



# Proven Performance

Crane Materials International (CMI) is the leading developer and manufacturer of high performance products and engineered solutions. Our manufacturing facilities enable us to exceed customer needs by providing a wide range of environmentally responsible, cost-effective synthetic and aluminum products for your marine, flood, seepage, and chemical containment problems.

By providing innovative technologies and specialized technical equipment, our products provide engineers, contractors, and owners alternatives to traditional materials and practices used in the construction industry. Together, these products, technologies and services constitute engineered systems that serve a variety of applications in the civil construction markets.

CMI's products and services provide sustainable, high quality solutions at substantial cost saving's. The use of our products has proven to significantly lower the project's carbon footprint compared to conventional materials.

Simply put, we are a full-service provider of specialty products, installation equipment, and technical services, offering economical solutions to marine, flood, seepage, and chemical containment applications in an environmentally friendly way.

Our expertise in the civil construction market focuses primarily on the following applications:

- Flood Protection
- Water Control
- Cut-Off and Containment
- Retaining Walls

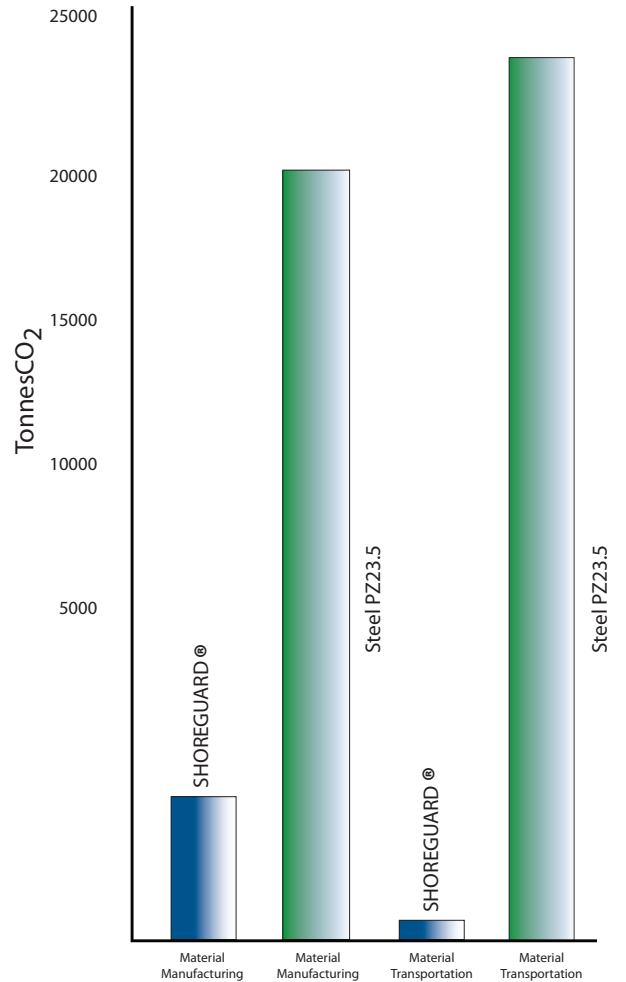




“The use of our products has proven to significantly lower the project’s carbon footprint.”



Carbon Footprint Comparison  
ShoreGuard® VSP vs. Steel Sheet Pile



Saginaw, MI

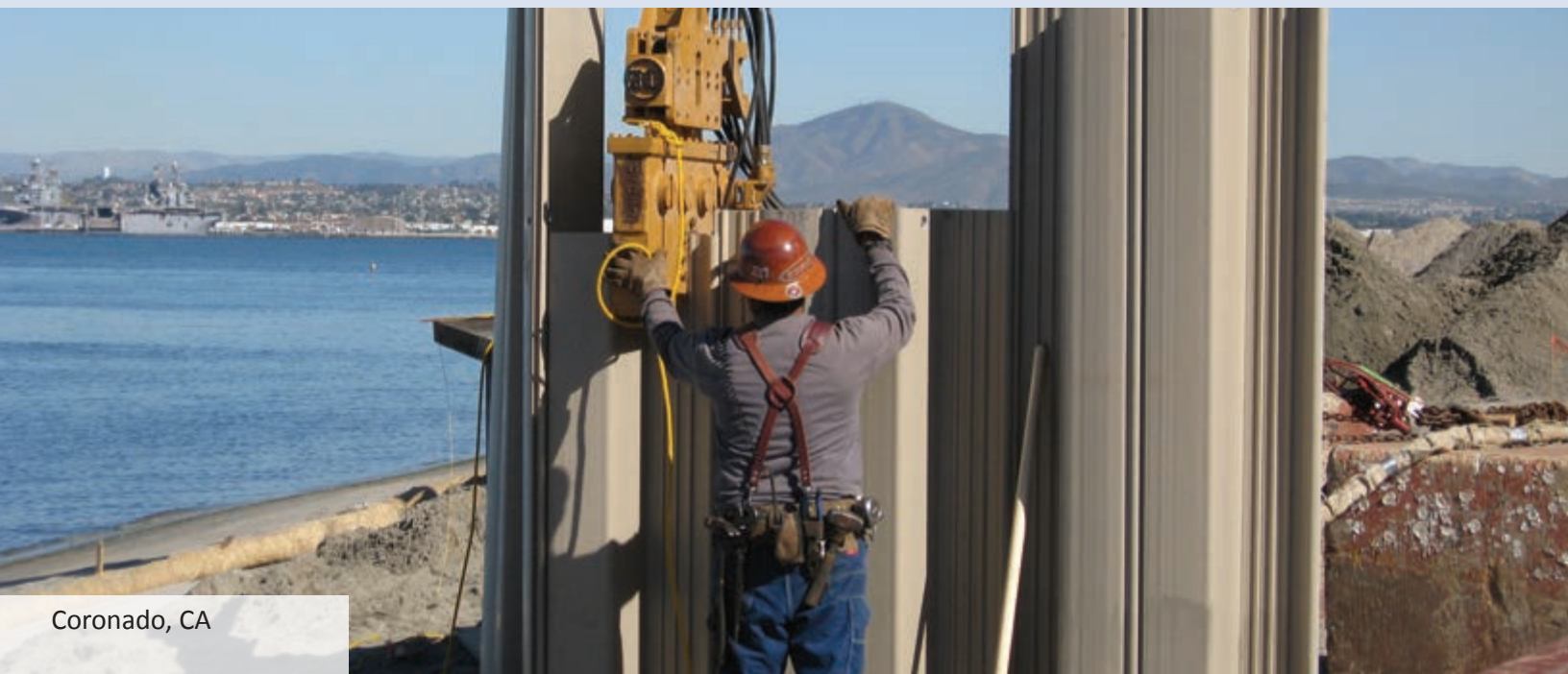


# Flood Protection

In terms of property damage, floods are the second most expensive type of natural disaster people face. For centuries, business owners, government agencies, and engineers have all looked at ways to protect valuable property from flood damage. It is common for flood wall and levee repair projects to be completed for half the cost using CMI Sheet Piling when compared to using conventional materials such as steel and concrete. The significance of this cost savings cannot be over-emphasized as the nation faces the challenge of funding the repair and upgrading thousands of miles of levees and earthen dams which do not meet current FEMA standards or traditional 100 year flood design criteria. Considering the magnitude of the situation, flood control projects using ShoreGuard® and UltraComposite™ sheet piling would result in saving millions and possibly billions of dollars for municipal, state, and federal governments.

Flood control projects using CMI's family of synthetic sheet piling have been in service for over 25 years. ShoreGuard® and UltraComposite™ sheet piling is commonly used in projects designed to stabilize and raise the height of levees and earthen dams. CMI sheet piling can help to prevent overtopping, internal seepage, piping of stratum, surface erosion and rodent damage. ShoreGuard® and UltraComposite™ sheet piling is also used for cantilevered flood walls in levee repair projects. In fact, CMI's sheet piling protects some of the nation's most valuable assets, including international airports and some of the largest refineries in the world.

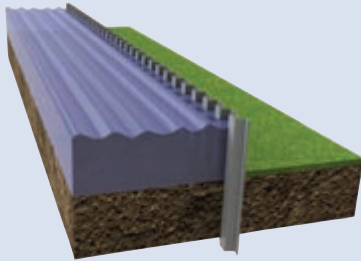
CMI's synthetic sheet piling has been exhaustively tested and used by the U.S. Army Corps of Engineers for over 15 years. The performance is proven. If you are attempting to control flooding, overtopping, internal seepage, piping of stratum, surface erosion or rodent damage in a flood control, levee repair or earthen dam project then CMI Sheet piling has the solution.



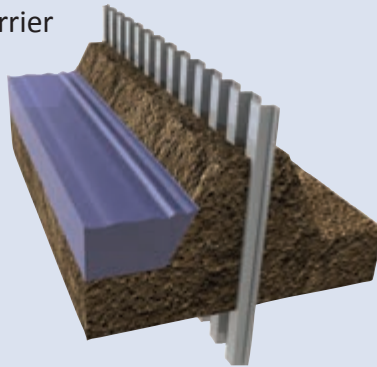


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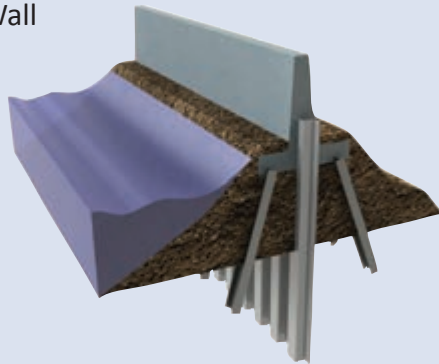
Flood Wall on Flat Land



Flood Wall and Seepage Barrier on Levee



Seepage Barrier for a T-Wall



## The Project

In 2008, for the first time in more than twenty years, FEMA began updating Flood Insurance Rate Maps. In doing so, FEMA deemed many levee systems unacceptable including the San Francisco Bay area. Many of the cities in the area immediately began searching for an economically feasible solution to increase the height, stability and overall integrity of their levee system. After analyzing all options, the city of Redwood Shores, CA chose ShoreGuard® vinyl sheet pile. ShoreGuard® was chosen for a number of reasons: it offers substantial cost savings, is corrosion-resistant, has a high strength to weight ratio, offers seepage protection, is a good rodent deterrent, and has a low carbon footprint. Delays in the permitting process left only one month to complete the installation. With the use of an ABI Mobilram unit, the construction crew was able to install the ShoreGuard® sheets three times quicker, enabling the project to be completed on time.





# Water Control

A water control structure is a device that alters the flow of water in a stream, drainage channel or storage pond. Engineers and hydrologist have been designing water control structures for thousands of years to divert water to irrigate fields and protect against flooding. In the past many of these structures were constructed from earth, concrete, or steel, and require routine maintenance and regular inspections. Advancements in manufacturing and material science have provided additional products and technologies to design longer lasting, cost effective water control structures. The family of synthetic sheet pile from CMI have proven to be one such technology.

ShoreGuard® and UltraComposite™ sheet piling are commonly used in the construction of Water Control applications such as baffle walls, weirs, silt fences and breakwaters. Projects ranging from small retention ponds to the largest fresh water diversion structure in the world have utilized CMI's sheet pile products. ShoreGuard® and UltraComposite™ sheets have revolutionized the industry by providing a cost-effective, sustainable building material which provide a long service life without toxic coatings or preservatives.

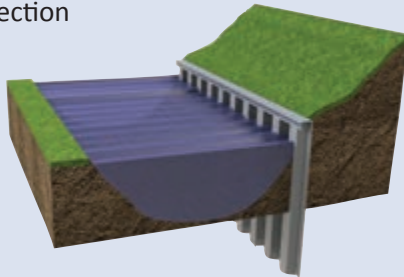
Top project engineers, government agencies, and general contractors all over the world choose to design with and install CMI sheet piling for a long list of water control applications. From demanding projects involving harsh acid mine drainage to simple erosion control or water diversion operations, the CMI family of sheet pile products have been used successfully for over two decades. In fact, the National Resource Conservation Service (NRCS) specifies vinyl sheet pile for a number of different applications including; toe walls for scour protection, weirs, undermining protection, stream bed grade stabilization, bank slope stability, and bank retaining walls.



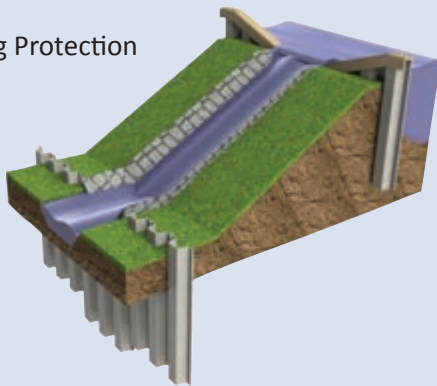


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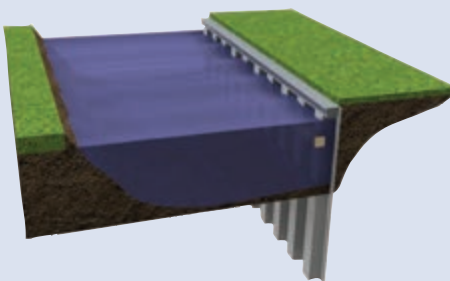
Toewall for Scour Protection



Weir & Undermining Protection



Bank Retaining Wall



## The Project

North America’s largest conservation facility, The Wilds, rose to critical status in 2007. The main beaver dam was abandoned, causing the lowlands to drain. With the support of the Environmental Protection Agency Surface Water Improvement Fund and the U.S. Partners for Fish and Wildlife Program, the water level was restored, native wetlands species were replanted, and a trail system was installed. Because aesthetics and long-term performance of the constructed weir system were priority, vinyl was the preferred building material. ShoreGuard® sheet piling met the necessary aesthetic requirements, but was also chosen because it’s a sustainable, eco-friendly material made predominate from post-industrial recycled materials. ShoreGuard®-525 and ShoreGuard® AW-1075 caps were installed by only a two-man crew and a mini-excavator.





# Cut-Off & Containment

CMI has decades of experience providing environmentally friendly sheet piling that is used in some of the most challenging chemical containment, levee seepage, and groundwater cut-off projects. CMI's ShoreGuard® and UltraComposite™ sheets have been utilized in remediation projects throughout the world including federally funded Superfund and Environmental Protection Agency (EPA) managed sites. CMI sheet piling has been successfully used in corrosive chemical environments such as those containing VOCs, BTEX compounds, methane vapors and Non-Aqueous Phase Liquids (NAPL).

Whether it is salt water, jet fuel, benzene or even creosote, CMI sheet piling has been used in projects that are designed to offer better performance than slurry, steel or concrete. CMI's ShoreGuard® and UltraComposite™ sheets are lightweight for easy handling and economical shipping. Compared with many slurry installations, CMI sheets require a small construction footprint and less equipment at the job site. Typically, projects that use CMI sheets can avoid excessive dangerous air emissions (created during slurry wall construction when digging up contaminated soils) because the sheets are driven into the ground. Also compared to slurry walls, sheet piling structures generally do not require soil mixing, create hazardous material disposal issues, require huge volumes of water at the job site, or necessitate environmentally harmful bentonite mining operations.

The patented I-Beam Lock™ technology designed into ShoreGuard® and UltraComposite™ sheet piling improves lock integrity and durability for challenging installations. The entire surface area of CMI sheets are impermeable, and with interlock sealant in conjunction with the I-Beam Lock™, the sheets can provide permeability rates superior to slurry. ShoreGuard®'s chemical resistance has been optimized over the decades using XCR Manufacturing Technologies™. XCR integrates state-of-the-art material processing, high precision die technology, and vinyl formulations based on 65 years of experience. The newest ShoreGuard® factory is the only facility of its kind in the world, designed from the ground up to produce synthetic sheet piling.

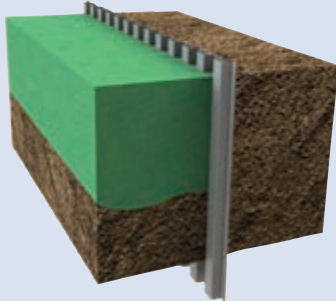




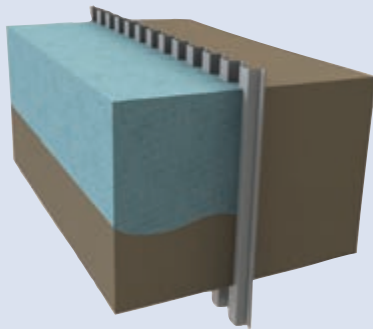


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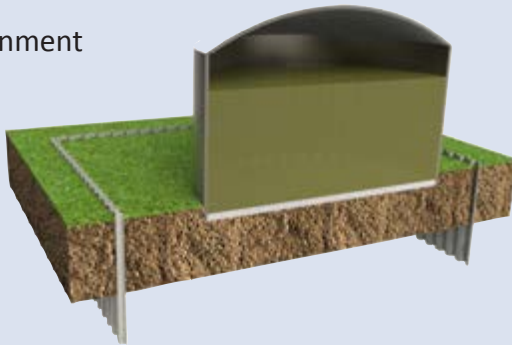
Chemical Containment



Saltwater Cut-Off



Secondary Containment



## The Project

Hackensack Meadowlands is one of the most contaminated areas in the country. It consists of three different Superfund sites affected by mercury, PCBs and VOCs. In 1999, the NJ Meadowlands Commission created the EnCap project to remediate municipal landfills. In order to protect Berry Creek, a tributary of the Hackensack River, engineers designed an underground vertical barrier to contain the PCBs. ShoreGuard® vinyl sheet pile with sealed locks was determined to be the best product to cut-off contaminants. While soil conditions in the marsh should have been soft and organic, years of illegal dumping made driving conditions difficult. CMI's PileClaw™ Installation Equipment was used to maximize the efficiency and predictability of driving the synthetic sheets into the ground.



# Products and Attachments

Soil conditions can make driving any sheet piling to significant depths a challenging task. PileClaw™ Installation Equipment's proprietary technology offers 20 years of documented performance and has several quality control and construction advantages over conventional sheet driving applications. CMI's PileClaw™ Installation Equipment technology incorporates patented features that help deliver superior results.

As the flagship of CMI's line of installation equipment, the PileClaw™ Mandrel has been successfully used in many different driving conditions and has installed CMI sheet piling to depths as great as 70 feet. The Mandrel can be used with a variety of traditional driving equipment including cranes, excavators and Mobilram pile drivers. CMI has specifically fabricated the Mandrel to work with multiple CMI profiles and sheet lengths.

With an adjustable width, PileClaw™ DriveGuide can work for a variety of sheet piles and Mandrels. Its built-in system helps keep sheets aligned and plumb during installation taking some stress off the interlocks. When used in conjunction with the PileClaw™ Mandrel, the PileClaw™ DriveGuide also holds sheet piles in the ground during Mandrel extraction, increasing the rate of installation. Compact for shipping, PileClaw™ DriveGuide is color coded for easy on-site assembly, reducing labor time in the field.







“PileClaw™ Mandrel can be used with a variety of traditional driving equipment including cranes and excavators.”

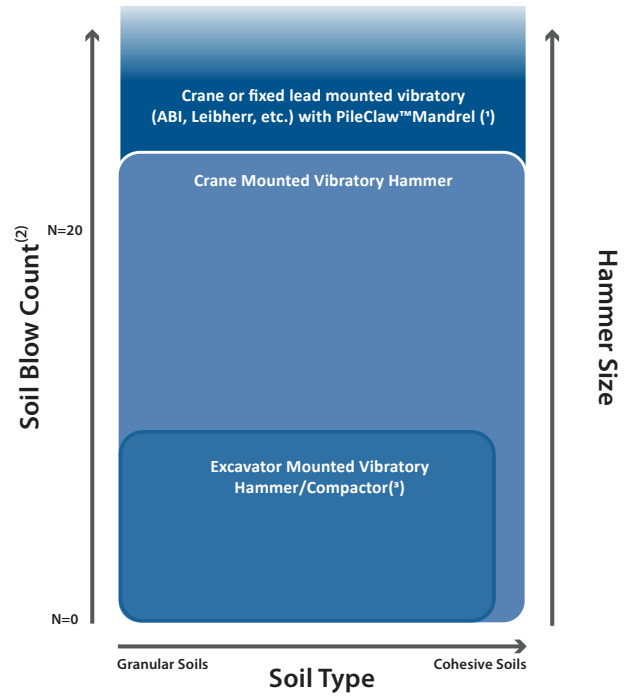
PileClaw™ Mandrel



PileClaw™ DriveGuide



## Vinyl Sheet Pile Installation



1. PileClaw™ Mandrel is also used when sheet lengths become difficult to manage due to length, even in softer soils.
2. Installations in high blow count soils may require additional construction techniques not addressed in this graph.
3. Excavator mounted installation method will vary greatly based on equipment specifications and sheet length.





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Physical properties are defined by ASTM testing standards, The Aluminum Association Design Manual, The Naval Facilities Design Manual DM 7.2, and The US Army Corps of Engineers General Design Guide: PVC Sheet Pile and/or standard engineering practice. The values shown are nominal and may vary. The information found in this document is believed to be true and accurate. No warranties of any kind are made as to the suitability of any CMI product for particular applications or the results obtained there from. Crane Materials International is a Crane Building Products® company. CRANE MATERIALS INTERNATIONAL products are covered by one or more of the following U.S. Patents and International Patents: 4,674,921; 4,690,588; 5,292,208; 5,145,287; 6,000,883; 6,033,155; 6,053,666; D420,154; 6,575,667; 7,059,807; 7,056,066; 7,025,539; 7,393,482; 5,503,503; 5,803,672; 6,231,271; 1,245,061CA; 7,914,237 and other patents pending. © 2005-2012 Crane Materials International. All Rights Reserved.