

## City of Manhattan Beach Goes Green with Pervious Concrete

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Manhattan Beach is a community committed to helping the environment. For years the city has offered free waste reduction programs such as composting classes and recycling collection. Now, they have taken another significant step toward protecting the earth's resources by installing pervious concrete in nine city parking lots.

Pervious concrete pavement is a permeable, porous material that is often said to resemble a rice cake. Pervious pavements help improve ocean water quality by allowing storm and nuisance water to infiltrate into the ground, decreasing the amount of runoff carrying pollutants.

The Manhattan Beach pervious parking lot project was made possible by a \$900,000 competitive grant awarded to the city from the State Water Resources Control Board. A demonstration of this environmentally friendly material was given as part of the city's Earth Day celebration last month. The event was attended by residents and city officials.

Pervious concrete is not a new material. It was originally used 100 years ago in Europe as structural insulation in buildings. It has been successfully used as a paving material in Europe for the past 80 years and in the American Southeast for the past 20+ years. It has also been used successfully in southern California and has recently been gaining increased popularity as more and more building owners and municipalities are considering the environmental impact of their construction and public works projects. Manhattan Beach's decision to use pervious is an example of this trend.

Ish Medrano, Engineering Technician for the City of Manhattan Beach, says, "Unlike conventional concrete, you can't do slump or compact tests with pervious, so it's a little harder to predict. Although pervious concrete has been used in many other cities, it's our first time using the material, so there is a bit of a learning curve."

By capturing stormwater and allowing it to seep into the ground, pervious concrete recharges groundwater, resulting in zero discharge of polluted runoff into waterways, lessening of urban flooding, improved health of adjacent trees, on-site bioremediation of pollutants, and a reduction or elimination of the need for storm drain infrastructure.

Two of the Manhattan Beach parking lots are located in a median greenbelt that is a popular place for local residents to jog. "This is the ideal spot for pervious concrete," notes Medrano, "because it is an isolated natural setting that will recharge the local area."

Two other lots are in the downtown district, and three are right on the beachfront. Because of its light color, pervious concrete also helps to reduce the urban heat island effect caused by large areas of dark



**Manhattan Beach residents attended a demonstration of the city's new environmentally-friendly pervious concrete parking lots at their local Earth Day celebration.**

colored pavement. For these reasons, the use of pervious concrete is among the Best Management Practices recommended by the Environmental Protection Agency and by other agencies and geotechnical engineers across the country.

One of the challenges faced by the Manhattan Beach team over the course of construction was the tighter tolerances required by pervious concrete as compared to traditional concrete. "Pervious concrete needs to be placed, covered and cured more quickly," says Medrano, "We worked with the police and fire departments to close off the road so the trucks would be able to get here on time. We timed the trucks so they came just when we needed them. And we used a conveyer belt to pour the concrete so it was in constant motion."

Medrano adds, "Another example of something we hadn't figured on is that after the pervious concrete has dried, it takes two coats of paint to draw the street markings, where usually it takes one. This is because of the irregular texture of the cured pervious concrete. Little things like this that we're learning will help us know how to approach the next pervious project, and sharing our experiences with other contractors, owners, and municipalities who embark on pervious concrete projects can be helpful to them as well."

The two parking lots located right on the beach are built on grade, with storm drains at the edge where the concrete meets the sand. The 10 inch-deep pervious concrete has a great capacity to hold rainwater that would otherwise puddle up on the surface and run through the storm drain back into the ocean. In flow meter and sample tests that are regularly conducted to determine how much and how clean the water is that is coming through the storm drain, it has been shown that the pervious concrete is successfully trapping stormwater and there is now very low flow into the storm drains.

The community has responded positively to the new parking lots. "Any kind of construction project brings some inconvenience for the residents," comments Medrano. "At first, people were asking, 'Why are we ripping up perfectly good parking lots and redoing them? It's a waste of money!'" But once they learned that the new parking lots would be better for the environment than the asphalt ones, they were all for it. We had a lot of public support."

With this important project, Manhattan Beach has shown that pervious concrete is a sound material for pavement construction when designed and constructed properly; that it does not contaminate ground water; and that the cost per square foot for pervious concrete is very competitive compared to



conventional parking lots when the holistic system is considered. If other southern California municipalities follow suit, the entire region will be contributing to a healthier environment.

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