



Coastal Resiliency Case Studies



CONSTRUCTION REMEDIATION TECHNIQUES
FOR RESIDENTIAL AND COMMERCIAL
PROPERTIES

CASE STUDY 1

Residential renovation and addition in the core district

Existing Historic Main Dwelling, Cottage and new Garage with Studio above proposed to be relocated on site and elevation above required flood plane elevation – roughly 5' from current F.F.E.



Existing Conditions

Existing 19th Century residence
built below current flood plane

Water staining visible at base of
main house due to shingles
“wicking”

Standing water visible at cottage



Technical Details Flood Vents

Flood Vents allow high water levels to flow inside the foundation and underneath the residence so water can temporarily move freely - reducing the threat of hydrostatic lateral pressure which causes significant structural damage

WHAT? HOW? WHY?



WHAT IS A FLOOD VENT?

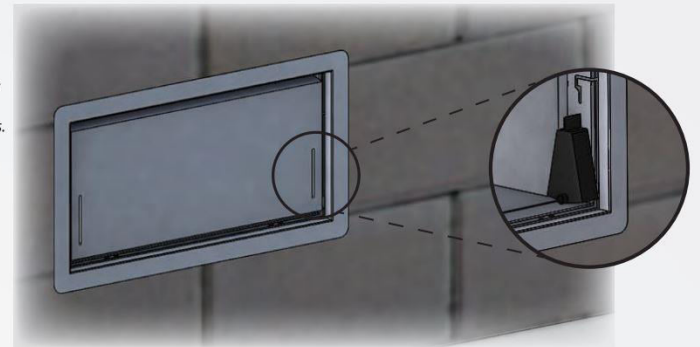
Smart Vent's line of ICC-ES Certified, Engineered Flood Vents protect houses and buildings during floods by preventing hydrostatic pressure buildup that can destroy walls and foundations. This mitigation technique, referred to as Wet Floodproofing, allows floodwater to freely flow through an enclosure such as a crawlspace or garage.



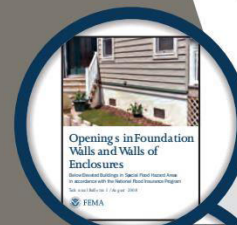
HOW DOES IT WORK?

The SMART VENT door is latched closed until flood water is present. Rising flood water activates the internal floats, which unlatch and open the door. Smart Vent's 3-inch clearance, when open, helps let flood debris pass through unlike a typical air vent that will clog.

Pictured to the left: Debris easily getting through a 1540-510 model during Hurricane Ida, 2009.



Pictured to the right: Positioning of one of the internal floats.



WHY DO I NEED IT?

FEMA and NFIP Regulations along with Building Codes require that any residential building constructed in Flood Zone Type A have the lowest floor, including basements, elevated to or above the Base Flood Elevation (BFE).

Enclosed areas are permitted under elevated buildings provided that they meet certain use restrictions and construction requirements such as the installation of flood vents to allow for the automatic entry and exit of flood waters.

This wet floodproofing technique is required for residential buildings, and is also an option for commercial buildings.

Technical Details Helical Piers

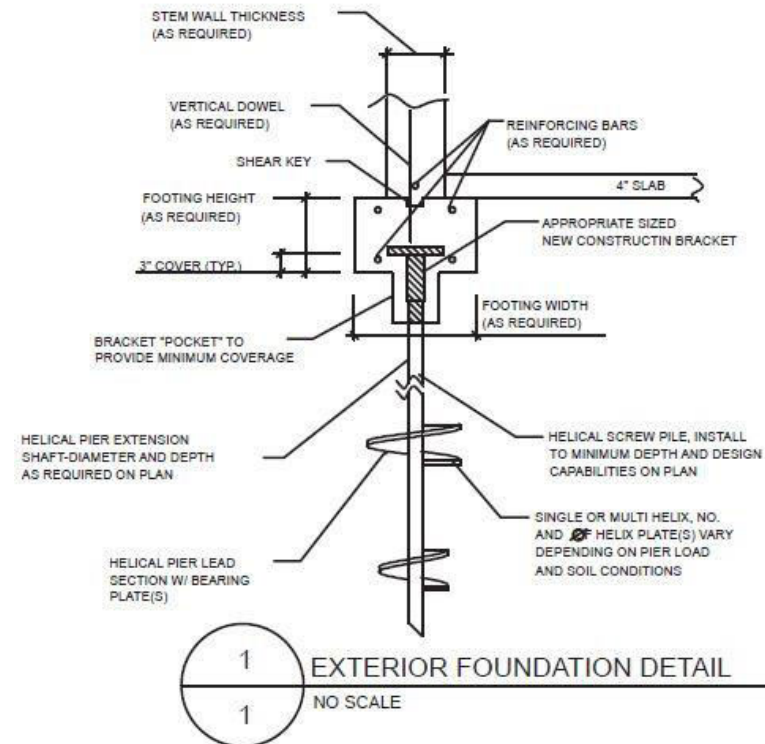
Due to saturated soil conditions typical foundation details will not support required loading from weight of the residence – Helical Piles are required.

Corkscrew shaped metal piles are “screwed” into the ground to provide proper bearing for footing and slab at grade



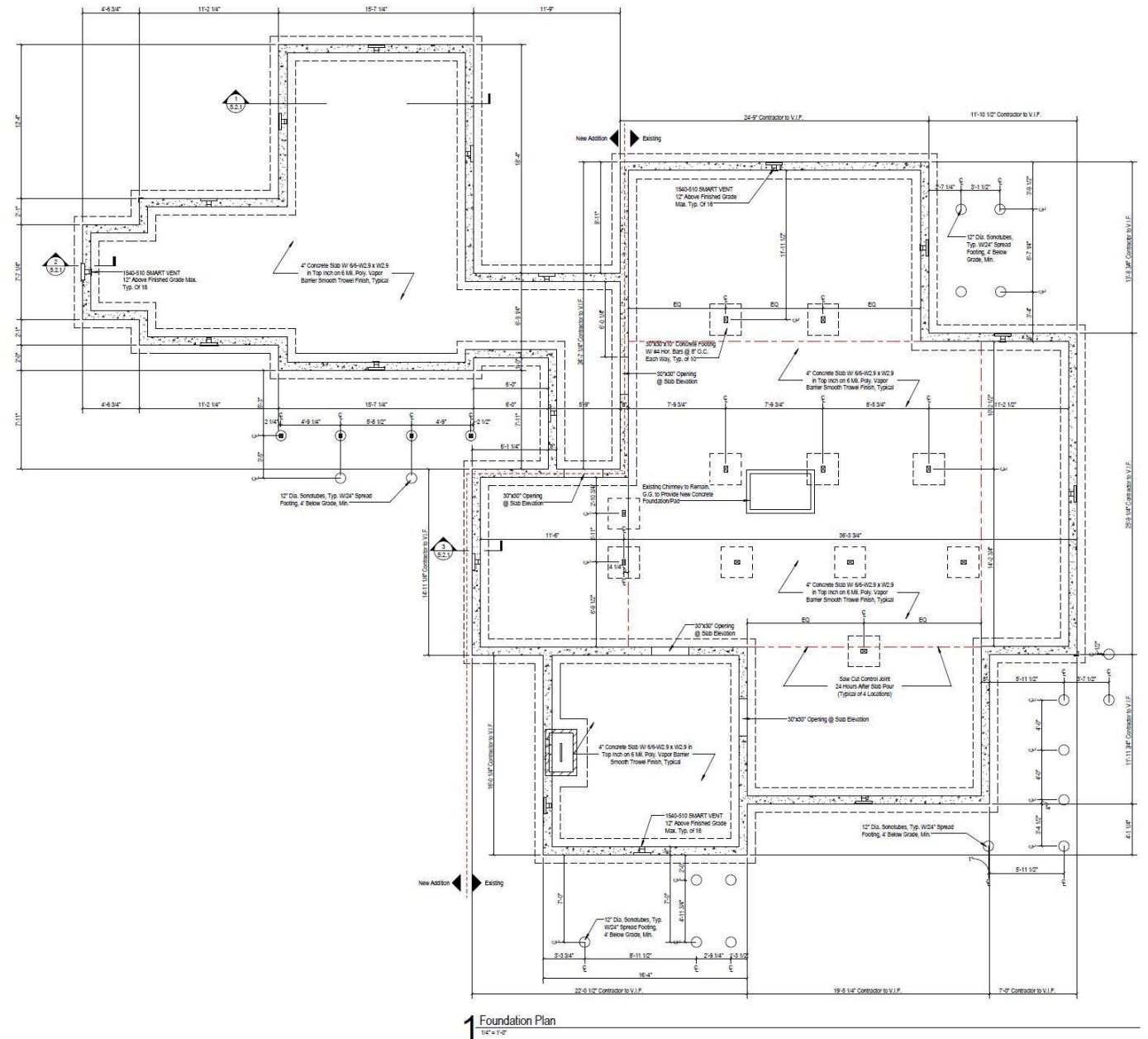
HELICAL PIER FOUNDATION PLAN

NO SCALE



Technical Details Proposed Foundation Plan

Foundation plan submitted NBD
indicating flood vents, footings,
bearing walls and columns



Progress Photos

Relocated residence set on new elevated foundation

Existing Topsoil has been removed for construction



Completed Project Photo

Completed Project

Elevated Board Walk

Permeable surfaces

Mixture of materials

Screening or tempering elevation
change



Completed Project Photos

Vegetated permitter plantings
selected to withstand high water
table and soil conditions



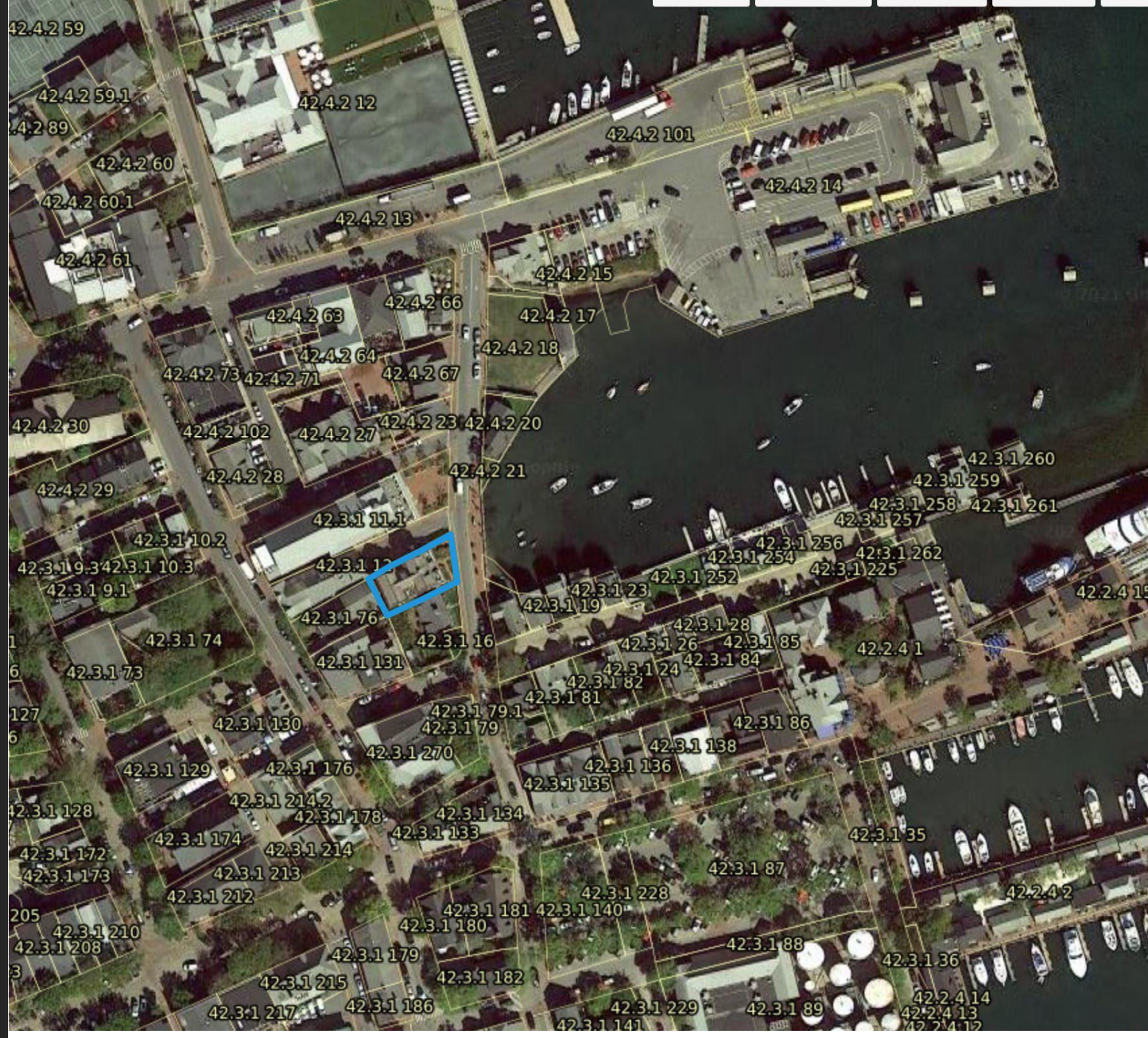
CASE STUDY 2

Newly constructed Mixed Use structure in core district

High pedestrian and vehicular traffic area

FEMA Flood plane elev. 9/ 10

Existing Grade elev. 4



Existing Street Scape & Facade

FFE Approx. 6" from Existing Grade

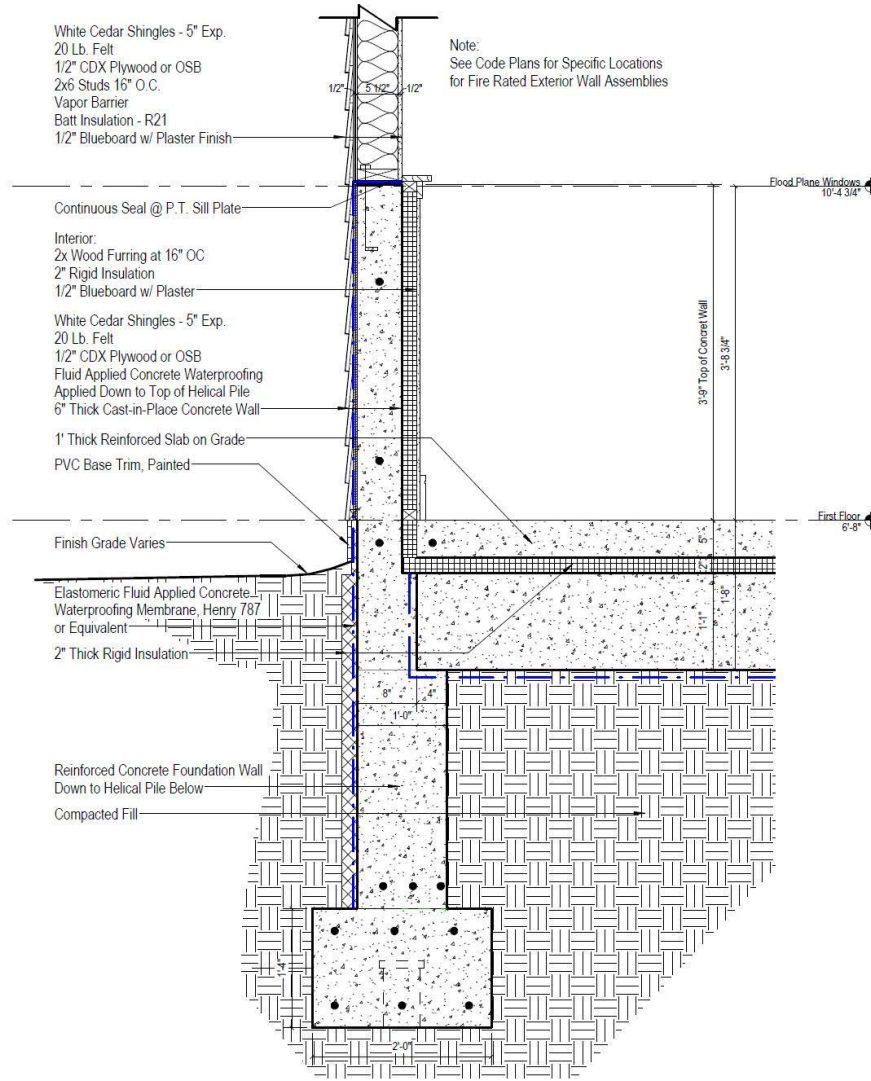
Raising the FFE to flood plane height would represent an increase of over 5-6' in finished floor elevation creating a disconnect with pedestrian retail traffic

To minimize – Mass. Building Code allows certain commercial construction below the flood plane provided protective measures are put in place

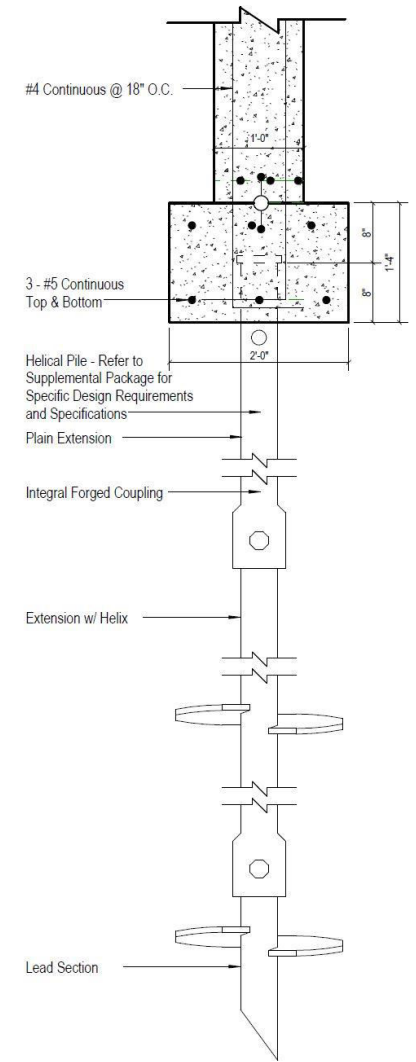


Technical Details Helical piles & Footings

Construction Schematic detailing helical pile and concrete foundation wall at flood plane



1 Foundation / Floodwall Detail
1" = 1'-0"



2 Helical Pile Detail
1" = 1'-0"

Technical Details *Helical piles & Footings*

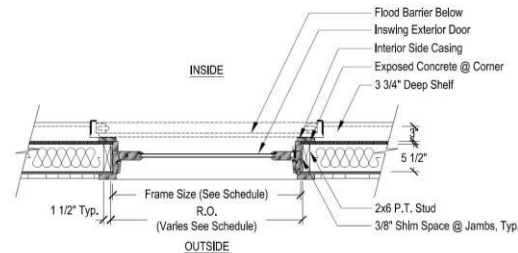
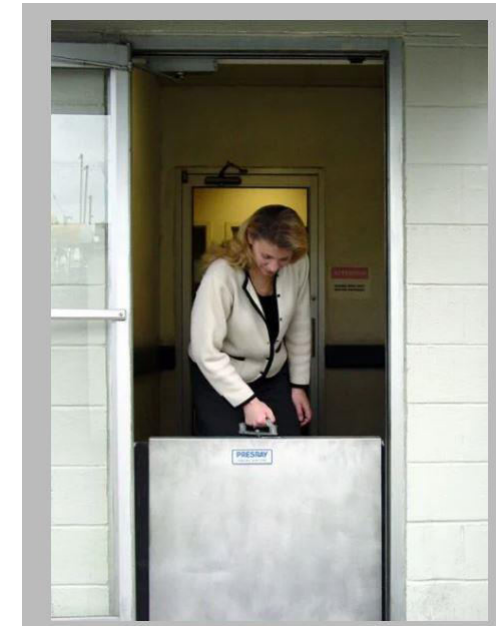
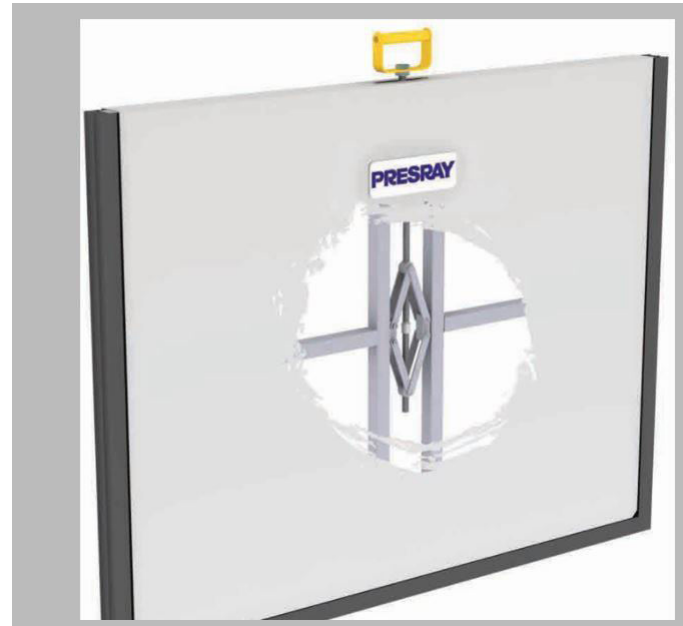
Site Photos prior to footings being formed

Caps of Helical piles visible

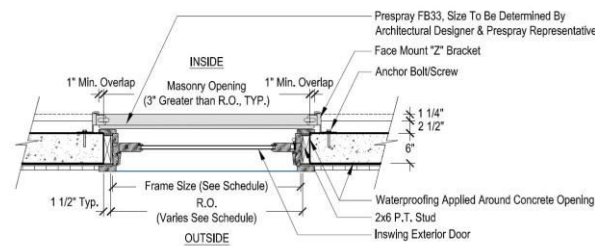


Technical Details Adjustable Flood Barriers with Mechanical Seals

Adjustable flood barriers are design to be installed prior to an anticipated high-water event. Barriers are set in place manually. An internal mechanism increases the panels width which applies sufficient pressure to withstand the hydrostatic lateral loads.

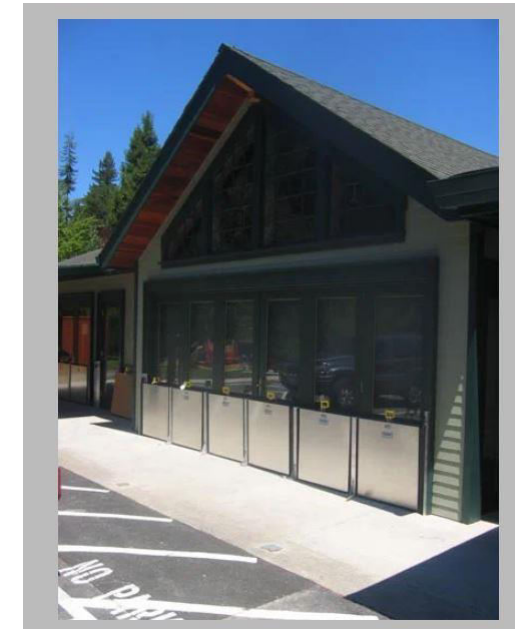


JAMB CONDITION AT WOOD FRAMED WALL ABOVE



JAMB CONDITION AT CONCRETE FLOOD WALL

Flood Barrier Details @ Exterior Doors
Scale: 3/4" = 1'-0"



Completed Project Photos

Finished project w Landscaping
and ADA Accessible Ramp

