RSA Protective Technologies, LLC. has developed the Movable Barrier Flood Wall System (MBFS) to prevent flooding for municipalities, federal projects, shorelines, private housing, levees, utilities, airports, commercial property and more.
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**DESCRIPTION:**

The MBFS is a custom-designed series of concrete flood walls placed underground inside a trenched concrete U-channel. A variety of powered systems raise the flood wall above grade to prevent flooding. After the flood, the flood walls are lowered back underground where the system remains “invisible.” The scope of the system ranges from a closure unit to miles of flood protection. Based on Finite Element Analysis, the systems can be designed against hydrostatic, hydrodynamic, wave action and impact loading up to a hurricane load.

**PROTECTION LEVEL:**

The MBFS is designed for flood heights from 3 to 20 ft. The depths of the foundations are 1.8 times the height. A 5-ft rise utilizes a 9-ft foundation. Each flood wall is produced as a single molded concrete element with inserts, voids, vertical guides, post tension rods and other required constructs. The foundation is produced as a cast-in-place U-channel through a series of custom supplied forms with inserts, vertical guides and other required constructs.

**LEAKAGE CONTROL:**

Additional elements include horizontal and vertical water seals, a drive over top and spring-loaded up-locks, which can suspend the flood walls in their raised position if the powered system fails. An internal powered sparger drainpipe mounted along the bottom of the foundation discharges any leakage from inside the system. The pump empties faster than the leakage so there is zero leakage on the dry side. The system design also utilizes a drain on the secure side that is plumbed into the foundation and pumped out through the sparger to prevent ponding on the dry side. The system design allows for changes in contiguous flood wall heights, turning corners, changes in elevation, and utility pass through.
CUSTOM SOLUTIONS:
Geotech analysis has developed a variety of additional foundation elements, such as cut off walls, batter piles, foundation heels and toes to assure long term stability. RSA supplies the custom design, engineering, fabrication, assembly, installation, commissioning and O&M oversight for each application. RSA partners with Mueser Rutledge Consulting Engineers (MRCE) as Engineers of Record. MRCE customizes the foundation for each system.

One of the methods to move the flood walls employs a cable winch system that uses wire rope as the cable and winds the cable onto a drum. One winch systems is used for each individual flood wall. This assembly is mounted just below grade in a bump out that is integral to the foundation pour. The drum is connected to a motor and gear box which provides the power to lift/lower the flood walls. A holding brake in the winch system maintains the flood wall in the full up position.

A unique design for the MBFS uses a double cable system which is wound up onto a dual drum. The cables are located approximately at the quarter points of the wall to provide level lifting. Each cable is reeved over sheaves and passes down around the lower lifting sheaves located in the base of the wall. and terminates into a fitting that is mounted onto the inner face of the wall. The cable continues up on the other side of the flood wall and terminates into a fitting that is mounted onto the inner face of the foundation. This type of system is called a single purchase in which the winch load is half of the lifting load. This allows for a smaller, less expensive cable winch system per panel. We are calculating that at a rate of rise of 1”/second the system lifts a 10,000lb. flood wall using only a 1.5hp motor. The other part of the load is carried by the cable termination fitting on the foundation.

To operate the system the motor rotates in one direction raising the flood walls and then in reverse lowers the flood walls. When the flood wall reaches a certain height the up-locks automatically spring out to support the flood wall in its up position in the event...
of a winch failure. In normal operation the up-locks are suspended above grade and only contact grade when needed.

In an alternate design which eliminates the motor/gearbox from the panel only the dual drum is located in the bump out. To activate these systems a mobile powered drive unit is brought to the site and inserted inside the drum to rotate and raise/lower the flood wall. A ratchet device is attached to the drum so as the walls are fully raised the drum is locked in the up position. Here the Up Locks also act as a redundant safety feature to maintain the flood wall in their full up position.
### Typical Applications

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Unlimited flood line contour

Flood panels lowered for points of egress

Flood panels raised for continuous flood line
Movable Barrier Floodwall

Winch motor connects to two cables to raise / lower flood wall
Winch motor connects to two cables to raise / lower flood wall
Movable Barrier Floodwall System – Patent Art
Concrete cast flood wall with post tension rods, guide rollers, vertical seals and drive over top
Sub-surface elements for concrete foundation (if required) – batter piles, rock anchors, sheet pile
Side Elevation View showing redundant Up Lock

UP LOCK RETRACTED AND HELD BY TRIGGER

TRIGGER ON LOWER STOP PULLED TRIGGER UP TO RELEASE MANUAL LATCH AND TAKE OVER HOLDING THE UP LOCK CLOSED

1514 UP LOCK IN DEPLOYED POSITION

TRIGGER CONTACTS UP LIMIT AND ALLOWS THE UP STOP TO SPRING OPEN
Sparger pipe pump drain system
View Our Videos

RSA Movable Barrier Floodwall System Video
RSA MBFS 1:5 scale working model

RSA Movable Barrier Floodwall System details Video
RSA MBFS 1:5 scale working model - elements

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Zero Leakage