Corridor 15 - 26

Capitalize on the Site

15 Fit streets to the slope

16 Design streets to enhance natural features

Connect the Flows

17 Design a network of interconnecting streets

18 Connect transit to the community

Layer the Systems

19 Move stormwater along the street

20 Create urban gardens

21 Create an urban forest

Create a Centre

22 Create activity on a Main Street

An Economy of Means

23 Make streets cheaper

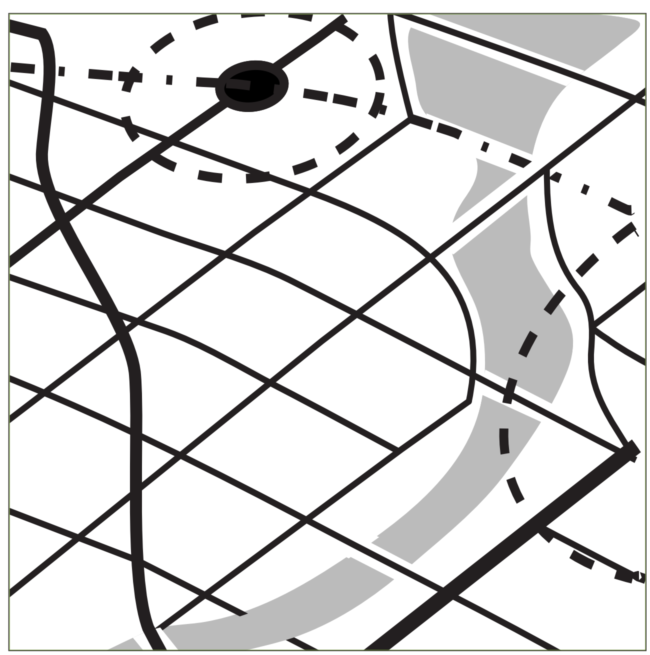
Make it Home

24 Provide parking wisely

25 Create safe and comfortable streets

26 Create a sense of enclosure

Corridors are the conduits for moving materials, energy and resources within and between neighbourhoods, districts, and regions. Corridors of all types and at all scales — be they streets, lanes, boulevards, pathways or streams — need to reflect their unique and specific functions. Regional transit corridors should be designed to coordinate and concentrate growth where it is most appropriate. Local corridors should be designed to be walkable and connect residents to commercial services, transit stops and natural areas, and so on. Laid over the urban fabric, an interconnected street network can and should yield to natural stream corridors without unduly compromising street interconnectivity.



capitalize on the site

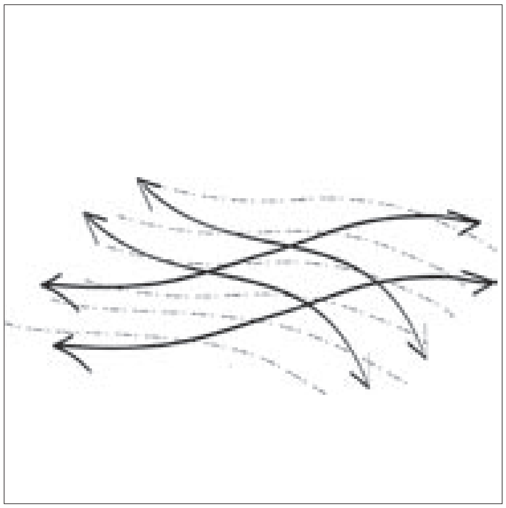
Related Charrette Strategies
C1; D2; F2; J1; K2; K3; L1

Related Guidelines
4.2; 17.2; 17.4; 27

15 Fit streets to the slope

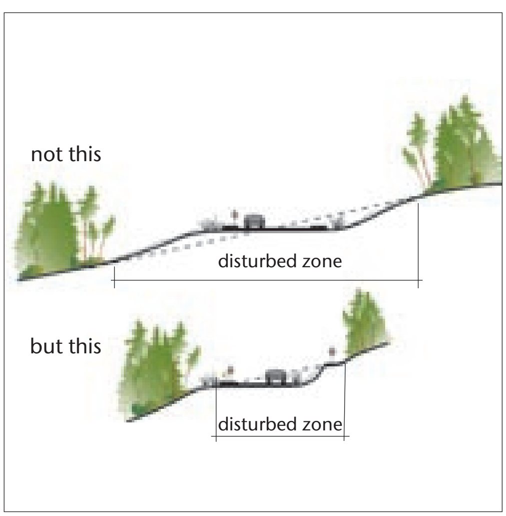
"The city was on many levels; some streets — often mere alleys — had to negotiate an incline so steep that they cascaded into flights of stairs." Christine Whittimore, Parabola, Winter 1993.

As our communities grow and gently sloping land is consumed, development on sloped sites becomes more common. Streets designed to work with the existing terrain lessen impacts on sensitive slopes. This means building somewhat steeper streets that follow the contours of the land; it also means allowing minimum road widths in order to reduce the cutting up of the slope. Hillside streets must also be interconnected to reduce trip length and increases pedestrian utility. Capitalize on the site by allowing the shape of the land to direct the placement of an interconnected street network.



15.1 Work with the Contours
Envision the interconnected street network as a net that has been laid over the landscape. Some streets may run nearly parallel to the contours; cross streets may run gently at an angle to these contours so that, if possible, street gradients are kept to 7% or less. Capitalize on the site by fitting the interconnected street system to the land in a way that minimizes grading and maximizes interconnectivity and accessibility.

15.2 Steep Streets on Steep Slopes
Steep slopes sometimes surround pockets of developable land. Capitalize on such sites by strategically crossing some steep slopes in order to gain access to suitable development areas. Allow such streets to be steeper than the norm in order to minimize distance and the amount of disturbance to the slope (even a 12% gradient is manageable over short distances). Special accommodation for pedestrians and the physically challenged may be required, and allowances should be made for icy conditions. It is more sensible to deal with these needs on a case-by-case basis than it is to set a blanket maximum limit on street gradients. For example, restricting road gradients to a maximum of 6% on slopes greater than 10% often reduces previously attractive and ecologically significant slopes to rubble.



15.3 Narrow the Platform
Hillside streets must be cut into the slope. Minimize the effective width and impact of the street platform (often referred to as the street section) in order to reduce the amount of site disturbance. This can be done by simply narrowing driving lanes and sloping boulevards. The resulting platform will decrease the amount of cut and fill required to build the road and reduce the cost of construction. The minimum width of a platform is dependent upon the layout of buried services; consequently, cheap and practical alternative locations for some utilities may be sought. For example, lanes could be used for Hydro and telephone access. Lanes can also reduce width requirements for streets by accommodating parking in the rear. In extreme cases, providing a sidewalk on only one side of the street, or on an alternative alignment, can decrease platform impact.

16
Corridor
capitalize on the site

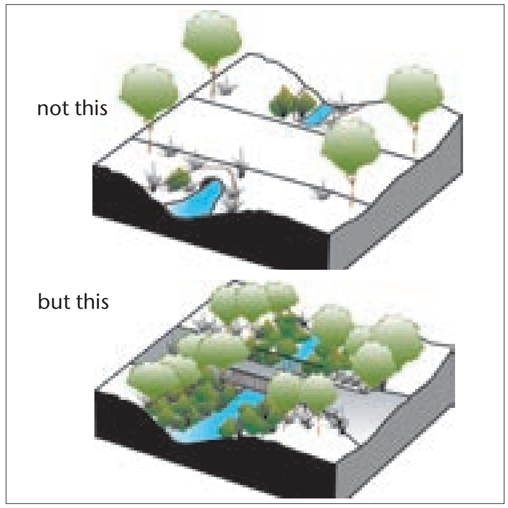
16 Design streets to enhance natural features

"A new road, on stilts, swung up and out on the edge of town; from up there you could take in almost the whole city at a single view." Christine Whittimore, Parabola, Winter 1993.

Every site has unique natural features that contribute to the overall function, experience, and identity of the community. Streets can give access to, and enhance, these features with only minor disturbances to the network and with no loss of connectivity. Narrow, inexpensive, one-lane wooden bridges can be built over streams; this will calm traffic, create a significant gateway feature, and virtually eliminate impacts on the stream below. Capitalize on the site by using streets to enhance natural features.

Related Charrette Strategies
E3; F2; F4; G2; K3; L1

Related Guidelines
3.1; 13; 17; 27, 29



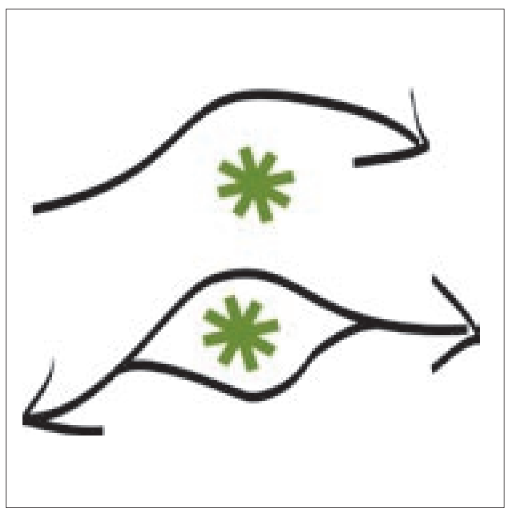
16.1 Use a Bridge, Not a Culvert
Culverts have a greater impact on watercourses than do long-span narrow bridges, and they are more difficult for wildlife to traverse. For these reasons, it is wise to capitalize on the site by crossing streams and rivers with a long-span bridge. Make sure that the bridge is as narrow as possible. Until relatively recently, many bridges in British Columbia — even those located on main roads — were one-lane, "take-your-turn" bridges. Local roads and residential collector roads are candidates for the modern use of this type of bridge. Position the bridge so that it will cross the stream at the point that causes the least impact.

BRIDGES

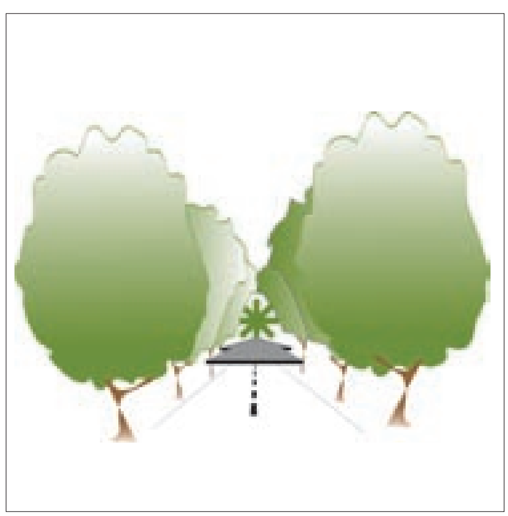
Bridges are the preferred option for stream crossings as they allow the maximim amount of riparian vegetatation to be protected, maintain the natural stream bed, and maintain the natual hydological condition that existed before development. Bridge construction should always maintain the natural stream width and provide suitable footing to prevent erosion (Chilibeck et al. 1992; Lanarc, 1994).

ROAD CONSTRUCTION

Road construction should be informed by the location of environmentally sensitive areas and stream courses. Where stream crossings are necessary, cross streams at a 90 degree angle to minimize disturbance.



16.2 Go around
Some natural features are so unique and/or ecologically sensitive that they must be preserved. A street network flexible enough to accommodate an occasional shift in order to move around such features may well heighten their visual impact, thus adding value to the community. Capitalize on the site by building streets around its most important natural features while maintaining overall street connectivity.



16.3 Frame Views
Views can link residents to the larger community and contribute to a strong sense of place. Capitalize on the site by terminating streets on views and landmarks. Ensure that insensitive street siting or building massing (or orientation) does not unduly compromise views. Frame the views for heightened impact by setting buildings close to the street.

FURTHER RESEARCH

Chilibeck et. al., *Land Development Guidelines for the Protection of Aquatic Habitat.*

Lanarc Consultants, Ltd., *Stream Stewardship: A Guide for Planners and Developers.*

Arendt, *Conservation Design for Subdivisions: A Practical Guide to Creating Open Space Networks.*

17
Corridor
connect the flows

Related Charrette Strategies
A2; B2; C1; D2; F2; F4; G2; K2; N2

Related Guidelines
4; 6; 15; 19; 27; 29

WALKABLE NEIGHBOURHOODS

Residents in communities with interconnected street patterns, high employment and housing densities and pedestrian-oriented features (i.e., continuous sidewalks, street trees, etc.) tend to make three times more as many transit trips and nearly four times as many walking and bicycling trips as do residents of more non-integrated, lower density suburban areas with auto-oriented land use patterns (Parsons Brinckerhoff Quade and Douglas, Inc., 1993).

FURTHER RESEARCH

Centre for Housing Research, *Green Neighbourhoods.*

Duany Plater-Zyberk & Co., *The Lexicon of the New Urbanism.*

Parsons Brinckerhoff Quade and Douglas, Inc., et al., "Making the Land Use Transportation Air Quality Connection – the Pedestrian Environment."

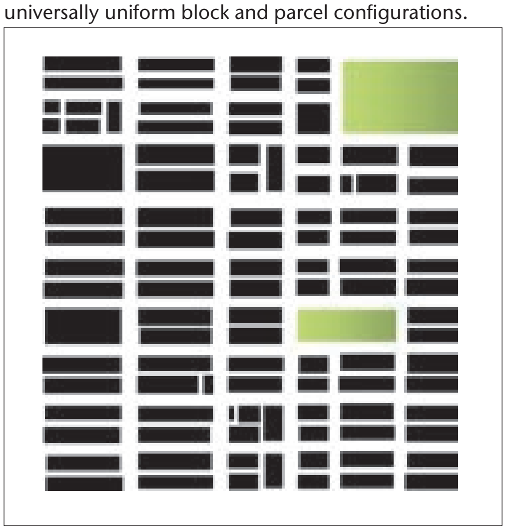
17 Design a network of interconnecting streets

"The Emperor's Palace was in the centre of the city, where the two great streets meet." Jonathan Swift, Gulliver's Travels, 1726.

Streets are the veins of a community. They accommodate the flow of people and services. An interconnected network of streets makes common destinations accessible and the neighbourhood legible. A fine-grained street network reduces street congestion and ensures that trips are direct rather than circuitous. This means that people can walk easily to neighbourhood destinations rather than drive. For green streets, an interconnected network facilitates the capture and flow of rainwater.

17.1 The Rectilinear Grid

The rectilinear grid, common to most North American cities built between 1850 and 1940, disperses traffic efficiently throughout a legible network of streets and lanes and reduces arterial road loads. Occasional interruptions by public park space create neighbourhood centres. The grid is ideal for flat or gentle slopes (up to 8%). Break the grid at important natural systems without forfeiting connectivity. Use of this pattern results in universally uniform block and parcel configurations.



17.2 The Radial Web

In this hierarchical pattern, strong axes radiate out from a prominent centre. Intersections are often marked by important civic spaces or buildings. The radial web is a less legible pattern than the rectilinear grid but can provide more dramatic prospects. Use of this pattern results in generally uniform, but occasionally problematic, block and parcel configurations.

17.3 The Open-space Pattern

Rather than lanes or fences, this pattern puts "green fingers" behind most homes. These green fingers can include stormwater management, habitat, and recreation. The open-space pattern generally requires cul-de-sacs and may compromise interconnectivity. Foot and bike traffic can use green fingers. This highly organic network must necessarily respond to topography. Use of this pattern results in fairly uniform block and parcel configurations.

17.4 The Incremental Grid

In the incremental grid, streets occasionally depart from rectilinear orientations to accommodate terrain changes or to respond to historical accidents of community develop-ment (i.e., working around an undeveloped parcel). Major streets provide the primary ordering element. Local traffic is dispersed through a fairly chaotic, but still interconnected, internal network, while terminated vistas and varied streets provide interest. Use of this pattern results in a variety of block and lot configurations.

18 Connect transit to the community

"It is a shabby experience; nothing that would encourage people to use public transportation." Christopher Alexander, A Pattern Language, 1977.

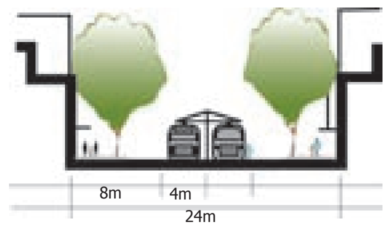
A viable transit system and a vibrant urban environment go hand in hand. Concentrated commercial and residential areas are a prerequisite for an efficient transit system. North Americans will leave the car at home if they live within a 5 minute walk of frequent transit. Research suggests that an overall density of 10 dwelling units per acre is a minimum threshold for an efficient transit system. Incorporate transit in a way that welcomes pedestrians and cyclists, brings life to streets, and offers alternatives to the car.

Related Charrette Strategies
A2; B2; E4; G3

Related Guidelines
6; 8.2; 8.3; 9; 22

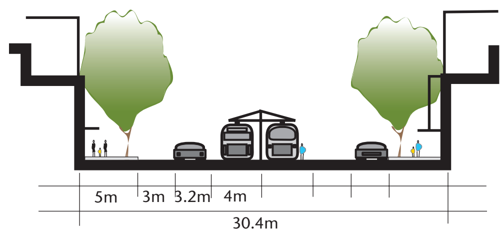
18.1 Transit "High Street"

One way to create a vibrant community heart is to create a transit "High Street," or "Main Street" — a street from which cars are either excluded or relegated to minority status. Such a street can be successful if frequent transit service is combined with high-density, mixed-use development. It allows for a narrower right-of-way, gives transit priority, and reduces the barriers to transit loading and unloading within the central median. Density is the key to success here. Successful examples of a High Street can be found at the centre of large areas of relatively high-density living (50 units per hectare and higher) and within mixed use and highly connected (and safe) street and path systems.



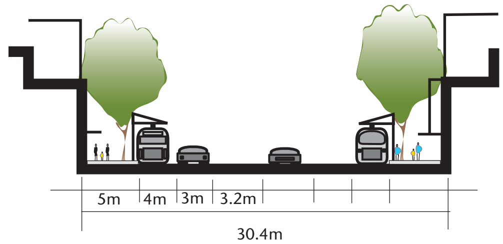
18.2 Urban Corridor

Light rail and automobile traffic can successfully share a single right-of-way. A right-of-way as narrow as 32 metres can accommodate a surface light-rail system and 4 lanes of traffic. An 8 to 10 metre central envelope serves the rail line, while two travel lanes on either side allow through-traffic. The curb lane doubles as a parking lane during non-peak times, and a minimum 4 metre wide sidewalk lined with street trees provides a safe and comfortable space for pedestrians.



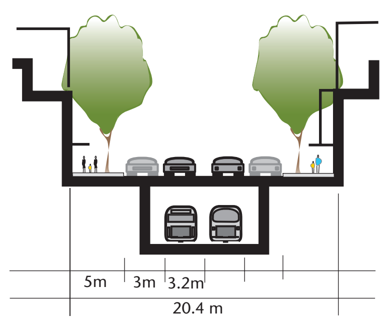
18.3 Sidewalk Off-load

When the surface light-rail line is on either side of the street, passenger movement occurs in much the same way as it does at a bus stop. This allows cars to use the central street surface. The train travels at curb's edge, becoming a pedestrian-scaled urban design feature. This eliminates parking but allows easy transition from sidewalk to trolley to sidewalk.



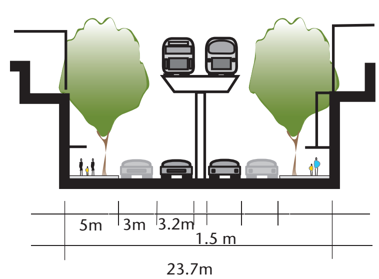
18.4 Below-grade Systems

Below-grade systems allow efficient transit movement without impeding surface traffic flow, but they do little to animate the street environment. They are more cost-effective in areas where transit infrastructure is developed in tandem with urban development. Although excavation costs can be prohibitive in existing urbanized areas, grade-separated systems generally have a quick travel speed. However, this time advantage is often offset by the increased time it takes to move between the street and the system below.



18.5 Above-grade Systems

Above-grade systems also place a premium on travel speed, but they are more difficult to integrate into the fabric of the street than other systems. For this reason, they are an effective regional system when combined with more street-friendly modes (i.e., surface rail, buses, trolleys) and used for intra-urban routes. Although grade-separated systems have a quick travel speed, this advantage may be offset by the increased time it takes to move between the street and the system above.



19
Corridor
layer the systems

Related Charrette Strategies
D2; F1; F4; G4; H2; K1

Related Guidelines
4; 5; 15; 17; 20; 23.2; 23.3; 30.4

19 Move stormwater along the street

"As you penetrate the flowing and no-flowing of water, the ultimate character of all things is instantly realized." Dogen Zenji, Shobogenzo, Sasuikyo.

Street corridors collect and transport stormwater. Ideally, most stormwater should be infiltrated into subsoils; however, stormwater from very large storms must be transported and stored. Layer movement on the street by using a system of corridors to capture, transport, and infiltrate stormwater. Generally, maintain street rights-of-way at no less than 40% pervious surface in order to accept runoff from paved areas and, thus, mitigate regional impacts to the urban watershed.

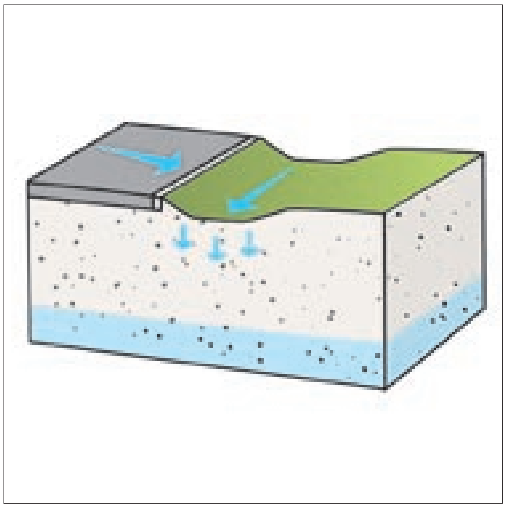
POLLUTANT REMOVAL

Roadside swales, verges and trenches are ideal for capturing and treating "first flush" runoff, which typically contains the highest concentration of pollutants.

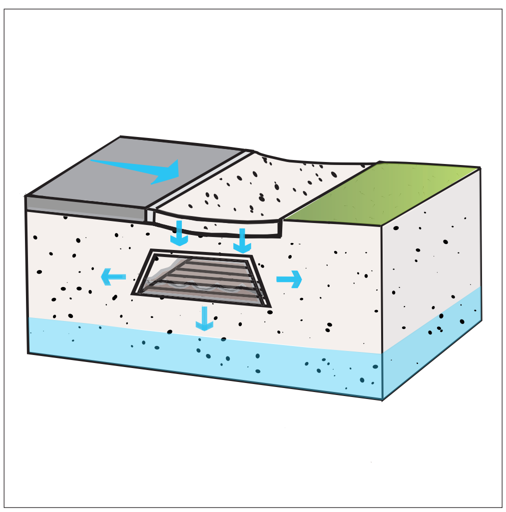
Vegetation planted within a swale increases its ability to filter and clean polluted stormwater. Slopes should be between 0.5% and 5% in order to maximize the contact of vegetation with runoff and to prevent scouring.

INFILTRATION CHAMBERS

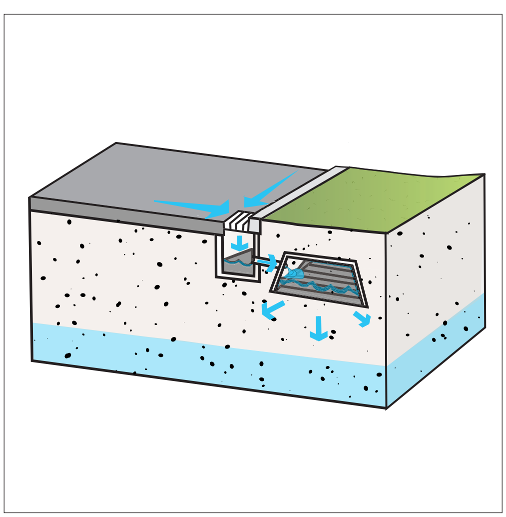
The use of subsurface infiltration chambers allows stormwater to be treated at its source before being released, at controlled rates to recharge groundwater. It also enables the reuse of treated water. Such systems are suitable for both new and retrofit sites (Condon and Gonyea, 2001).



19.1 The Roadside Swale
A variation on the rural ditch, the swale is a shallow, grassy channel that can be located in the roadside boulevard. Runoff from the street drains to both sides and is collected in the swale. Stormwater gradually infiltrates to the level of the water table after filtering through the grass and soil. Infiltration chambers just below a grassy boulevard can enhance infiltration at roadside zones. Excess water travels in the swales, or via infiltration chambers, along the network of streets to a holding pond where additional infiltration, evaporation, and transpiration occur.



19.2 The Crushed Stone Verge
Finish the shoulders of a street with crushed stone rather than with a curb and gutter. Runoff can infiltrate through the crushed stone into the soil. The crushed stone verge can be an effective stormwater management practice if it is properly maintained: used in conjunction with a subsurface infiltration chamber and filter cloth, it can dramatically increase infiltration capacity. The system can be installed with or without a flush (or rolled and slotted) curb.



19.3 The Curb and Gutter System
A standard curb and gutter system can be designed for infiltration. Runoff from the street can drain to both sides, where it is directed along the curb and into catch basins. However, unlike a standard stormwater system, the catch basins direct the stormwater to subterranean infiltration chambers located in a gravel trench under the boulevard. There it can infiltrate through the gravel into the soil. This system has the advantage of being most like conventional practice, but has the disadvantage of being the most costly of the three to install and maintain.

FURTHER RESEARCH/POLICY

Condon and Gonyea, "Case Study: Condord Roads Trial Project."

Metro Regional Services. *Green Streets: Environmental Designs for Transportation.*

Centre for Watershed Protection, *Design of Stormwater Filtering Systems.*