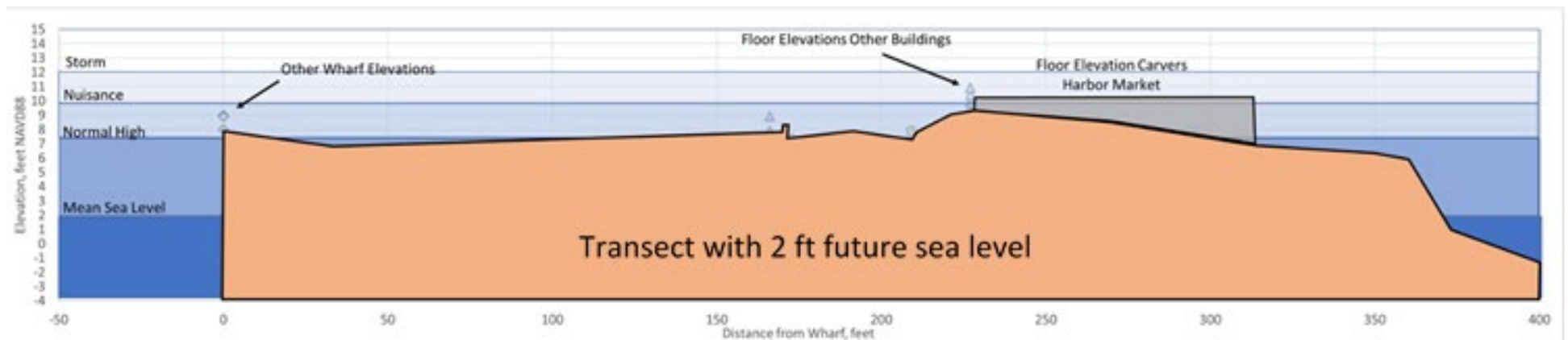
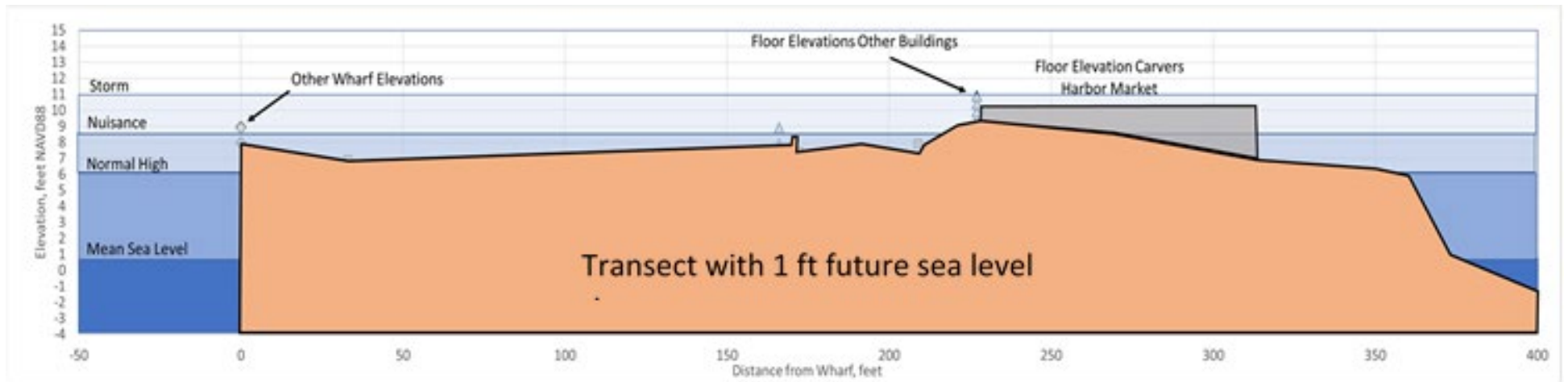
Regardless of the unknown porosity of the grout fill, the sluice structure now provides the main conveyance of tidal flows from the harbor to Carver Pond and vice versa. The sluice is an iconic symbol of the town but one that worsens the flood potential and makes solutions to flooding more difficult and expensive.

Two other factors may help or hinder flood protection, depending on what options are implemented. First, is the issue of land ownership. Main Street is a state-maintained roadway and thus can be modified with state assistance. On the harbor side, much of the land area is publically owned (parking lot) and is amenable to construction of public infrastructure for flood protection. The Carver Pond shoreline, in contrast, appears to have more private ownership of land and thus would be more difficult to implement publicly-financed flood protection.

Similarly, several aspects of the existing buildings along Main Street have both positive and negative characteristics as far as flood protection is concerned. On the positive side, buildings are light wood frame construction, allowing options of moving or elevating in response to the flood threat. On the negative side, it is difficult to flood proof wood frame buildings as their walls and floor are buoyant and porous, making it difficult to keep water out or to prevent floatation. In addition, all buildings are privately owned, making it difficult to coordinate a unified response to flood threats.

**Abandon or Retreat:** Vinalhaven residents are justifiably proud of their maritime history and working waterfront. Lobster fishing is the economic pulse of the community and the vibrancy of the community is linked to proximity to the sea. The DART analysis has focused on the near term – a time span of several decades – in which the rate of sea level rise should allow continued use of the Main Street. This will require adjustments to and provisions for more frequent nuisance flooding and higher potential storm tide levels. The higher sea level rise scenarios of 3 feet or more will take decades to materialize and the town will have some time to better understand the likelihood of these extreme scenarios that are now uncertain. Though not part of the DART analysis, the Town should consider that in the long term – by the end of the century – it may be necessary to relocate the Main Street commercial buildings if higher sea level rise projections become a reality.





**Armor:** In the context of Vinalhaven, the armoring option may include the possibility of constructing a flood wall around the Main Street “peninsula” to keep elevated flood water out of buildings. This option may consist, for example, of concrete flood walls running generally parallel to Main Street, with one wall on the harbor side (the location could be along the side of the road, along the wharf, or could bisect the parking lot) and the other other running along the Carver Pond shoreline. Closure gates (either rolling or swinging flood gates that could be closed by the Town emergency response team) would be required across Main Street to connect both sides of the flood wall) and at any location where a road penetrates the wall such as into and out of the parking lot. A modified flood wall strategy could require closing the sluice structure to prevent tidal flow and storm tides from flowing into Carver Pond. This may eliminate the need for a large flood wall on the Carver Pond side of the Main Street buildings. All flood wall options are complicated by land ownership issues. While flood walls are technically feasible (subject to better understanding the porosity

of the grout fill) they would likely be very expensive, given the long lengths with relatively little land area protected. Like relocation, the armoring option was not considered in great detail by the DART Team.

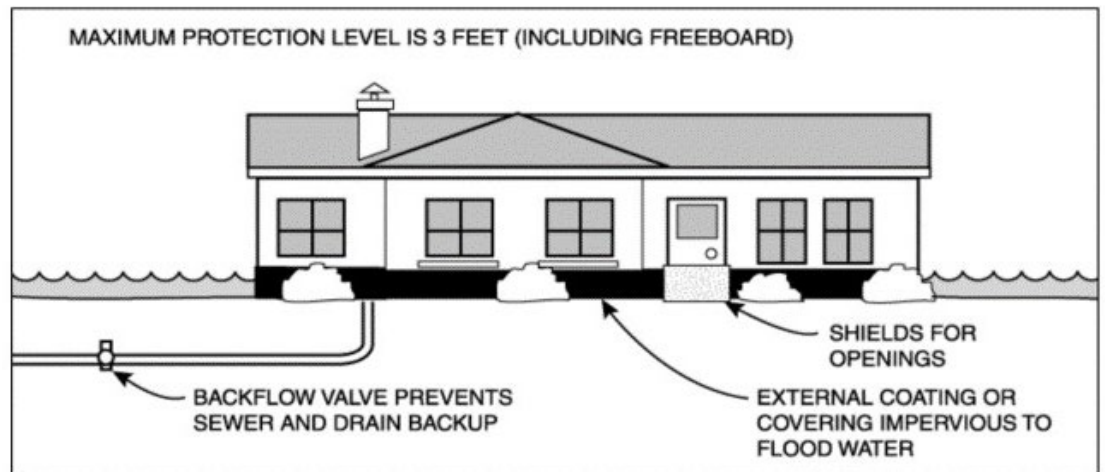
**Short Term Adaptation:** The DART team focused primarily on other flood adaptation options that could be implemented by individual building owners or collectively by the Town with the goals of providing protection from nuisance floods and lessening impacts of major storms over the next several decades.

Individual building owners should implement appropriate dry and wet flood proofing techniques to limit flood impacts to their buildings and contents. Specific measures that can be implemented may vary from building to building, and should be implemented only after careful consultation with flood proofing experts.

*Dry floodproofing* generally refers to actions taken to keep flood waters out of a building. These may include installing backflow preventers to keep flood waters from backing up sewer pipes, applying waterproofing coating to building exteriors, or installing door dams or barriers to prevent water from entering door openings. These methods are generally most appropriate for buildings built a slab on grade and with masonry, brick, or concrete wall construction. They are more difficult to implement – or may be detrimental to the building – in case where buildings are light wood frame construction and where the first floor is elevated but the strength of the attachment to support piers is uncertain. Water proofing walls and installing door dams do little good if the building is elevated above a crawl so that water rises through a porous floor from below. Waterproofing the perimeter of light wood frame walls maybe harmful and cause the entire building to be more buoyant and float off the foundation, or collapse due to unbalanced water pressures.



Examples of flood walls surrounding harbor area in Vlissingen, Netherlands.





*Wet floodproofing* generally refers to actions taken to reduce damages while allowing flood waters to freely enter a building. Examples include raising electrical panels and running wire down to outlets rather than up from a basement, moving equipment (furnace, water heater, etc.) to a higher floor or elevated above the flood elevation, replacing batt insulation with foam (panels or spray foam) below expected water levels, installing flood-proof flooring materials, installing waterproof wall materials (replacing drywall or wood planks) below the flood level, and having provisions to move interior contents upstairs in the event a flood is forecast. The idea is to reduce damages and make it easy to clean after a flood. In this case, opening may even be provided to allow for a more free flow of water onto and out of the building as that can equalize water pressure to prevent floatation off a foundation.

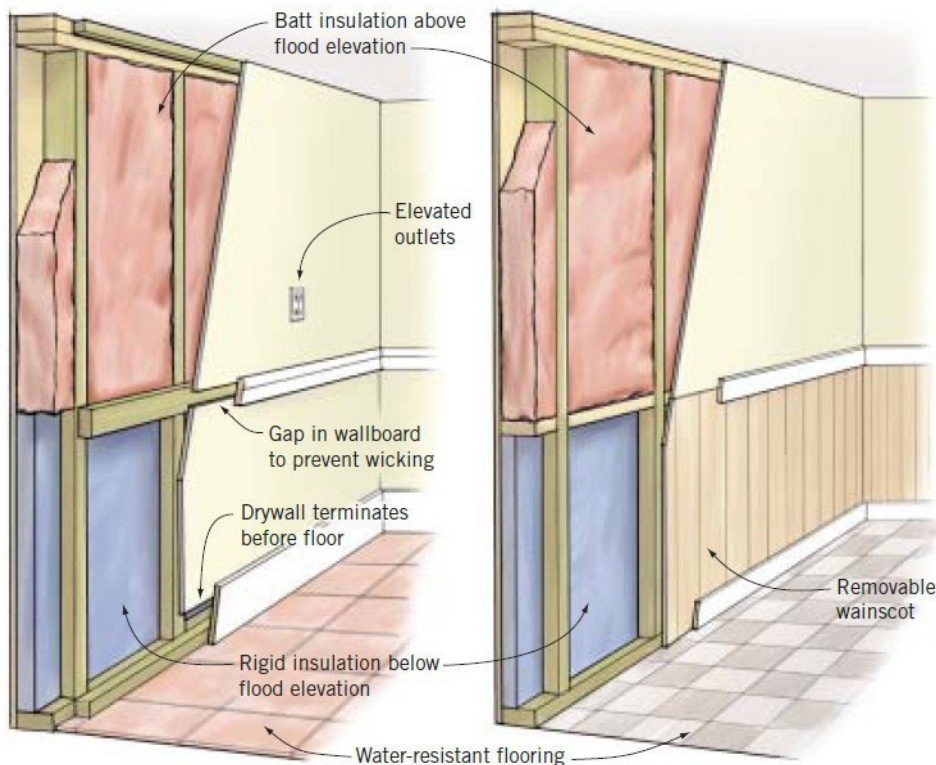
*Raising buildings* is also a widely used technique to lessen the chance of flood damages. After hurricane Sandy, thousands of homes and small buildings were raised in New Jersey and elsewhere, so the procedure is becoming more common. The procedure usually involves some excavation around the perimeter of a building foundation, sliding steel I-beams under the building, and then raising the building supported by the steel beams using hydraulic jacks. Once raised on jacks, the building

is often set back down on temporary wood cribbing supports while a new foundation is constructed. Once the new foundation is complete the building is jacked up off the cribbing and set back down on the new foundation at the new elevation. This process works well when buildings are stand alone; some buildings on Main Street will be more difficult as they are attached and share walls.

For Vinalhaven, most of the Main Street buildings have a FEMA BFE of 10 ft. Elevating building first floors to about +13 ft (or more to add extra freeboard) would increase the elevation enough to allow for 3 ft of future sea level rise keeping the same flood potential as currently exists. Raising buildings would be largely controlled by individual owners, but the Town could assist and coordinate if blocks of owners agree to elevate at the same time.

*Raising roads* is perhaps the best strategy recommended for the Vinalhaven community for a coordinated response to flood threats. The elevation of Main Street varies but for the transect measured was between 7 and 8 ft NAVD88. This make the road vulnerable to nuisance floods, with increasing flood frequencies projected as sea level rise. Raising the road surface to about 9 ft NAVD would elevate the road above

### DRAINABLE, DRYABLE WALL CONSTRUCTION





the nuisance flood level projected for several decades into the future. It would even elevate the road above the FEMA 100-year still water levels of 8.8 ft NAVD, though not fully to the 10 ft BFE (which includes wave effects, and is then rounded up to nearest whole foot). Elevating the road can be implemented as a community action with state participation, and can be implemented along with modification to side walks. This would require close cooperation with local building owners, as many transitions would be required for adjacent privately owned driveways.

A similar strategy can be used to elevate the wharf over time and to elevate the parking lot between the wharf and Main Street. These areas will see increased flood frequencies and flood depths, so a long term strategy of raising their elevations is a prudent adaptation to future sea level rise that can be implemented by the community.



*Construction to raise road in Miami Beach.*



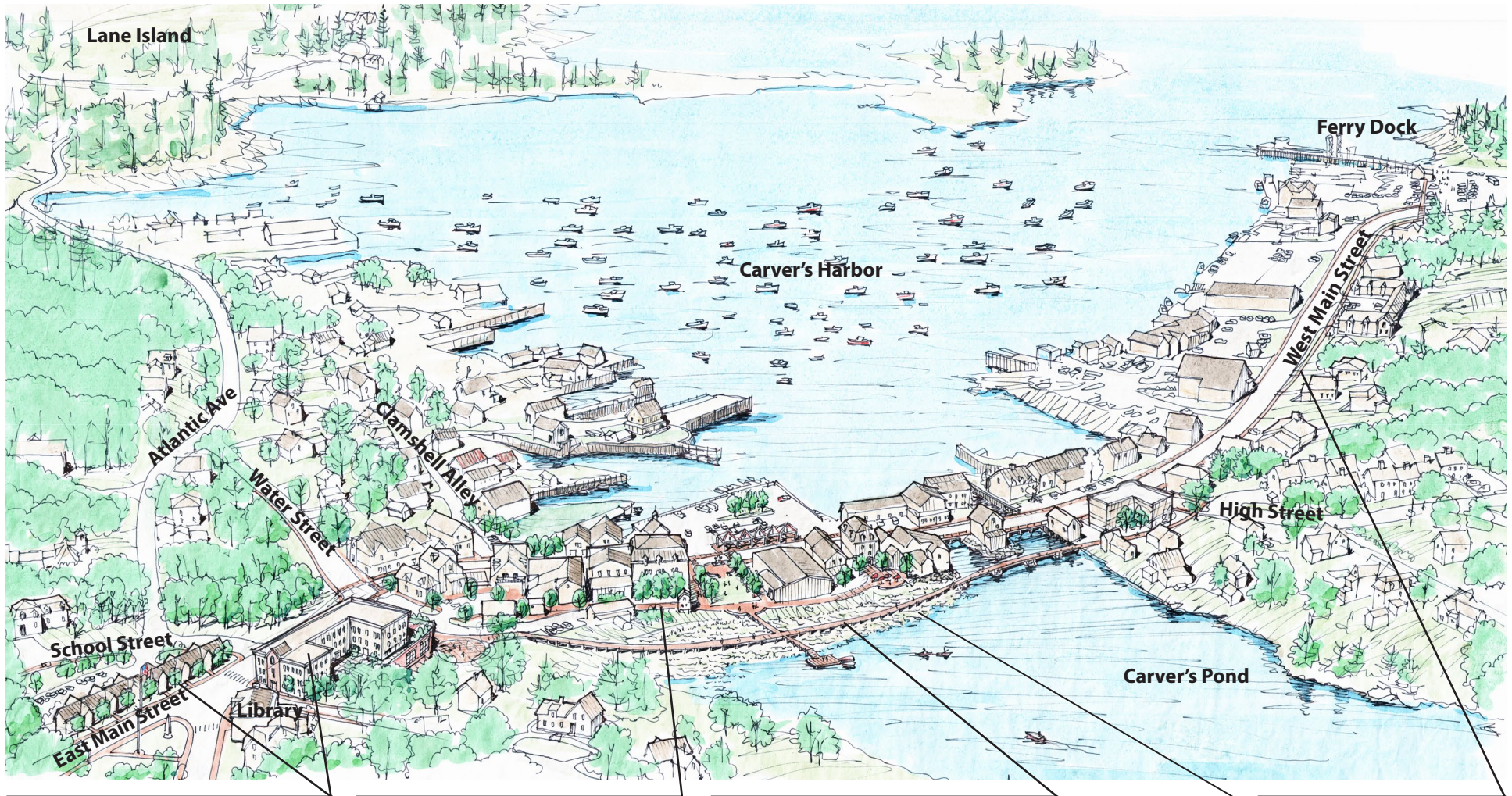


# Connections & Complete Streets



# A Vision for a Vibrant Main Street: Perspective Looking South Across Carver's Harbor

*This perspective view of Carver's Harbor and Main Street illustrates how the Downstreet area could be change over time to include additional housing, a community center, pedestrian improvements, recreational trails, and new opportunities for economic revitalization.*



New townhouses and a mixed-use building frame East Main Street and with the library provide a community anchor. Set into the hill on the DPW site, a new multi-story building modeled on the old New Factory could provide affordable family and worker housing on upper floors, with a community center on the lower level.

A combination service alley and pedestrian walk crosses the rear of the buildings along Main Street, easing congestion on the front walks. Attractive paving, trees, lighting, and other landscape improvements would encourage businesses to open up new shop fronts and cafes on the North side overlooking Carver's Pond.

A new multiuse path/boardwalk provides a safe route for bikes and pedestrians from High Street to the community center and East Main. A viewing platform and boat launch enhances recreational access to Carver's Pond. A new park in the location of the current Post Office building creates an inviting connection.

Constructed wetlands help to treat storm-water runoff from the village before it gets to the Pond, improving water quality.

Continuous sidewalks provide for safe pedestrian travel from the Ferry Dock to Downtown. This could include an 8-10 foot wide multi-use path on the north side to accommodate Bicycles.



# Complete Streets Strategies for Main Street: Existing Conditions

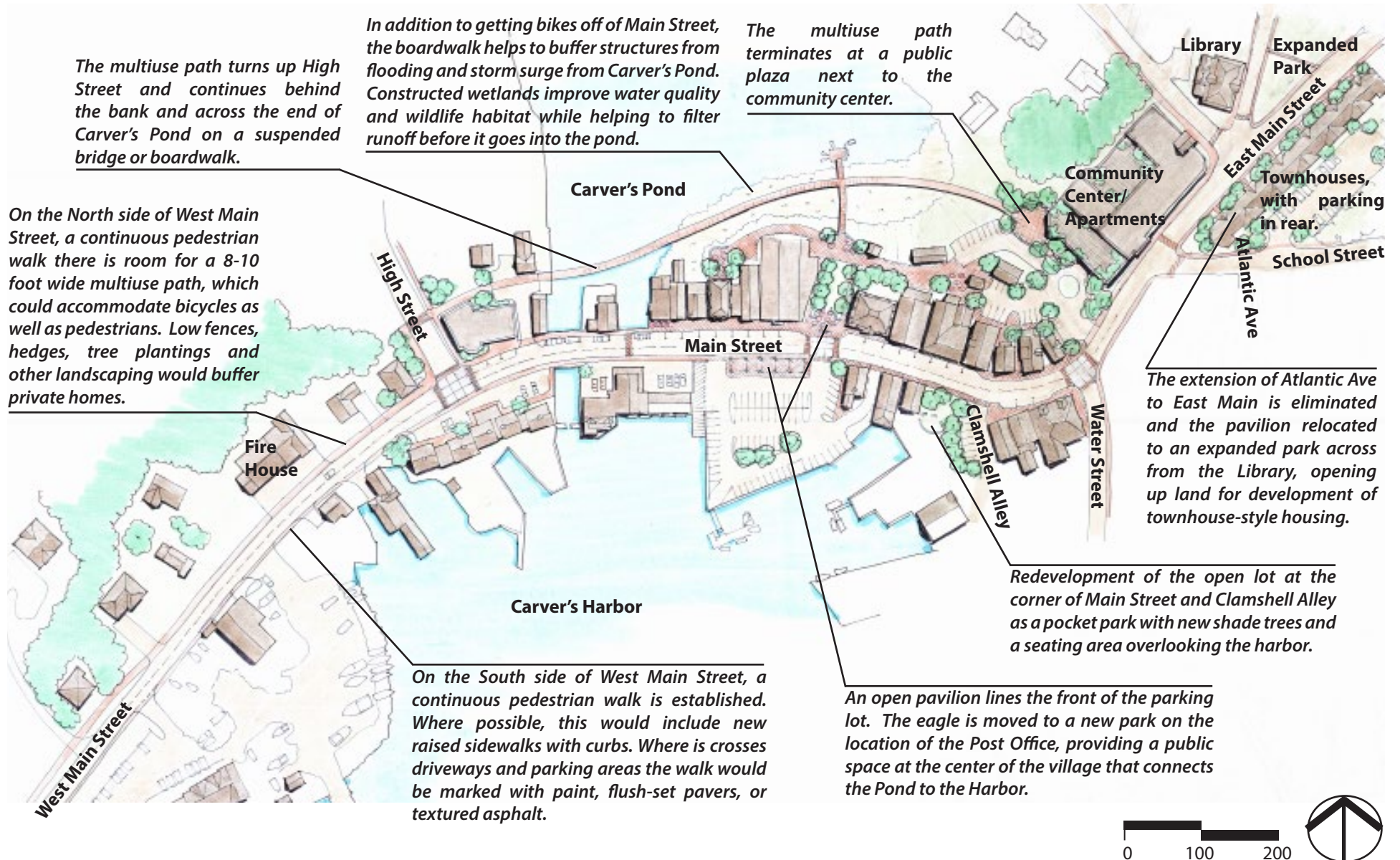
Based on Geographic Information Systems (GIS) mapping data from the town and the state of Maine, this map is based on an aerial photograph, overlaid with property lines and labels with land ownership. Orange lines represent two-foot contours.





# Complete Streets Strategies for Main Street: Conceptual Plan

*This conceptual plan shows one way that Main Street could be redeveloped over time to improve pedestrian safety and comfort, provide attractive new gathering places, and create opportunities for new housing, community uses, and business development. The purpose of this plan is to illustrate design ideas that can help achieve the town's goals for safety, accessibility and beautification - development of a final plan will require detailed engineering analysis, building feasibility studies and public discussion.*





## Complete Streets Strategies for Main Street: Conceptual Plan Detail

At the center of the Complete Streets strategy is the goal of making Main Street accessible to all users, while accommodating all forms of transportation, and doing so in a way that make the street both more attractive and resilient to flooding. This plan shows how an approach that combines public and private land into a unified masterplan can accomplish these goals. By using space more efficiently, existing parking and service access can be maintained and improved while opening up new areas for public parks and other pedestrian amenities. See text on the next page for further explanation of numbered plan elements.





## COMPLETE STREETS STRATEGIES FOR DOWN STREET

In 2013, Complete Streets was formally adopted as a policy by the Maine Department of Transportation (MaineDOT). Among other things, the intent of this policy "...is to help ensure that all users of Maine's transportation system ...including bicyclists, pedestrians, people of all ages and abilities, transit users, and motor vehicle users, have safe and efficient access to the transportation system" (MaineDOT Complete Streets Policy – Adopted June 18, 2014, p. 1). As further described by the policy, Complete Streets are part of a multimodal transportation system, which maintains necessary travel lanes for vehicles, but is also designed, as needed, with sidewalks, bicycle lanes, transit stops, ADA-accessible routes and other elements.

These issues are of particular concern along Main Street in Vinalhaven, which is the key crossroads (and bottleneck) on the island. Constructed on fill across the mouth of what is now Carver's Pond, Main Street incorporates two travel lanes, a row of parallel parking on the north side, and a narrow sidewalk on the North side. On the South side there are some short segments of sidewalk, but for the most part pedestrians have to share the edge of the street with parked cars, driveways, and head-in parking spaces that extend to the edge of the street. Throughout the downtown there is no accommodation for bicycles, other than sharing the vehicular lanes, and most buildings are not ADA accessible.

As in most historic villages, Vinalhaven was laid out long before there were cars. Streets were of necessity shared by pedestrians, horses and wagons, and it worked because everyone was moving at more or less walking pace. Sidewalks or board walks were more important for getting above the muddy street and providing access to shops than for safety. After motorized vehicles arrived, safety concerns necessitated separation of the different modes of travel. Cross walks were invented in order to minimize conflict points.

Because Downstreet Vinalhaven was constructed on a narrow causeway there was never enough room to build continuous sidewalks, and the needed parking adjacent to businesses, shops and lodging continues to use up much of the available space. Potential planning and design solutions are complicated by seasonal swings in vehicular trip counts and pedestrian activity, not to mention the daily pulses of traffic to and from the ferry. In addition, any solutions have to be cognizant of the need to preserve the historic character of the downtown, including the need to avoid prettying it up too much, and turning it into something that no longer feels like Vinalhaven.

The masterplan and visualizations throughout this report illustrate some potential solutions to these issues. The ultimate solution will inevitably involve compromises between the needs for vehicular capacity, pedestrian comfort, parking, handicapped access and beautification. But if landowners, businesses, residents and the town work together across lot lines and right-of-way boundaries, there are many ways to achieve a more efficient design that can better accommodate these various uses.

## Bicycle Facilities

Safe and convenient bicycle access is an important part of the Complete Streets concept in general - and of particular importance on a summer resort island, where getting more people on bikes can ease traffic congestion and reduce the overall number of cars on the island. The Downstreet area is both a key destination and crossing point for bicyclists arriving on the ferry or touring the island. The Conceptual Plan identifies the possibility of a continuous multi-use path, 8-10 feet wide, along the north edge of West Main Street from the ferry dock to High Street. From there the path could run North of the Bank and cross a new bridge/boardwalk that would carry it across the south end of Carver's Pond[1], ending up at the entrance to a new Community Center [2]. From there it could continue East as a marked lane along the existing shoulder of East Main Street. (Numbers refer to the Concept Plan Detail)

While obviously more expensive than an on-road route, this new multi-use path would eliminate the need for bicycles to traverse the Main Street bottleneck. It would also create a visual and recreational amenity that would enliven the north side of Main Street buildings and provide a unique way of experiencing the Pond. The boardwalk could be constructed in such a way as to help buffer the north side of the village from wave action across Carver's Pond during storms. Constructed wetlands on either side of the boardwalk [3] could further dampen wave action, while also serving to filter stormwater runoff from properties along the edge of the pond, improving water quality.

## Pedestrian Improvements

There is currently a more or less continuous sidewalk or marked pedestrian lane from the ferry dock to the downtown, but it requires crossing numerous driveways and where it follows the shoulder of the road brings pedestrians close to traffic with no protection. Regrading to improve cross-slope, improved pavement markings and/or changes in pavement could all improve the pedestrian experience, especially along the south side, without compromising driveway entrances to important harborside businesses.

On the north side of East Main there is an opportunity to create a curb-separated continuous sidewalk that would link the ferry dock to the downtown. As described above this could be widened into a multi-use path. As part of establishing this sidewalk or path, driveways could be redesigned to limit the width of curb cuts. New curbs along the street, low retaining walls on the private side where needed, street tree plantings, fencing and other landscape improvements could help to separate traffic, reduce conflicts, maintain privacy for private house lots, and improve the appearance of the entire street. Care will have to be taken to maintain access to parking areas along the north side of the street, but as these tend to be used for long-term worker parking conflicts can be kept to a minimum.



As sidewalks enter the downtown, the narrowing width between buildings reduces the available width for new sidewalks. To maintain parking access to downtown businesses, pedestrian travel on the south side of the street will likely have to continue as painted zone within the street cross section rather than a grade-separated sidewalk. This can be improved with more consistent markings or the use of stamped asphalt or flush-laid pavers [4].

In the center of the village, the town parking lot offers an opportunity to create a multi-use space. By reconfiguring the edge of main street in front of the parking lot and shifting some parking spaces it would be possible to create a raised, linear pedestrian plaza, which could feature an open pavilion, pergola or other structure. This would improve the character of the street by reestablishing a stronger street edge and screening the parking lot. It could be used for summer market activities or as a simple gathering place with seating [5]. At the East end of the parking lot, the plan shows a raised cross-walk or “speed-table” which, as described elsewhere in this report, makes it more comfortable for pedestrians to cross the street and provides a clear warning to drivers to slow down as they enter the village center.

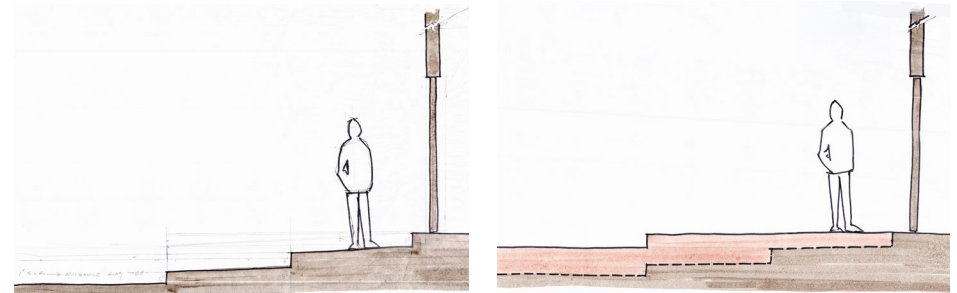
On the North side of Main Street [6] there is room for a more comfortable sidewalk width, which can even provide for outdoor seating and dining areas as exists at the Harbor Gawker. The principal issues are the grade changes, uneven heights of curbs, and lack of ADA access to buildings - which as described in the next section are probably best solved by raising the entire street. More consistent surface treatment either in concrete or pavers, would resolve tripping hazards and improve overall appearance.

The last major improvement to pedestrian access would take the form of a multi-use alley on the north side of the buildings facing Carver’s pond. The existing service alley would remain, but be improved with a coherent approach to width, paving materials, screening and plantings. This would maintain delivery access to the market and other businesses, but also open invite pedestrians to use this corridor to explore the pond and walk between businesses [7]. By improving access to the north side of the buildings and cleaning up the area, new opportunities would be created for businesses to open up entrances in the rear, with cafe’s looking out on the pond, etc. Shared parking could be established at the east end of the corridor, helping to reduce parking demand on Main Street [8].

## Accessibility

Aside from expense, the ability to rebuild Main St. to have continuous safe pedestrian circulation and provide ADA access to each building is limited by the narrow bridges and short distance between facades. Because of flooding concerns, finished floor levels within the structures cannot be lowered, and the elevation distance between existing floor levels and the street precludes the installation of realistic ramps.

In looking at Main Street from a resilience perspective, however, an interesting possibility emerged. Main Street is currently subject to storm surge flooding, and with sea level rise predicted over the coming decades will probably be inundated by high tides by mid-century. One way to reduce these impacts is to gradually raise the level of Main Street by bringing in more fill every decade or so as the street needs to be repaved. A happy benefit of this approach is that it will also reduce the relative difference in elevation between the street pavement and building entrances, allowing for handicapped access to be established to many building entrances without extensive ramp systems.



*Under the existing sidewalk conditions (left) the grade change between the street and buildings in some areas requires a curb, a step in the middle of the sidewalk, and another step or two into the building. By filling and raising both street and sidewalk area over time, the street can be brought above the flood level and ADA access provided to building entrances (right).*

## Parks and Other Public Spaces

The centerpiece of the new masterplan is a park that would replace the existing post office building, providing a tree-shaded gathering place and connecting the Main Street frontage with the new pedestrian alley in the rear of buildings facing the pond[9]. The eagle sculpture currently located at the edge of the town parking lot could be relocated to the entrance of the park, with a paved terrace area along the street for sitting and outdoor dining.

A second park space could be established on the empty lot at the corner of Main Street and Clamshell Alley [10]. This “pocket park” could include parking off the side street and a sitting area with views of the harbor. Plantings of new shade trees could take advantage of the deeper soil conditions.

In fact both parks would provide a valuable opportunity to introduce some large shade trees to the downtown. While the underlying granite fill makes tree planting problematic along Main Street, one function of the new park areas would be to allow for placement of soil beds extensive enough to support the planting of large shade trees. These would provide a welcome visual amenity to the downtown, reduce wind velocity and cut summer heat and glare.

# Building a Stronger Vinalhaven



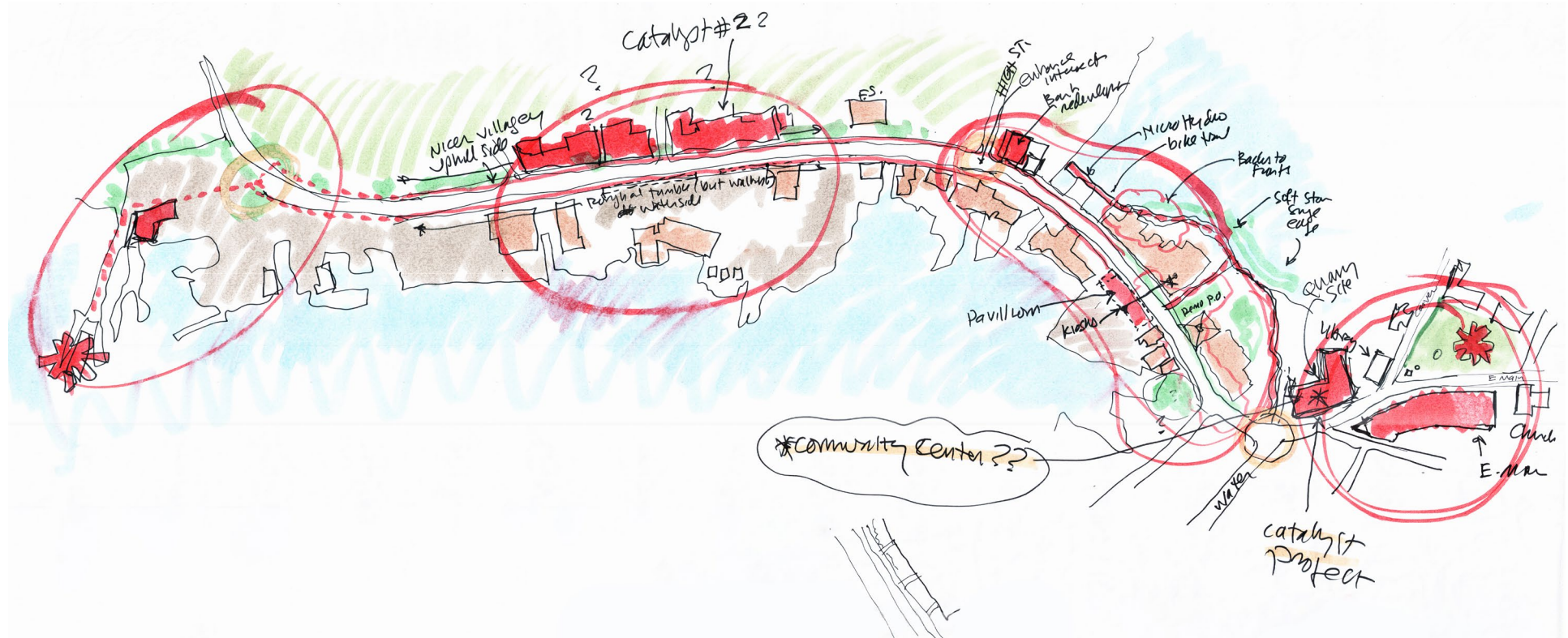
In thinking about possible design improvements to the public realm and where potential sites for new development in Vinalhaven could be identified, the AIA DART team wanted to keep a number of principles in mind. We sought to:

- Maintain Vinalhaven’s “working waterfront” – both in spirit and in actual function. This meant not making design proposals that would present an operational impediment of any kind to the lobster fishers and not imagining a level of public amenity that would be incongruous with this important industrial function
- Remediate the aspects of the built environment that were dangerous, unwelcoming, or an impediment to the equitable use and enjoyment of downtown Vinalhaven by the elderly, infirmed, or mobility-impaired. We considered traffic-calming measures to be among these goals
- Address infrastructure deficiencies that inhibited business growth
- Protect and preserve Vinalhaven’s historic buildings and resources
- Think creatively about Vinalhaven’s future with an eye to how potential sustainable development sites could be used either to address current deficiencies (such as the need for permanent workforce housing) or to support the evolution of a more diverse economic base

The diagram below was the design team's first attempt to identify and prioritize our collective recommendations. It describes a sequence of design interventions that focus on improving the built environment from the Vinalhaven Ferry Terminal along West Main St., Main St., and East Main St. to the public space around the War Memorial at the Vinalhaven Public Library on Carver St. The diagram focuses on four study areas:

1. Improving the experience of leaving the Ferry Terminal and engaging West Main Street
2. Finding a sustainable development site somewhere in-between the Ferry Terminal and Downstreet that would activate the public realm
3. Improving and defining the historic Downstreet commercial district while preparing it for the impacts of sea level rise and storm surges. Included in this study area is a proposal for the net factory site
4. Imagining a new and primarily residential town square bounded by new sustainable developments on East Main and Chestnut Streets

It should also be noted that all proposals for new buildings should have their first occupiable floors above the 10.0 NAVD 100-year flood elevation.



### *The Concept.*



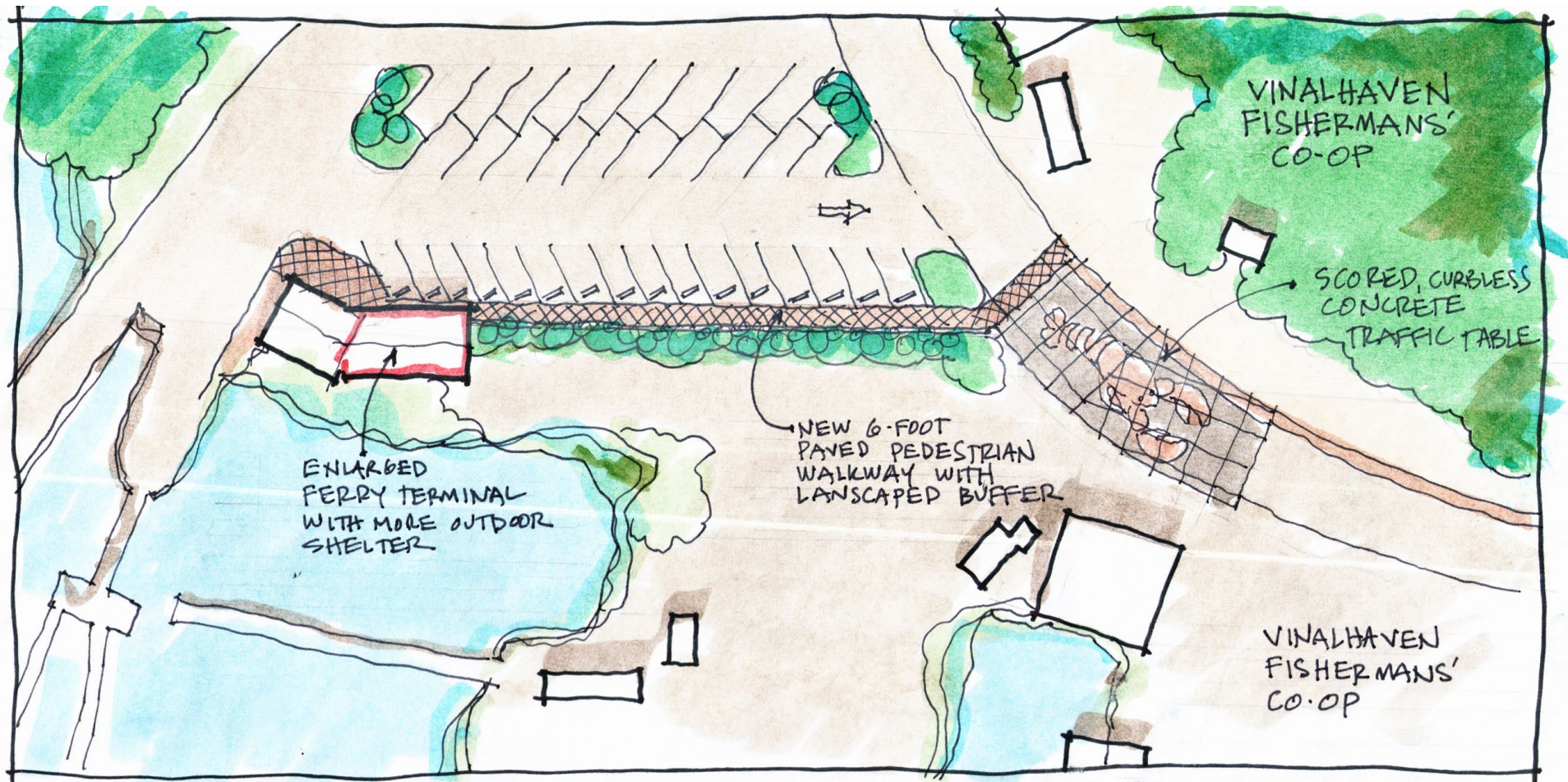
The below plan diagram for enhancements to the ferry terminal includes three primary recommendations. First, the terminal building itself could be slightly enlarged to provide more sheltered outdoor space and seating for people waiting for the ferry or a taxi to town. Second, the pedestrian route from the ferry terminal to Main Street is currently inadequate. The only accessible path is through the parking lot. The ideal solution to this would be a 5 or 6-foot wide paved path between the employee parking stalls and the property line with a planted buffer between this route and the adjacent commercial site. This could be accomplished by either re-striping the existing parking lot or securing an easement from the abutter.

We heard at community meetings that Vinalhaven is a “walkable community”. We also heard that getting a car on the Vinalhaven ferry is considerably more difficult than just walking on and – in fact – the island’s residents do not wish to see an increase in vehicular traffic. Yet, for pedestrians arriving at the ferry terminal and wishing to

go into town – especially elderly or infirmed pedestrians – the only viable alternative currently available is to call a taxi. Meeting this mobility challenge begins here.

Last is a proposal to address what happens when pedestrians get to Main Street. We reviewed several exiting studies for sidewalks or improved paths. The alternative that seems to make the most sense is to imagine Main Street with two different public realms: a fully-accessible and amenity-enhanced sidewalk on the north or land-side of Main Street, and little more than a flush-curbed path with a change in paving materials (if anything) on the south or harbor-side. The imperative, then, is to get pedestrians immediately across Main Street to the land side path and slow traffic at this intersection with the first in a series of traffic tables or speed tables.

According to the National Association of Transportation Officials’ “Urban Street Design Guidelines”:



Enhancements to Ferry Terminal.



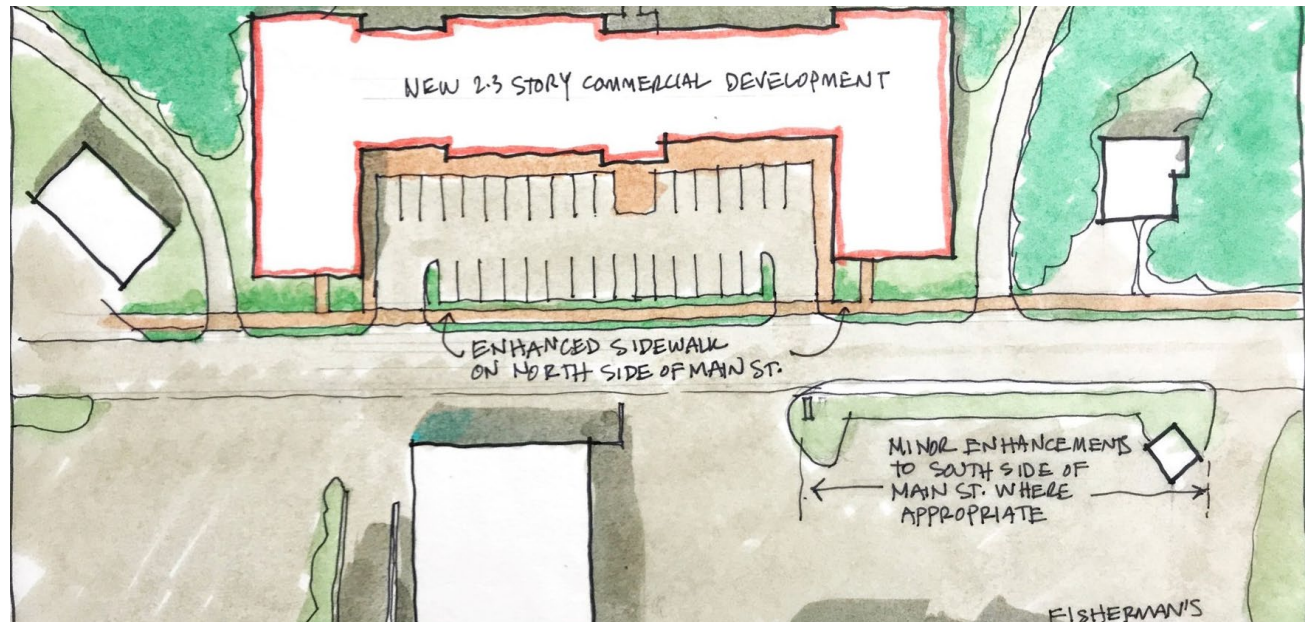
*"Speed tables are midblock traffic calming devices that raise the entire wheelbase of a vehicle to reduce its traffic speed. Speed tables are longer than speed humps and flat-topped, with a height of 3–3.5 inches and a length of 22 feet. Vehicle operating speeds for streets with speed tables range from 25–45 mph, depending on the spacing."*

In the ferry enhancements plan diagram on the preceding page, we show a crosswalk at the western end of this speed table, a length more like 60 feet, a demarcated pedestrian path on the land side, and fully flush curbs on both lateral sides to allow trucks to continue using the adjacent "Fisherman's Co-op" parcels as they do now. We are showing the surface of these speed tables as scored concrete, perhaps with a colored admixture for greater visual legibility.

The diagram titled "Development Opportunities Between the Ferry Terminal and Downstreet" illustrate what a desirable reuse of the parcels for sale across Main Street from the "Fisherman's Friend" convenience store might look like. The plan shows a U-shaped commercial building and a small surface parking lot with an enhanced sidewalk. The bulk of the building is set back from Main Street with the two wings coming closer to the property line.

The perspective illustrates what this enhanced sidewalk could look like. From right to left, it begins with a full granite curb on the upland side of Main Street only. A bermed landscaped zone behind the curb raises the sidewalk more. The sidewalk itself is 6-feet wide with contemporary but "industrial" benches and street lights. Another landscaped zone separates the pedestrians from the parking and provides natural storm water management capacity for parking lot runoff and allowing the change in grade elevation to continue to rise. The building shown has two and three story sections with a simple utilitarian materiality and gabled roofs.

The building wings nearest to the property line could be gable-ended like the other storage buildings on the harbor side of Main Street. Note



***Development Opportunities Between the Ferry Terminal and Downstreet.***



***Development Opportunities Between the Ferry Terminal and Downstreet.***

that no improvements are depicted on the harbor side of Main Street.

The first floor of this building could be retail uses serving the various needs of residents, fisherman, and visitors. The upper floors could be incubator or professional office space. A walk-in medical center could also be housed in this building.

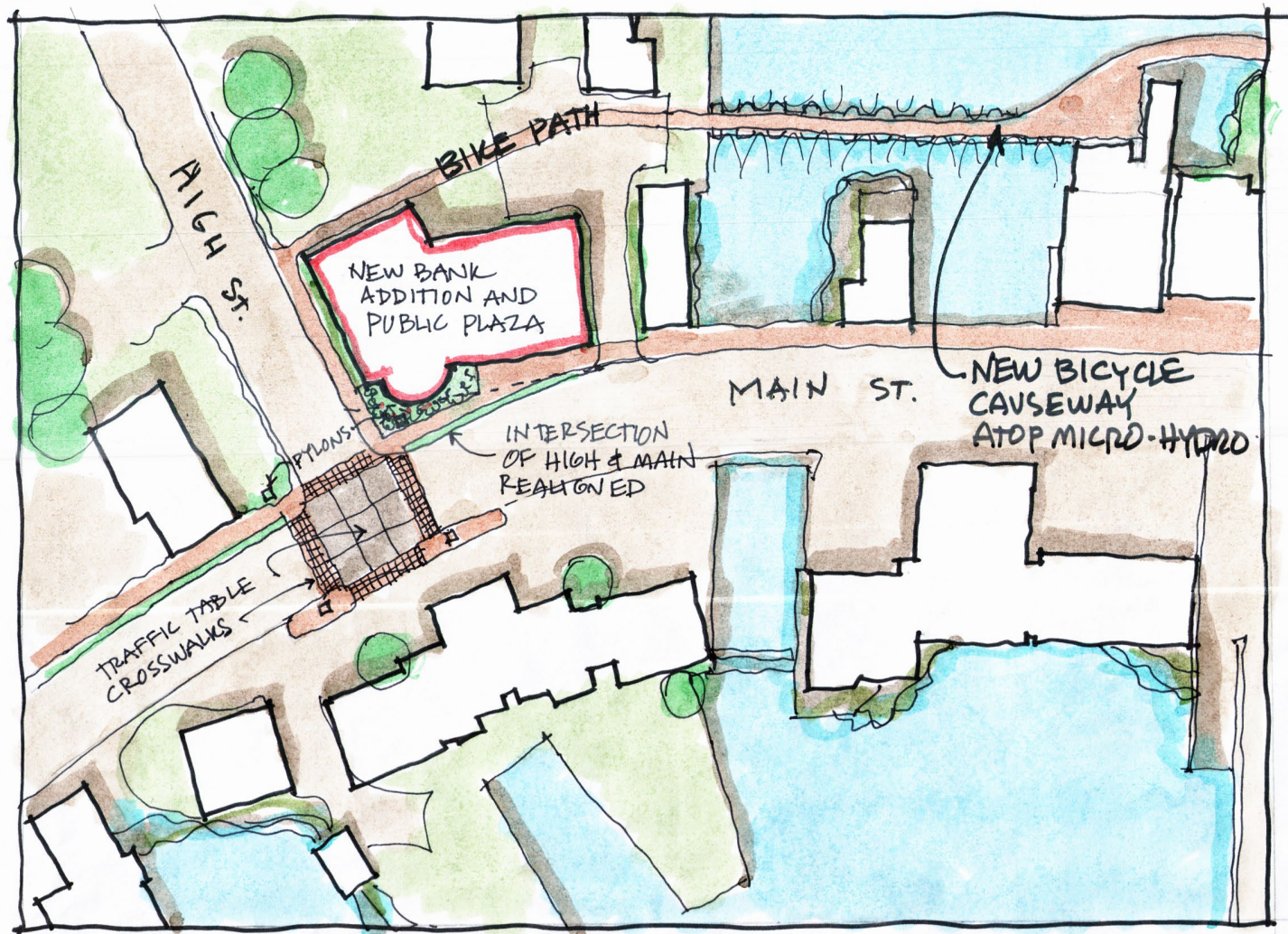


The plan diagram titled "Welcome to Downstreet, Intersection of High and Main" introduces a number of ideas.

First, we recommend a few improvements to this intersection. As configured today, it is far too wide and poorly-defined. Once traffic and parking lanes are defined and vehicle turning radii reduced to practical minimums, we believe the curb lines on the land side of this intersection can be beneficially realigned to a). produce more useable open space in front of the Camden National Bank building, and b). considerably reduce the width of the intersection and the length of pedestrian crosswalks. This intersection

should have clearly demarcated crosswalks and a raised speed table for traffic-calming with bump-outs (not shown) marking the end of parallel parking zones.

Most importantly, this intersection should signal the western boundary of the historic Downstreet commercial district. If environmental graphic devices such as commemorative signage, light pylon banners, or special statuary (like the granite eagle) can be used to help mark the boundaries of this district, this would be the place for it.



"Welcome to Downstreet", Intersection of High and Main.



The design team regrets not knowing that the parcel next to the Camden National Bank has been designated for a Veterans' Memorial. We certainly endorse having a Veterans' Memorial on this site. Our intent in showing an addition to the bank was twofold: 1). To say that the bank needs to become a partner in redeveloping (at least) this intersection, and 2). To say that this corner is architecturally "weak" in that something more visually prominent needs to "anchor" it. A Veterans' Memorial could certainly do this.

The below perspective sketch shows how a reconfigured ground plane with sidewalks, speed table, and granite eagles would appear. The sole purpose of showing a two-story building on this site was to illustrate what we meant by a "stronger" corner. The building sketched was meant to emulate the civic scale and style of the Public Library. Again, a well-designed monument on this corner could also serve all these goals.

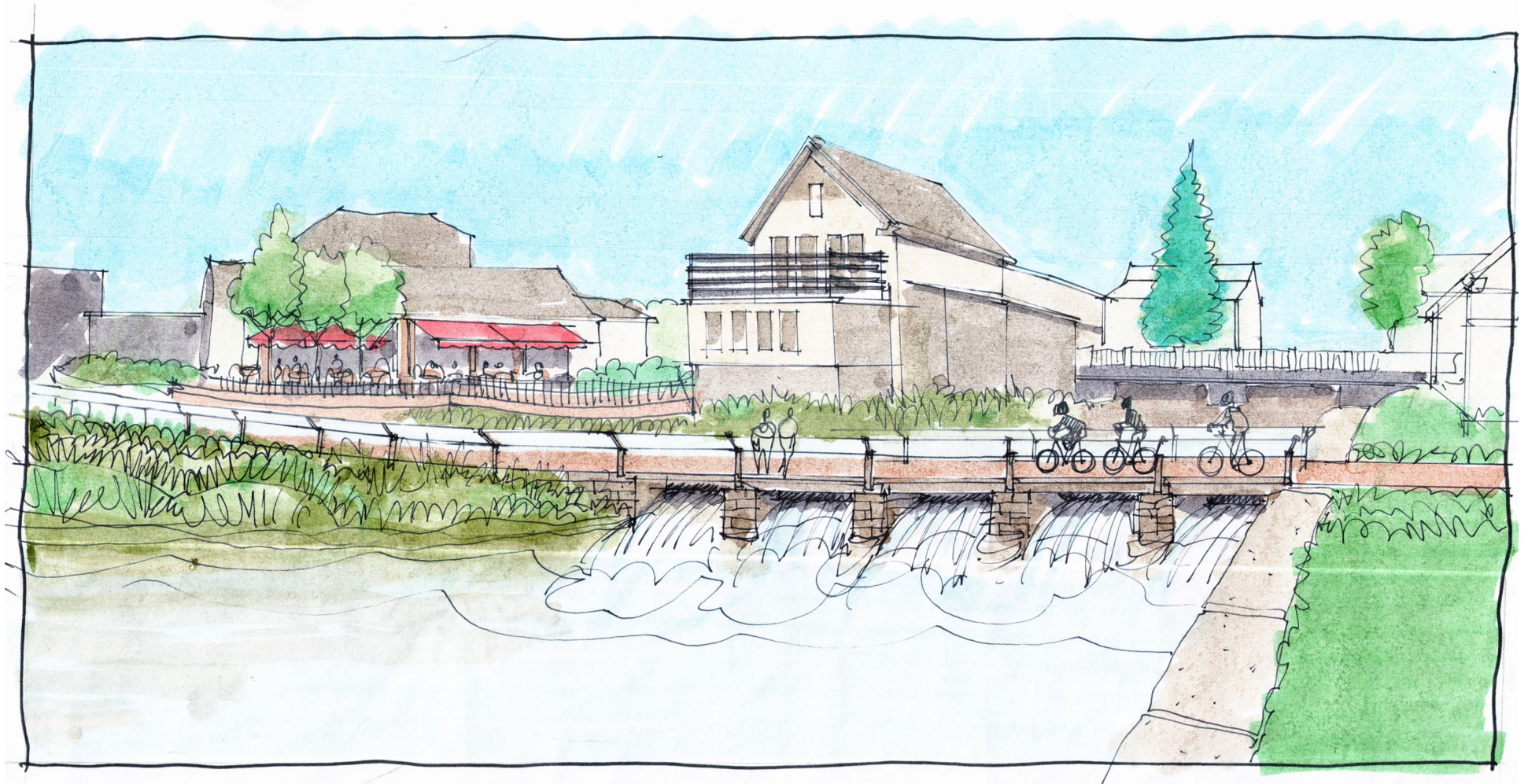


*Addition to Camden National Bank. Intersection enhanced for traffic calming, accessibility, and sense of place.*



The below perspective sketch showing constructed wetlands, a multi-use path, and micro-hydro is taken from a station point a few parcels upland from the Camden Bank on the seawall at Carver Pond. It shows the multi-use path in the foreground with a simple, contemporary guard rail built atop either granite piers (at the micro-hydro

gates) or on pilings through the new constructed wetlands. The building at the center is the rear of the existing Harbor Gawker. The awnings and seating at the left of the sketch are the possible outdoor seating area near or behind the Island Sprints' building.



*Constructed wetlands, multi-use path, and micro-hydro on Carver's Pond.*



The perspective sketch titled "New Park at Downstreet Center" shows the Post Office building replaced with a new open space. With this building removed, a better view of the Od fellows' Hall (also shown renovated with a new ground floor commercial use) is available. Note that this intersection is also shown with a speed table and crosswalks,

further contributing to traffic calming. Note also the contemporary but "industrial" street lights and bollards on the upland side of Main Street. The view is taken from just inside the proposed new multi-use pavilions in the parking lot on Main Street.



*New park at Downstreet center.*



The perspective sketch titled “Main Street with Enhanced Infrastructure, Road Surface, and North Sidewalk Raised” illustrates how a new sidewalk at the elevation of the commercial storefront thresholds on Main Street would improve the district’s accessibility. The transition over a granite curb down to an elevated Main Street level would need to be transgressed at crosswalks by accessible curb cuts. This diagram

also shows a demarcated but flush concrete walkway at the parking lot edge and proposed new freestanding multi-use pavilions at the edge of the parking lot to be used for things like farmers’ markets, art exhibits, crafts sales, or any other seasonal function. When not used, the fixtures and signage shown should be completely removable leaving only the structure and roof.

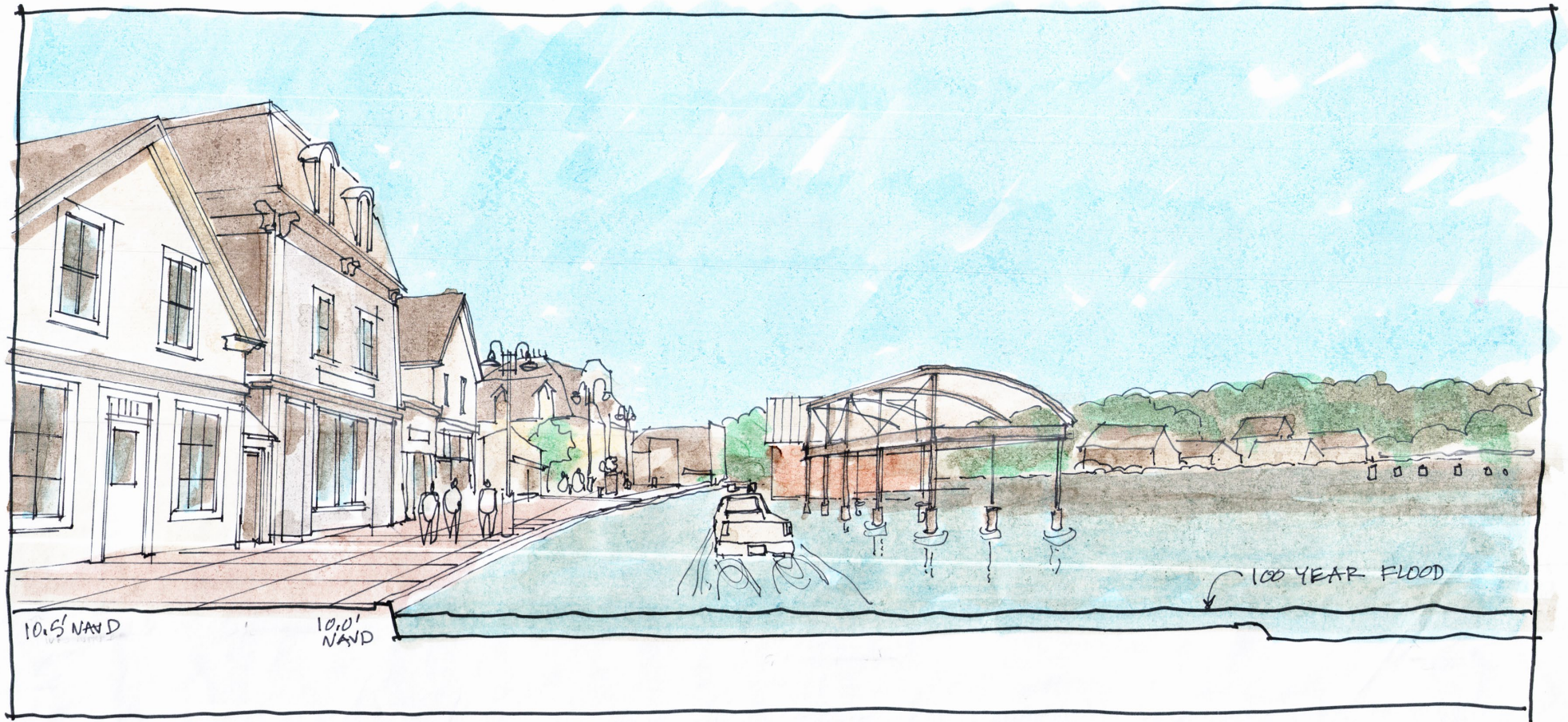


*Main Street with enhanced infrastructure, road surface and north sidewalk raised.*



The perspective sketch titled "Main Street with Enhanced Infrastructure and 100-Year Flood" shows – ideally – how flood waters at an elevation of 10 feet NAVD would

not flood the sidewalk or buildings, but would likely inundate the road surface and parking lot.

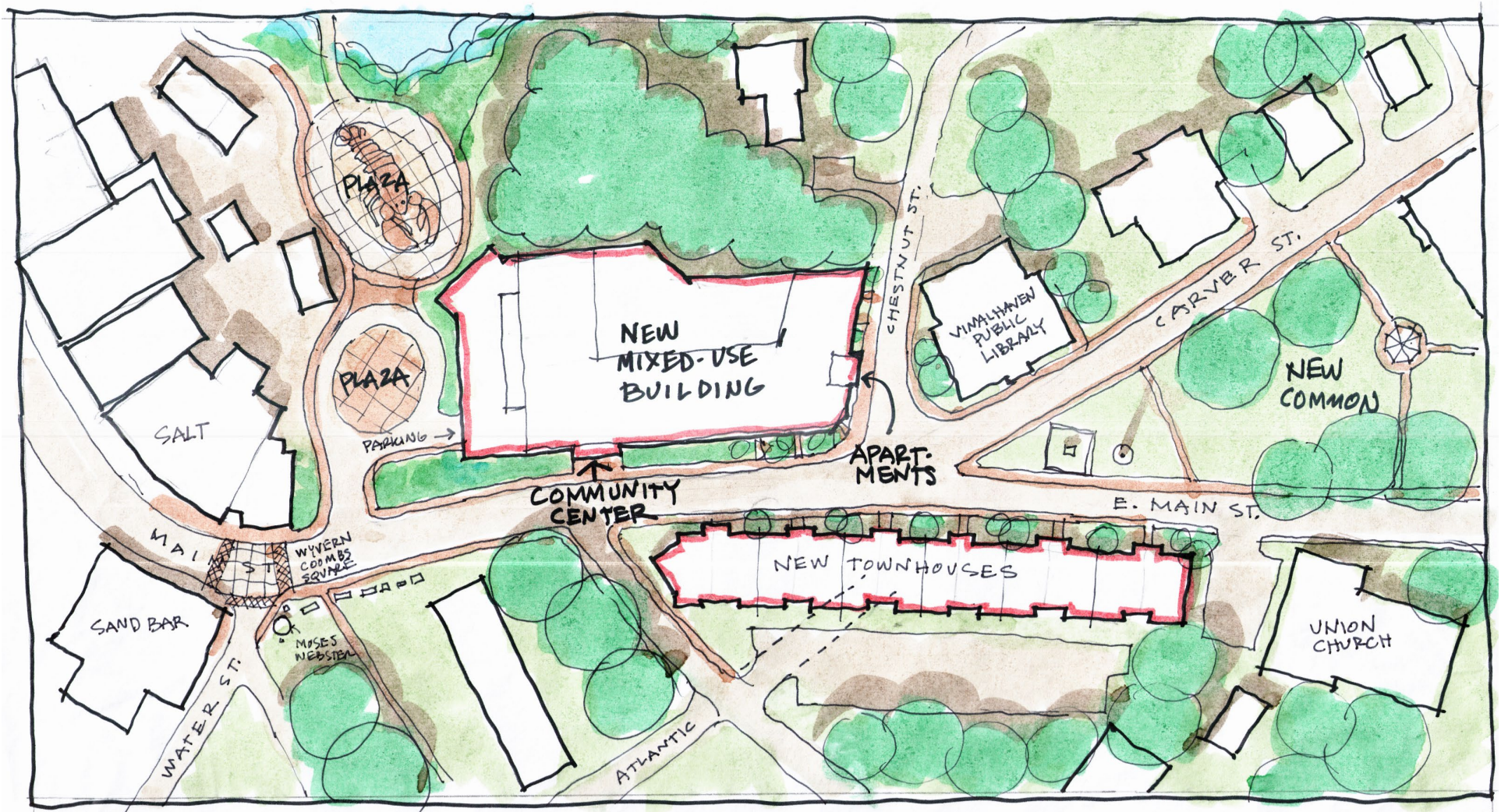


*Main Street with enhanced infrastructure and 100-year flood.*



The plan sketch titled “New Workforce Housing and Community Center” starts at the intersection of Water and Main Streets. This intersection could mark the eastern boundary of the historic Downstreet commercial district and – similar to the intersection of High and Main Streets – be marked with crosswalks, a speed table, and special signage or environmental graphics. This intersection could also become the beginning of a series of new outdoor plazas, the multi-use trail, and/or access to an enhanced public realm at the rear of the existing commercial buildings.

At the center of this plan is a proposal for a new mixed use residential building with community center and enclosed parking at the net factory site. Further east on Main Street, a site has been identified for new residential town houses. The plan also suggests that the existing bandstand and industrial artifact exhibit on this site could be relocated to a (currently privately owned) lawn on the other side of the War Memorial and flagpole. This combination of new buildings, the existing Public Library, the memorials and bandstand, and a very appropriately scaled lawn has the makings of a very nice new “town commons”.



New workforce housing and community center.



The perspective sketch titled "New Workforce Housing and Community Center" shows what this facility could look like from the intersection of Water and Main Streets. The upper residential floors could be designed to recall the net factory with a flat roof, simple horizontal siding, and tall rectangular windows. The sketch shows photovoltaic panels on the roof in an attempt to make this a "net zero energy building". The building's

second floor, the community center, is shown with a taller floor-to-floor height than the residential floors and very large industrial-scale windows giving these spaces great views of the pond and the harbor. The entrance to this facility can be seen midway up East Main Street where the street elevation will match the second floor.

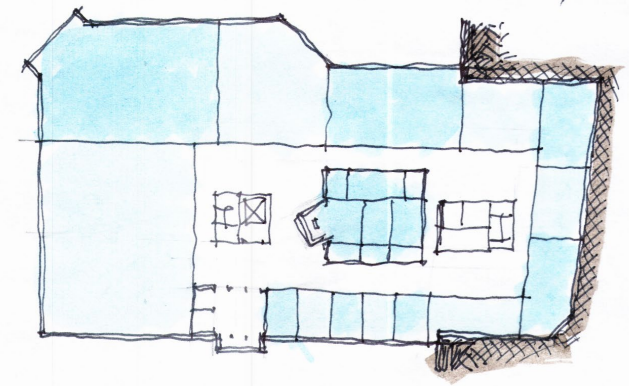
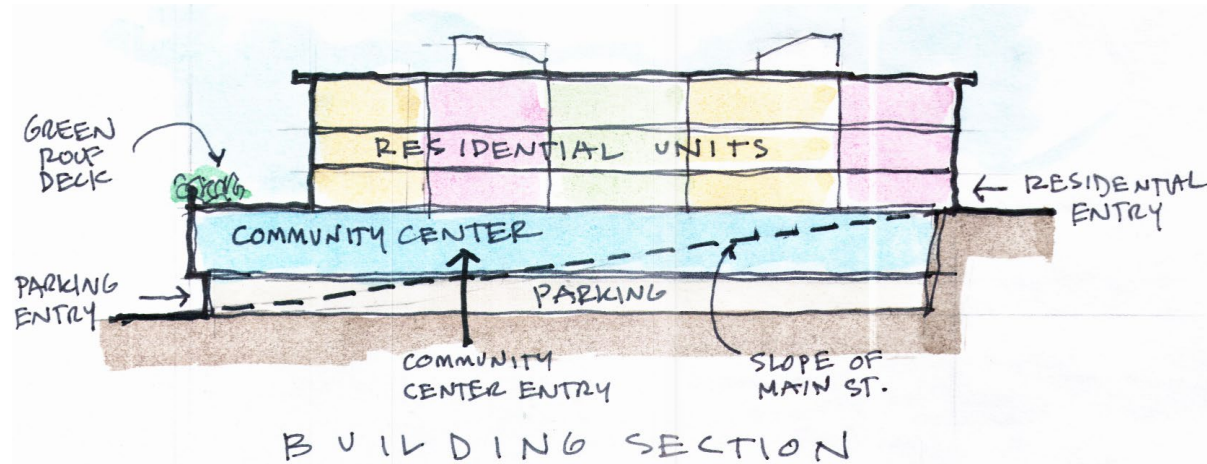


*New workforce housing and community center at Water and Main Streets.*

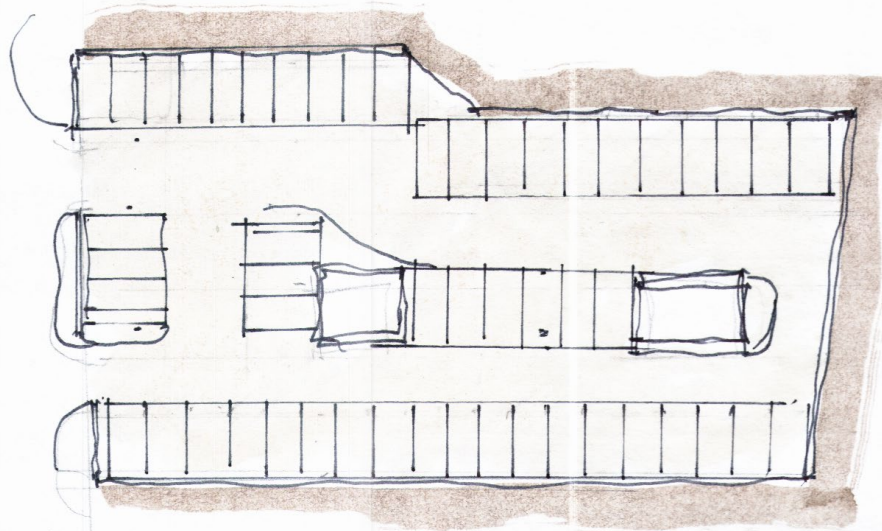


Below are several architectural diagrams of this proposed building. The "Building Section", a lateral cut through the massing, shows the parking level at grade – where it is also likely to flood. The first useable floor level – the Community Center – is well above the 100-year flood elevation. The residential use is shown as three floors above the community center with a main entry on Carver Street. The plans on this page show the parking level including grade-level access to an elevator core for access to the

community center and the town common above. The community center plan shows a variety of spaces ranging from 200 to 4,800 square feet in area. The eastern half of this space would have to be below grade against the existing rock ledges around this site. The typical residential floors are double-loaded corridor with 16 dwelling units of 850 to 1,000 square feet – although a greater number of smaller units could also be designed.



24,000 GSF, SPACES FROM 200 SF  
TO 4,800 SF



16 UNITS @ 850-1000 GSF EA.



The last perspective sketch, "New Workforce Housing at East Main and Chestnut Streets", shows how these two new residential developments could be designed to define a new residential town common. The buildings at the sketches' left are intended to be small, efficient townhouses or flats designed to emulate the existing wood frame residential stock. The three-story building at the back of the space is the only part of

the net factory development that would be visible from this elevation. The pitched roof depicted is shown as an alternative to the flat roof shown in a previous sketch. The base of the War Memorial obelisk and the arched entry of the existing library are shown at right.



*New Workforce Housing at East Main and Chestnut Streets.*



# Moving Forward



## MAKING IT HAPPEN—MOVING FORWARD

Vinalhaven can prepare for rising tides, challenges to the island economy, and future threats to the lobster industry. The sooner necessary preparations begin, the lower the overall cost and the greater the return on investment.

The first step is for discussion on which recommendations Vinalhaven wants to explore and the priorities, followed by building momentum by taking some actions.

There are opportunities to find the resources to help prepare for rising tides and strengthen Vinalhaven's economy. The table below identifies some of these opportunities and recommended action steps for 2018.



**Table: Resource Opportunities**

Projects	Resource Opportunities	2018 Action Steps for Resources
Safer crosswalks downtown- <i>quick start</i>	Town forces to paint and sign safer crosswalks	1. Vinalhaven public works should paint two improved crosswalks and add four advanced warning signs.
1. Sidewalks on Main & West Main Streets. 2. Multiuse path	<b>MaineDOT</b> 1. Statewide Transportation Improvement Program (STIP) 2. Bicycle & Pedestrian Funding	<b>Town Manager should work with MaineDOT for:</b> 1. Main/West Main Streets certification as a "Qualifying Pedestrian Area" eligible for transportation cost share. 2. Adding these projects to the STIP, to begin the long process of getting funding. 3. Bicycle & Pedestrian Funding grants.
1. Accessible sidewalk 2. Community Center 3. Flood Control	<b>Maine CDBG</b> 1. Housing Assistance 2. Downtown Revitalization 3. Public Facilities 4. Public Infrastructure	Town Manager, possibly with planning consultant, should apply for funds to focus on downtown, new housing, and benefits to Harborside, John Carver, and Hillside Apartments (clear benefit to disabled and low/moderate income)
All Projects	<b>Maine Community Foundation</b>	Town Manager should explore opportunities for feasibility funding
Community Center Housing component	<b>Tax Increment Financing (TIF)</b> • Locally approved	Select Board, working with the Town Manager and planning consultant, should develop TIF for any private development above community center and other desirable development to cover infrastructure.
Flood mitigation	<b>FEMA Hazard Mitigation Grant</b>	Town Manager, possibly with planning consultant, should perform necessary cost-benefit analysis to make town eligible for funding.
Multiuse trail	<b>Federal Land &amp; Water Conservation Fund</b>	Town Manager should explore L&WCF opportunities for the first phase of a multiuse trail.



Building partnerships is essential to move forward. The table below identifies some of these opportunities and recommended action steps for 2018.

**Table: Partnership Opportunities**

Projects	Partnership Opportunities	2018 Action Steps for Partnerships
Quick starts (for example, better marked crosswalks)	Quick starts on projects that require limited resources builds momentum	Organize volunteers. Start today!
Next steps	Identify priorities from DART	Set town priorities from DART. Start today!
Community center housing component	Housing developers and investment funds	Explore potential partners (for profit and non-for-profit) for upper floor housing component
Multiuse path and downtown revitalization	Explore with property owners	Explore opportunities. (Do not purchase for any project that might have future federal transportation money because those projects require 25% public hearing before any purchase.)
Portable community trailer	Acquire trailer	Explore opportunities for donation of used trailer
Flood mitigation	Coordinate with current vulnerability assessment	Use DART report to influence current assessment process
Lower flood insurance rates	FEMA Community Rating System	Apply for FEMA CRS with goal of 10-15% discount in flood rates for first round, more in future year as additional mitigation actions implemented

**Quick starts**, also known as “**Lighter, Quicker, Cheaper**,” are projects that can happen immediately, take very few resources, and help build momentum. The concept builds from the industrial concept of Lean Process, make continuous incremental improvements instead of starting with complex solutions, and Minimum Viable Product, include just enough features to make the product work, at least in the beginning.

One of the clearest opportunities for a Vinalhaven **Lighter, Quicker, Cheaper** quick start is the crosswalks and related street alignment. Vinalhaven appears to have a relatively low yield rate of vehicles yielding to pedestrians in crosswalks, creating a greater chance of crashes and discouraging walking, which then adds to the pressure for parking spaces as people walk less. Suggested crosswalks for simple interventions are:

1. The three crosswalks in downstreet Vinalhaven (Camden National Bank, Tidewater, and Carver’s Market).
2. The High Street (at Main Street) crosswalk (which needs both a crosswalk and road alignment markings).
3. The crosswalk between the westerly end of the West Main Street sidewalk and the Fishermen’s Friend.
4. One new crosswalk from the Vinalhaven Fisherman’s Coop and their parking lot on the north side of West Main Street.

Each crosswalk could be better marked with better warning signs for visibility. This project could engage students, have a very modest cost, reduce crashes, increase the safety perceptions, raise awareness, and build momentum. Steps should be:

1. Vinalhaven students paint a huge lobster to dominate each crosswalk. (This could be part of a design competition and each lobster could be the same or use different designs.)
2. Vinalhaven Public Works or volunteers paint white reflective lines on the outside of the crosswalk, to keep in compliance with crosswalk standards (in the Manual of Uniform Traffic Control Devices or MUTCD).
3. Vinalhaven Public Works paint hatched lines to better define and narrow Main Street immediately east of High Street to narrow the northeast corner of the intersection.
4. Vinalhaven Public Works install crosswalk warning signs, again in compliance with MUTCD.







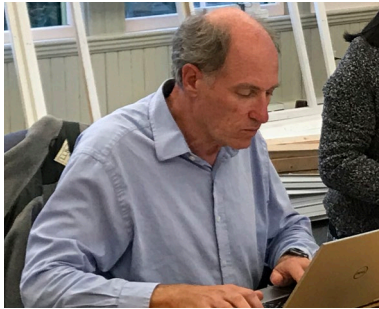






# Design & Resiliency Team





**Wayne Feiden, FAICP, Director of Planning & Sustainability, Northampton, MA; Lecturer of Practice, University of Massachusetts.**

Wayne's focus includes sustainability, resiliency, downtown revitalization, open space preservation, alternative transportation, and health impacts of planning. He led Northampton to earn the nation's first 5-STAR

Communities award for sustainability and the highest Commonwealth Capital score for Massachusetts municipal sustainability efforts. He teaches planning and sustainability practice and community economic development. He has authored 13 research publications, including American Planning Association PAS Reports on Local Agency Planning Management and Assessing Sustainability. Wayne's Bellagio Residency (Italy), State Department Professional Fellowship Exchange (Malaysia), German Marshall Fund fellowship (United Kingdom and Denmark), Fulbright Specialist fellowships (South Africa and New Zealand), Eisenhower Fellowship (Hungary) all focused on urban revitalization and sustainability. Wayne has led or served on 7 DART teams and 22 other AIA design and resiliency teams.



**Cori Burbach, Assistant City Manager, City of Dubuque, Iowa**

Cori Burbach is the Assistant City Manager for the City of Dubuque, Iowa. As assistant city manager, she assists the city manager in directing the day-to-day operations of the City government, acts as city manager in his absence, and exercises general supervision over all functions and activities of the City when acting for the city

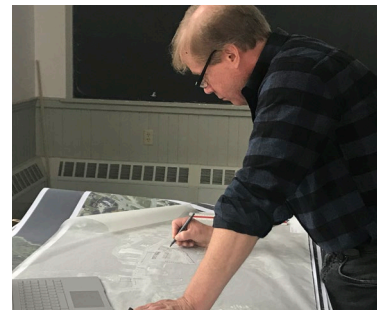
manager. An additional major responsibility of the position will be creating a more data-driven, high-performance organization focusing on outcomes and not outputs and including cross-departmental cooperation and integration with performance measurement and evaluation. Cori previously served as the City's Sustainable Community Coordinator, and prior to that, held positions in local government in Iowa, Wisconsin, Pennsylvania, and Delaware. Cori holds a master of public administration degree with a focus on city management and planning from the University of Delaware and a bachelor of arts degree in public administration with a minor in family services from the University of Northern Iowa. She is a member of the Urban Sustainability Directors Network, STAR Communities Steering Committee, International City/County Management Association, and Dubuque Young Professionals.



**Michael Davis, FAIA LEED AP, President, Bergmeyer Associates; Boston Civic Design Commission**

Michael R. Davis, FAIA, LEED AP, Principal and President at Bergmeyer Associates, Inc., is a practicing architect and an advocate for sustainable public policy. Mr. Davis advises the Boston Planning and Development Agency (formerly BRA) as Chair of the Boston Civic

Design Commission and served on Boston Mayor Thomas Menino's Green Building Task Force and Massachusetts Governor Deval Patrick's Net Zero Energy Building Task Force. He was 2013 President of the Boston Society of Architects and 2015-2016 Chair of the Board of Trustees of the BSA Foundation. For the American Institute of Architects, Mike has participated on or led AIA Sustainable Design Assessment Team (SDAT) charrettes in Ithaca, NY, DeKalb County, GA, Augusta, GA, Tremonton, UT, St. Helens, OR, Louisville, KY, and Bath, ME, and currently serves on national AIA Material Transparency and AIA 2030 Commitment working groups. Mike's recent projects include a modular student residence hall at Endicott College, a LEED Certified facility for Hostelling International Boston in an adaptively-reused historic building, and a deep-energy retrofit of public housing units for the Boston Housing Authority at the Cathedral Family Development, which achieved LEED Platinum certification. He blogs about his firm's work as signatory to the AIA 2030 Commitment at <http://mikedavisfaia.wordpress.com>. He holds a Bachelor Degree in Architecture from the Pennsylvania State University and a Master of Architecture from Yale University.



**Peter Flinker, ASLA AICP, Principal, Flinker and Dodson**

Peter Flinker is a registered Landscape Architect, a member of the American Institute of Certified Planners and a Fellow of the American Society of Landscape Architects. As president of Dodson & Flinker, Landscape Architects and Planners, he maintains an active portfolio of projects with public and private clients, including design of

new communities, downtown revitalization, planning for greenways and open space conservation, and sustainable design for schools and other public facilities. He has developed numerous training programs and award-winning publications in the areas of Smart Growth and Sustainable Development, including the Rhode Island Rural Design Manual, the Urban Environmental Design Manual and most recently, Village Guidance: Tools & Techniques for Rhode Island Communities.





### **David Kriebel, PhD, PE, Professor of Coastal and Ocean Engineering, US Naval Academy**

Dr. David L. Kriebel, P.E., is a Professor of Ocean Engineering at the U.S. Naval Academy where he teaches in the areas of coastal engineering and ocean engineering design, and where he has served as Director of the Ocean Engineering Program and as Chair of the Naval Architecture

& Ocean Engineering Department. Dr. Kriebel has been actively involved in ASCE, serving on post-tsunami investigation teams and developing codes and standards for coastal flooding and tsunami wave impact. He served on the Board of Directors of COPRI and was the COPRI President in 2008-2009. He also served 2012-2016 on the Coastal Engineering Research Board of the U.S. Army Corps of Engineers. Dr. Kriebel is the 2015 recipient of the inaugural Bob Dean Coastal Scholar Award from ASBPA.

### **Joel Mills, Senior Director, AIA Communities by Design**

Joel Mills is Senior Director of the American Institute for Architects' Center for Communities by Design. The Center is a leading provider of pro bono technical assistance and participatory planning for community sustainability. Its processes have been modeled successfully in the United States and across Europe. The Center has been the recipient of a numerous awards recognizing its impact. The Center has been the recipient of numerous awards for its impact nationally and internationally.

Joel's 24-year career has been focused on strengthening civic capacity and civic institutions around the world. This work has helped millions of people participate in democratic processes, visioning efforts, and community planning initiatives in over a dozen countries. In the United States, Joel has worked with over 100 communities, leading participatory initiatives and collaborative processes that have facilitated community-generated strategies on a host of issues. This work has catalyzed billions of dollars in new investment. His past work has been featured in over 1,000 media stories, including ABC World News Tonight, Nightline, CNN, The Next American City, Smart City Radio, The National Civic Review, Ecostructure Magazine, The Washington Post, and dozens of other sources. He has served on numerous expert working groups, boards, juries, and panels focused on civic discourse and participation, sustainability, and design. He has also spoken at dozens of national and international conferences and events, including the World Eco-City Summit, the Global Democracy Conference, the National Conference on Citizenship, and many others.

### **Erin Simmons, Senior Director, AIA Design Assistance**

Erin Simmons is the Senior Director of Design Assistance at the Center for Communities by Design at the American Institute of Architects in Washington, DC. Her primary role

at the AIA is to provide process expertise, facilitation and support for the Center's Sustainable Design Assistance Team (SDAT ) and Regional and Urban Design Assistance Team (R/UDAT ) programs. In this capacity, she works with AIA components, members, partner organizations and community members to provide technical design assistance to communities across the country. Through its design assistance programs, the AIA has worked in 200 communities across 47 states. In 2010, the Center was named Organization of the Year by the International Association for Public Participation (IAP2) for its impact on communities and contributions to the field. Erin is a leading practitioner of the design assistance process. Her portfolio includes work in over 60 communities across the United States. A frequent lecturer on the subject of creating livable communities and sustainability, Erin contributed to the recent publication "Assessing Sustainability: A guide for Local Governments". Prior to joining the AIA, Erin worked as historic preservationist and architectural historian for an environmental and engineering firm in Georgia, where she practiced preservation planning, created historic district design guidelines and zoning ordinances, conducted historic resource surveys, and wrote property nominations for the National Register of Historic Places. She holds a Bachelor of Arts degree in History from Florida State University and a Master's degree in Historic Preservation from the University of Georgia.

**Idfi Septiani**, Kelurahan Urban Village Head/Lurah, Samarinda, Indonesia and **Thi Binh Minh Hoang**, Vice Head of the Department of Geography and Natural Resources, Mientrung Institute for Scientific Research, Hue city, Vietnam. Idfi and Binh are Young Southeast Asian Leaders Initiative Professional Fellows, observing US resiliency efforts and sharing their own perspectives.