



Kansas LTAP Fact Sheet

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Alternatives to Curb and Gutter on Streets: Benefits and Challenges

By Lisa Harris



Alternatives can be used instead of curbs, or in combination with them. This project in Seattle combines curbs with rain gardens.



For several communities in Kansas in or near urban areas, Environmental Protection Agency regulations require that water quality best management practices (BMPs) be installed for new developments and re-developments one acre or more in size. Concentrated development in urbanized areas substantially increases impervious areas, such as city streets, driveways, parking lots, and sidewalks, on which pollutants settle and remain until a storm event washes them into storm drains that discharge to surface waters. Common pollutants include pesticides, fertilizers, oils, salt, trash, debris, and sediment.

BMPs are designed to keep stormwater closer to where it falls, and to prevent pollutants from getting into water bodies.

The EPA's stormwater program,

known as NPDES (National Pollutant Discharge Elimination System), has two phases: Phase I for cities with municipal separate storm sewer systems (MS4s) serving a population of 100,000 or more and Phase II. The Phase II, or "small MS4" general permit program, regulates MS4s that generally serve populations less than 100,000 in urbanized areas. Some MS4s located outside urbanized areas may also fall under Phase II if they have, or may have, the potential to negatively impact surface water quality as a result of their discharges.

There are many kinds of BMPs. Some are designed to receive and treat runoff from streets, providing an alternative to traditional curb and gutter.

This article is aimed at local government officials who review site plans for development, whether or not their jurisdiction is an EPA-regulated MS4. Developers may come to you with plans for BMPs, including alternatives to curb and gutter. This article provides some information and perspective from stormwater managers who have seen such projects in their own communities, and things to think about as you consider alternative approaches.

Communities in the Kansas City metro area have been requiring BMPs in developments for many years, to comply with the communities' Phase II permits. (Lenexa was the first city in Johnson County to hold a NPDES permit.) Some of

the BMPs built have been alternatives to curb and gutter.

We spoke with Rob Beilfuss, water quality specialist, City of Olathe, about the use of curb and gutter alternatives in the Kansas City area, their benefits and challenges, and the future of storm water management in urban and suburban areas. Beilfuss was storm water manager in Lenexa for many years and now holds that position in Olathe. We also spoke with Scott Lindebak, stormwater program manager in Wichita, about some experiences in their city with green roadside infrastructure.

What are some common stormwater BMPs?

Stormwater BMPs include *swales, detention basins, permeable pavement and pavers, stormwater planters, and catchment systems*, to name a few common types.

Curb and gutter and BMPs can be used on the same project. Olathe has a policy that allows curb to be removed for impervious areas that drain directly to BMPs.

Why consider streetside BMPs?

First, a principal reason for a city to consider streetside BMPs in site plans is that they help meet the water quality goals of the NPDES, Beilfuss said.

Other advantages of green alternatives to curb and gutter are:

—*Convenience*. Areas along roadways are convenient places to put BMPs. The city owns the right-of-way, and work crews can get to them.



—*Flood control.* BMPs can help mitigate downstream flooding by spreading out storm flow.

—*Aesthetics.* BMPs can be attractive green spaces if well designed.

—*Costs.* Beilfuss said BMPs can be more cost effective in the long run than ditches for flood control. He said ditches tend to erode and compromise the roadbed. Some green designs may be less expensive to install than curb and gutter.

Not all streetside BMPs are green

In an urban area where developable space is limited, using a nonvegetated “proprietary” BMP may make sense, such as CDS® Unit. A proprietary BMP is designed so that storm water runs into an underground chamber that is cleaned out periodically. Proprietary systems are effective at removing trash, oil and grease, and total suspended solids, which are common roadway pollutants. They can be placed under the ROW, so they don’t take up a lot of space. Green BMPs, such as swales and bio-retention cells work well too, but they can be more labor-intensive to maintain.

Maintenance issues

Any drainage system, including curb and gutter, is dependent on routine maintenance for effective operation. For water quality BMPs, both Beilfuss and Lindebak advise cities to understand the maintenance considerations before approving these structures.

Primary maintenance considerations include:

Trash. Trash removal is a consideration for any roadside BMP. Proprietary systems collect trash in an underground chamber, which can easily be removed with a vac truck every few months, depending on the pollutant load. Trash also collects in green BMPs. Trash scattered among native plantings can be unsightly and depending on the public view, the BMPs may need to be maintained frequently.

Establishing native plants. This is a short-term but intensive maintenance issue. There is no “instant native grass.” It takes several years to establish deep roots. The plants must be nurtured until they reach full stand. They need regular

Advantages and challenges for using curb and gutter alternatives

Advantages

- Help meet EPA regulations for controlling solids in storm water
- Help mitigate flooding by spreading out storm flow
- Can be attractive green spaces if well designed
- Some designs are less expensive to install than curb and gutter

Challenges

- Maintenance time and costs—short term and long term
- Public acceptance
- Lack of control of how property owners maintain the BMPs

watering, and a cover crop is usually recommended (like winter wheat) to protect the native plants that will be barely visible above the ground in the first year while they are establishing their root systems.

Weeding is also needed, and it takes a trained person to tell the difference between a weed and a native plant. Beilfuss said there has been a shortage of expertise in establishing native plants in Kansas, but that is changing.

Maintaining established plants.

Control of weeds and cedar trees can be accomplished with controlled burns. Lenexa crews are trained in prescribed burning and they burn native areas as needed (usually every 2 to 3 years).

Native grasses are green and growing in the heat of summer, but the biomass browns up and the plant is dormant in the cool seasons. The brown/dry biomass can be a fire hazard if located too close to buildings. Many cities mow native plants in the fall to show the public that the area is being maintained; this also reduces fire hazard.

Sediment removal. As drainage basins collect solids over time, they will need to be dredged and cleaned.

Responsibility for maintenance. After a BMP or drainage ditch is installed, it is often the responsibility an individual property owner or homeowner’s association (HOA) to maintain it.

An HOA typically does not know how to maintain ditches and BMPs. The HOA may not set aside funding for maintenance and overhauls of the BMPs that are needed over time.

Most BMP standards say that maintenance of the BMP is the responsibility of the property owner, but an enforcement mechanism is needed. Olathe inspects BMPs every two years and sends out a notice of violation if a property owner is not doing proper maintenance.

Public buy-in. A significant factor in successful long-term maintenance of green infrastructure, and one that might not come immediately to mind, is public acceptance. Green infrastructure is more likely to be maintained when the people see it as an amenity who live by it or have BMPs on their properties.

One issue with buy-in is public acceptance of native plants. Sometimes the public may perceive a stand of native plants as an “un-maintained” area or “weed patch.” It’s important to educate the public on the use and value of native



Proprietary systems with catch basins are excellent at collecting and trapping trash and debris.





Good resources on stormwater quality management

National Menu of Stormwater Best Management Practices. This EPA website provides links to recommended practices in the NPDES-related areas of public education, public involvement, pollution identification and control, and construction BMPs. The page also contains links to guidance for complying with EPA regulations and a host of stormwater case studies from different cities. <http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm>

Manual of Best Management Practices for Stormwater Quality, 2012 Edition, by the MidAmerica Regional Council (MARC) and APWA. This manual is the Kansas City area's local design manual. It takes into account the area's clay soils and other local conditions. The manual includes design standards for developing post-construction BMPs. Most cities in the Kansas City area have adopted the MARC-APWA manual by reference in their code. Olathe has adopted the manual as guidance, to allow more flexibility. http://marc.org/environment/Water/bmp_manual.htm. MARC has an excellent general website on stormwater as well, at <http://www.marc.org/Environment/Water/index.htm>

Kansas Department of Health and Environment. Beilfuss recommends carefully reading the Kansas stormwater permit that applies to your jurisdiction, if any. <http://www.kdheks.gov/muni/ms4.htm>. Rance Walker at KDHE is a good contact for stormwater questions -- (785) 296-5537.

Websites from other cities. Public outreach and education is a requirement in Kansas stormwater permits, and most Phase I and II cities have extensive stormwater webpages. These are excellent resources for communities that are being pulled into the program as their populations meet the Phase II criteria. (Gardner, KS, is one recent example.) Such communities need to adopt development codes that require stormwater BMPs, and some are learning from scratch.

Richard Basore. Basore is a KDHE watershed field coordinator. He maintains a list of interested stakeholders and sends regular email messages to them as he hears about new and interesting developments in stormwater issues. To be added to list, email Basore at rbasore@kdheks.gov.

Sources of training and mentoring

National conferences and expos. There are a lot of stormwater conferences out there with workshops, training sessions, and vendors with latest BMP technologies. You can find some by searching on the internet for "national storm water conference."

Certifications. Resources for certification are the National Certification for Stormwater, an AWWA training track on stormwater, and Enviro-cert International.

Peer groups. There are a few informal groups in Kansas that get together to share storm water information. In Kansas, a group called the "Clean 13" meets regularly to talk about BMP issues. Some of the member cities are Hutchinson, Wichita and Topeka. Call Rance Walker at (785) 296-5537 for more information about this group.

Johnson County's Stormwater Program meets on a regular basis. The county coordinates with the cities on BMP-related issues. Lee Kellenberger, Johnson County's stormwater program coordinator, is the contact for this.

MARC's water quality public education committee meets regularly. Anyone is welcome. Learn more at <http://www.marc.org/Environment/Water/index.htm>.

plants, Beilfuss said.

Olathe works with development consultants and their landscape architects to ensure that aesthetics are considered in their designs. The city promotes planting natives in groupings, with staggered

heights, to show the public that the area has been "landscaped" with natives.

Another issue with public acceptance is mowing. In the Kansas City and Wichita areas, residents want to mow their fescue right down to the edge of the

street. Roadside ditches can't be mowed when they are wet. Sometimes residents want to fill in the ditches in front of their homes. (See Wichita's experience with this in the sidebar on page ?7.)

Building buy-in

Providing public input and public education are requirements of a city's NPDES permit. The EPA has some good resources on its website for both of these activities. (See the first resources in the sidebar on left).

Specific populations can be identified for targeted educational activities. For example, cities in Johnson County give presentations to school kids so that they will understand what a watershed is and how a property impacts someone downstream. Cities in the Kansas City area also proactively reach out to HOAs and routinely respond to questions from homeowners and HOAs about how to maintain BMPs.

Future of stormwater management

National water quality standards appear here to stay (in fact, they are likely strengthen). NPDES Phase II requirements mandated general water quality protection measures for municipalities. In the future, stormwater programs will likely target their activities to priority watersheds (TMDL water bodies), Beilfuss said. TMDLs, or total maximum daily loads, are the maximum amount of a specific pollutant that can be assimilated by a water body without degrading the quality of the water such that it does not meet current water quality standards. Communities will need to develop a plan to restore and protect waterways that have high TMDLs.

New EPA regulations may also be on the horizon. Currently the EPA targets new developments and redevelopments. Beilfuss said the EPA has discussed modifying the stormwater rule to include retrofitting built-out areas with BMPs. Retrofitting BMPs can be costly in built-out areas due to lack of available space. It may be necessary to remove an existing impervious area or building in order to build a BMP.

Due to the cost burden on development, this proposed requirement



may not ever come to fruition, Beilfuss said. If it does, municipalities will have to work closely with existing developments to identify cost-effective BMP retrofits. One example of a cost-effective solution would be installing little BMPs tucked along a curb and gutter street rather than a whole new system. An example of this is in Kansas City, MO, where the city has retrofit some bump-outs along a street to route stormwater into green infrastructure along the roadside.

Work with your developers

Traditionally, stormwater systems were designed for flood control. Water quality considerations are relatively new. Sometimes developers use consultants who don't understand the value of using treatment trains (a series of complementary BMPs), Beilfuss said. Consultants may pick the most expensive and maintenance intensive BMP, when there are other more cost effective options out there. The ability of the future property owner to maintain needs to be considered as well.

When reviewing site plans, it's important to understand how the methodology works for choosing a BMP, so that possible alternatives can be considered, if needed.

Once the site plan is complete and construction is under way, construction of the drainage structures should be monitored. Olathe requires a stormwater permit and performance bonds for any development installing BMPs. Through the permitting process, the city establishes an inspection schedule to ensure proper installation.

Conclusion

We hope this article has shed some light on the advantages and challenges of BMPs, especially those that are alternatives to curb and gutter—and will help you get started if your community reviews plans that include them. As seen here, different communities can have different experiences and perspectives, and it's important to carefully think through these kinds of projects.

Check out the stormwater resources

Wichita's experience with green infrastructure

Wichita's street standard is curb and gutter. Scott Lindebak, the city's stormwater division manager, says that the city promotes using alternatives to curb and gutter, but the message is not getting traction. He said that's probably because two Wichita developments that tried alternatives have received complaints from residents.

Both were built over a decade ago and have ditches on residential lots that drain to a detention basin. In each case, some residents have filled in their ditches, either to allow for easier mowing or to provide off-street parking adjacent to the road. Some residents installed pipe for drainage, but there was no consistency in pipe size from house to house. That makes it difficult to maintain those pipes.

Lindebak said that the projects were not intended to address water quality; they were something new, something different, and were likely proposed by the developer for cost savings. In the end, the HOAs did not maintain control of the drainage process and also did not maintain the drainage basin effectively.

"Many homeowners end up filling in the ditches and the city loses control of managing the drainage," Lindebak said.

To create an aesthetically pleasing detention basin in the Wichita area, Lindebak said it needs to be 10 ft deep or so, receiving drainage from 10-20 acres. During dry spells, water may need to be added to it from a well.

Lindebak said that developers, HOAs and home buyers need to completely embrace the concept and the maintenance costs involved for streetside BMPs to be successful.

Lindebak thinks that Wichita will continue to have an urban standard of curb and gutter and will use other kinds of BMPs in developments to meet EPA requirements for water quality.

in the sidebar on page 3. Those are just a few examples of helpful resources available to you. ■

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Sources:

- Interviews: Rob Beilfuss on 8-1-13; Scott Lindebak on 7-15-13.
- KDHE Municipal Stormwater Program website: <http://www.kdheks.gov/muni/ms4.htm>
- Eliminating Curbs and Gutters. EPA NPDES fact sheet. Accessed 8-5-13. <http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=browse&rbutton=detail&bmp=88&minmeasure=5>