

Sidewalk Projects

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Sidewalks in Olympia, Washington

A 2000 survey of residents in Olympia found that sidewalks and walking facilities are the top choice for neighborhood public improvements. In 2003, citizen volunteers completed an inventory of arterials, major collectors, and neighborhood collectors that did not have sidewalks. These streets compose 42 percent of the City's street system. The inventory found 84 miles of missing sidewalks on these high-volume streets. At previous funding levels, it would take the City 180 years to construct the needed sidewalks.

In 2004, a funding measure was placed on the ballot for parks and sidewalks facilities. Voters approved an increase of the private utility tax resulting in approximately \$1 million dollars annually for sidewalk construction.

Sidewalk construction typically triggers the installation of stormwater controls. These stormwater controls often require the acquisition of additional right-of-way or land. The total cost for the stormwater mitigation can exceed the cost of the sidewalk construction. The land required for stormwater controls can be expansive, on retrofit projects, it is sometimes simply not available. Porous concrete does not generate increased stormwater runoff and therefore does not trigger the need for stormwater controls. Porous concrete allows Olympia to build sidewalks without building costly stormwater ponds.

The City of Olympia, Washington has installed over 7,500 square yards or about two miles of porous concrete sidewalk to date, with more projects coming each year. We have experience with three different types of porous concrete materials over an eight-year period. Materials range from the regular "no-fines" porous concrete to a new form of 100 percent sand "all-fines" concrete.

Porous Concrete Sidewalks in Olympia

The City of Olympia installed its first 1,500 feet of porous concrete sidewalk in 1999 along North Street in East Olympia. The sidewalk was adjacent to an existing roadway. Due to the stormwater regulations and price of land in Olympia at the time, the sidewalk saved an estimated \$140,000 in initial construction cost. Maintenance costs were unknown.

A survey of residents using that sidewalk in 2000 found that 52 percent of sidewalk users liked the appearance of the Regular porous concrete surface; 25 percent did not. When asked about the walking surface, 49 percent said it was less slippery, while 9 percent said it was more slippery than a regular sidewalk. If the price was comparable to traditional concrete, 52 percent said they would consider using it at their homes verses 15 percent who would not. When asked if the City of Olympia should encourage developers and

builders to use porous pavements 72 percent said yes, while 11 percent said no.

Since 2000, there have been advances in the use of finer aggregates in porous concrete. These finer aggregates result in smoother surfaces with more and smaller surface voids than compared to Regular porous concrete. This finer aggregate porous concrete may be less prone to clogging. The appearance is also more appealing to the public.

Olympia also installed a section of Stoney Creek porous concrete sidewalk in 2004. Stoney Creek uses ¼-inch sized aggregate. The concrete is also self-consolidating, meaning that after screeding no additional surface rolling or compressing is needed. The surface texture of Stoney Creek is much smoother than Regular porous concrete. Cleaning of Stoney Creek previous concrete should be easier and more effective than Regular porous concrete.

Percocrete porous concrete uses sand aggregate and is similar to regular concrete in texture. The surface voids of Percocrete porous concrete are smaller than most of the leaf litter material that falls on a sidewalk. For this reason, Percocrete porous concrete may be the least susceptible to surface clogging. Olympia has been using Percocrete previous concrete in sidewalks since 2004 and plans to continue to use it in the future.

Streets in Olympia which contain a section of porous concrete sidewalk include: North Street, Division Street, Boulevard Road, Bush Street, Birch Avenue, Brawne Avenue, Percival Street, Bigelow Avenue, Miller Avenue, San Francisco Avenue, 5th Avenue, State Avenue, and 21st Avenue.

Porous Concrete Construction Costs

Olympia typically uses three bid items for its porous concrete sidewalk projects: Porous Concrete Sidewalk (SY), Porous Concrete Underdrain (CY), and Porous Concrete Testing (SY).

Porous Concrete Sidewalk includes the cost to form, supply, and finish the porous concrete material. The porous concrete sidewalk is four inches thick. Porous Concrete Underdrain includes the cost to excavate and place the drain rock. Geotextile is a separate bid item. The Porous Concrete Testing is payment for the pressure-washing test.

A summary of the bid items for 2005 and 2006 construction are below:

Table 1: Percocrete Porous Concrete Bid Costs

Bid item	Year	Total Quantity	Range of Bids	Average Bid Price
Porous Concrete Sidewalk	2006	4,290 SY	\$88-\$119	\$106
	2005	2,295 SY	\$66-\$102	\$84

Porous Concrete Underdrain System	2006	1,760 CY	\$43-\$122	\$72
	2005	580 CY	\$44-\$131	\$72
Porous Concrete Testing	2006	4,290 SY	\$2.25-\$12	\$6.70
	2005	2,295 SY	\$7-\$8.75	\$7.80

These bid costs are high when compared to a traditional concrete sidewalk. For the same time period, the bid prices for traditional concrete sidewalk in Olympia averaged \$40 per square yard. Essentially, porous concrete sidewalks include the cost of a stormwater facility. The cost of building a stormwater facility must be added to the traditional sidewalk bid prices for a true comparison.

Life cycle cost comparison between porous concrete sidewalks and traditional concrete sidewalks with stormwater facilities vary depending on the project assumptions made. The most critical assumptions are land acquisition cost and the life (in years) of the porous and traditional concrete materials. Generally, as the cost of the traditional stormwater mitigation increases, the life cycle cost comparison favors the porous concrete. Thus, in retrofit projects where land is not available for stormwater facilities, porous concrete has an economical advantage.

Future of Porous Concrete Sidewalks

Porous sidewalks are a relatively easy first step into permeable pavements. Sidewalks are lightly loaded and generate a significant percentage of the roadway runoff. In Olympia, sidewalks can be up to 20 percent of the impervious surface in a street section. The reduced strength of porous concrete is also less of a concern in sidewalk design.

The use of porous concrete requires a shift in maintenance responsibilities from traditional stormwater ponds to sidewalk cleaning. This maintenance has to be performed if the concrete voids are to remain open. Funding and equipping the cleaning program may be the most difficult part of working with porous concrete.

The outlook for porous concrete sidewalks is good. Porous concrete sidewalks have a clear environmental benefit over traditional concrete sidewalks. Porous concrete is accepted by citizens in sidewalk applications. Lastly, it can substantially reduce initial construction costs when stormwater mitigation is expensive.

Photos of a recent sidewalk project

San Francisco Avenue porous concrete sidewalk showing art installation



San Francisco Avenue porous concrete sidewalk adjacent to bakery.

