

# Planning for Sustainable Brownfield Redevelopment

## MULTIFAMILY MODULAR HOUSING ON BROWNFIELDS

### BAY AREA, CALIFORNIA, EPA REGION 9



California’s San Francisco Bay Area has a tight housing supply, a shortage of affordable homes and high residential construction costs. The East Bay in particular is home to some of the region’s most economically vulnerable communities who experience high levels of housing instability. At the same time, brownfields and other underutilized property are prevalent.

The East Bay Asian Local Development Corporation (EBALDC) and Bay Area Metro approached the U.S. Environmental Protection Agency (EPA) Region 9 for assistance to explore the environmental safety and economic feasibility of placing modular, factory built housing (FBH) on brownfield sites. FBH applies modular methods to residential projects by pre-assembling repeated modules off-site. Figure 1 describes various FBH types. The goal is to help alleviate the affordable housing crisis in the Bay Area while fostering brownfield revitalization. In winter 2017, EPA’s Land Revitalization Team evaluated the use of FBH to analyze the extent to which FBH is a feasible approach for creating safe, affordable homes on brownfields within the Bay Area.

EPA’s Land Revitalization Team reviewed existing literature and case studies, met with experts and convened an industry focus group to analyze the current FBH market in the Bay Area. The research identified challenges and opportunities to create a more robust market for FBH. The Team developed a report which identifies a range of FBH manufacturing methods, summarizes recent industry developments, shares best practices and ways to move forward with FBH. In addition, the report describes benefits and risks developers and communities should assess when pursuing affordable FBH projects.

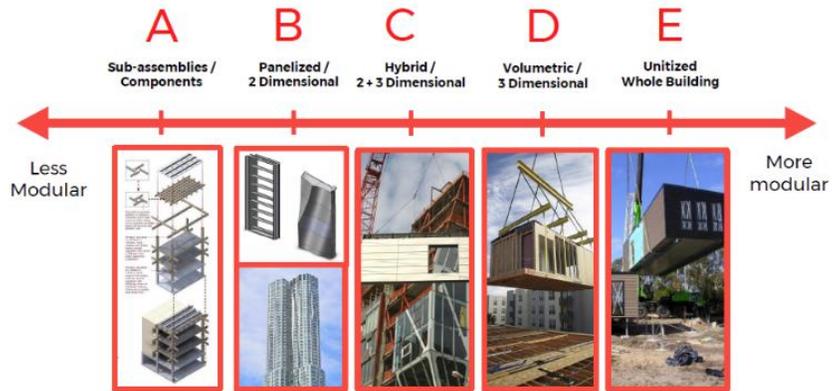


Figure 1. FBH can include factory-built components ranging from two-dimensional wall assemblies to three-dimensional buildings.

#### Benefits of FBH

- Does not require additional environmental remediation or impact remedy implementation on brownfields. In some cases, the savings incurred by FBH technology may offset cleanup costs.
- Offers cost savings of 20% on construction materials, on-site labor, and abated interest, and time savings of 40-50% (see Figure 2), as reported by FBH manufacturers.
- Reduces material use and waste, increases construction safety and predictability, improves assembly line quality control, and reduces impact on the site neighborhood.
- Offers synergies with many integrated housing policy strategies, including high priority development, transit oriented development, and brownfield redevelopment.

#### Limitations and Risks

On the other hand, FBH can have technical limitations due to site size, shape, and context, as well as economic limitations due to an immature business model, and social limitations related to stigma and labor politics.

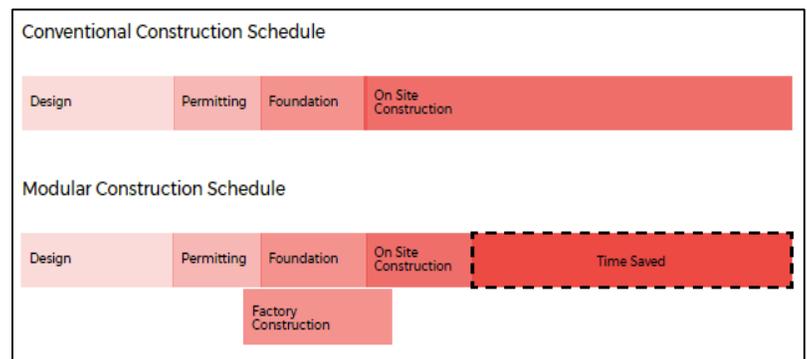


Figure 2. A comparison of conventional and modular housing construction schedules shows the time saved with modular construction.

### Potential Opportunities

EPA's Land Revitalization Team identified several potential opportunities to help advance development of affordable FBH in the Bay Area:

- The California Department of Housing and Community Development could develop standards outlining FBH code submittal requirements, to clarify the implementation of FBH redevelopment and build capacity for less-experienced project teams.
- The California Housing Finance Agency could help secure upfront capital for FBH projects to support traditional construction lenders that are less experienced with structuring FBH financing.
- With their ability to self-finance, several large, Bay Area affordable housing developers may be primed to pursue FBH for their developments. By placing large, repeatable orders with manufacturers, they lay the groundwork for a more robust local market, where manufacturers have more certainty about their suppliers, prices and products.
- Local and regional planners can explore synergies among multifamily affordable FBH on brownfields, in priority development areas and near transit nodes, as a method of compliance for the state Sustainable Communities and Climate Protection Act.
- Local governments can explore using FBH multifamily housing to meet their Regional Housing Needs Assessment goals.

For more information, please contact Nova Blazej, EPA Region 9 at [blazej.nova@epa.gov](mailto:blazej.nova@epa.gov).

### LESSONS LEARNED

- FBH may offer cost and time savings to develop affordable, multifamily housing on brownfields.
- Local government can build capacity and reduce risk by developing FBH standards.
- Large affordable housing developers can help develop the local market for FBH manufacturers.

### NEXT STEPS

- Nonprofit developers are expected to meet with FBH manufacturers to advance projects.
- Bay Area Metro to distribute the report regionally to planning departments, transportation agencies, developers and nonprofit research organizations, such as the Urban Land Institute and SPUR.
- Share report with other organizations nationally.



Figure 3. Case study examples of FBH modular residential construction in California.