Environmental Issues in Land Use Decisions

This section deals specifically with issues of water quality and water quantity insofar as they relate to land use decision-making. It contains

1) descriptions of how development affects local water quality and quantity;
2) descriptions of methods commonly used to control either or both;
3) examples of and suggestions for local government involvement in their control;
4) references to relevant state (of Wisconsin) statutes, and;
5) references to other web sites and more detailed sources of information.

Storm water Basics

Storm water quantity

Since all development contains some combination of impervious surfaces such as rooftops, parking lots, and roads, and other changes to the landscape, development affects the ability of land to absorb rain. This fact is intuitively obvious and our attempts to deal with its consequences can be readily observed in such common things as rain gutters on houses, curb and gutter lining the edges of streets, and ditches along larger roadways. These devices direct rainwater that, because it cannot infiltrate the surface on which it fell, must go someplace else.

While creating impervious surfaces can profoundly affect the amount of water running off any given tract during a rainstorm, other changes in the landscape can also change the amount of rain that will run off. These include:

1) changing the amount and types of vegetation (generally speaking, less vegetation = more runoff);
2) changing land slopes (such as grading yards so that rain will run away from building foundations);
3) flattening the landscape (filling small surface depressions that catch rain water and force it to infiltrate the soil rather than run off);
4) compacting soil materials (an inevitable side effect of construction that makes soils less permeable).
More than half of the rain that falls on some developed areas may become runoff, and during intense storms, this can lead to flash flooding of streets and low-lying areas. However, the area that gets flooded is not necessarily the area on which the runoff originated. Because runoff from one developed area often flows into other developed areas, a storm in one may mean flooding for another unless adequate safeguards are in place to prevent this.

In areas where there are not enough routes above ground for storm water to travel safely, some municipalities decide to install storm sewers. These collect storm water from streets, parking lots and (sometimes) rooftops and carry it in below-ground piping either to a municipal sewer treatment facility for treatment, or to a storm water detention pond, from which it is discharged at a safe flow rate.

**Storm water quality**

Storm water runoff from developed areas is not just rainwater, but a mixture of water and all the things it picks up as it travels overland, including eroded soils from construction sites, oils and other chemicals that leak from autos, road salt, fertilizers and herbicides from lawns, small rubbish, etc. Active farmland in the area may also contribute eroded soil, fertilizers, manure, etc. Without treatment of this water, these contaminants end up in the streams, rivers and lakes that receive it. Storm water runoff can, thus, significantly degrade these waters.

**Storm water detention ponds**

Storm water detention ponds are an increasingly common feature of new developments. These ponds serve two basic purposes, flood control and pollution control, and, thus, address both storm water quantity and quality issues mentioned above.

Detention ponds, by virtue of their size, work as temporary reservoirs for storm water run off during and after a storm. They have outlets engineered to control the flow rate at which water can discharge from them. Thus, a new development, which is almost certain to create a greater total quantity of run off than was generated in the pre-development condition, can still discharge it at a flow rate equal to that of the pre-developed condition. In other words, ponds take the greater quantity of runoff from a developed area and spread its discharge from the area over a longer period of time, thereby minimizing the risk of flooding downstream.

Detention ponds also allow suspended particles of soil and dust (and other water pollutants that often attach to these particles) to settle out of the storm water run off. These sediments are stored at the bottom of the pond until later dredged and disposed of either in a landfill, or by spreading it over land and planting with grass. The disposal method depends on the toxicity of the sediments.
Here is a sample design:

For more detailed information on detention ponds, see publication GWQ 017 *Stormwater Ponds*, the source of this diagram, available from Wisconsin county Extension offices or from Extension Publications, 30 N. Murray St., Madison, WI 53715; phone (608) 262-3346.

**The role of local governments in Storm water management**

In Wisconsin, the state government holds local governments responsible for controlling both the quality and the quantity of the storm water draining into waters of the state. State statute 61.345 gives authority to villages to enact construction site erosion control and storm water management zoning ordinances. State statute 92.11 gives authority to a county, city or village to develop land use regulations to control non-point source pollution (such as storm water run off from developed or agricultural areas).
Generally speaking, it is a good idea for local governments to compel developers to limit storm water discharges from their developments to levels equal to pre-developed conditions. As mentioned above, this means limiting runoff flow rate, not total runoff, so as to prevent flooding of areas downstream. Failure to do so can result in liability for flood damage for the community in which the runoff originated. Whether the regulation of storm water discharges will take place right on newly developed property or elsewhere in the community is the decision of local officials. The question of who will pay the costs of constructing and maintaining these facilities (detention ponds or other treatment facilities) is also one to be answered locally.

For more information . . .

For more detailed information on this subject, or for examples of storm water control ordinances already drafted by local governments in your area, contact the storm water specialist at your regional Department of Natural Resources office (listed in the state government section of your white pages). Also check out www.dnr.state.wi.us/org/water/wm/nps/stormwater.html.

**Sewage Disposal Basics**

Any proposal for the construction of buildings must deal with the issue of sewage disposal. The importance of properly disposing of sewage can hardly be overstated. Failing to do so can result in very serious contamination of ground water aquifers that supply well water users, and of surface waters in which humans recreate and many other species live. Contamination of this sort is difficult, sometimes impossible to clean up. Once it occurs, letting nature take its course is often the only means of eliminating the hazard.

There are two basic options for sewage disposal:

1) municipal sewage treatment;
2) private on-site wastewater treatment systems (POWTS).

**Municipal sewage treatment**

Wisconsin municipalities that offer sewage treatment, or are connected to the systems of other municipalities, normally require all developments in the sewer district to connect to it. (Exceptions may be granted to owners of POWTS that can prove that their systems are functioning properly and whose property is not adjacent to a collector sewer.) New developments are normally required
to connect. And so, planners and permitting agencies must consider the capacity of the treatment facility before allowing additional development. There may also be some haggling between developers and local governments over who will cover the cost of extending sewers to new developments. Sewage treatment facility operators judge whether connection is possible. The costs of extending sewers and expanding sewage treatment capacity are factors that should guide both short- and long-term land use decisions and planning.

**Private On-Site Wastewater Treatment Systems (POWTS)**

Because much new development is taking place in areas not served by municipal sewage treatment facilities, developers of these areas must resort to POWTS for sewage disposal. POWTS rely on the soil beneath them to treat liquid sewage before the water in it returns to the ground water even deeper below. Therefore, before a development proposal can be drafted, a certified soil tester must conduct tests to determine the viability of the proposed site for POWTS. The results of these tests determine, to some extent, the types, maximum sizes and possible locations of the POWTS, and thereby, the amount, location and type of development, that will be permissible on the site.

There are three conditions that may limit or prohibit the use of POWTS on a site: tight soils, rocky soils, and the presence (currently or in the past) of high ground water. Tight soils (usually clays) do not allow sufficient water flow through them to handle the flow of sewage from POWTS. Rocky soils may allow too much flow through them to adequately filter and treat the sewage before it reaches the ground water. And since protection of the ground water, which supplies water well users, is one of the principal aims of POWTS, the presence of, or potential for high ground water on a site can also disqualify it for use of POWTS. Again, property owners must hire a certified soil tester to determine whether or not POWTS can be used on their properties.

Once a site has been deemed suitable for POWTS, there are three basic types available:

1) conventional systems
2) mound systems
3) holding tanks (not, technically, a treatment system)

Both conventional and mound systems rely on septic tanks (for separation and decomposition of solids) and absorption fields (where clear liquid waste is allowed to infiltrate and be treated by the soil below). The principal difference is that conventional systems have their absorption fields installed below grade and, therefore, require a considerable depth of suitable soil. Mound systems have absorption fields installed above grade that are then covered up with a mound of soil. (You may notice these rectangular mounds on the properties of some suburban and rural dwellers.) Mounds are used on sites where there is some suitable soil, but it is of
insufficient depth to use a conventional system. The need for good, deep soils for developments in areas not served by municipal sewers helps make farmland the preference of many developers. The following is a diagram of a **conventional system**:


A **mound system** is basically the same set up, except that the absorption field is above the original grade and, thus, a pump is often needed to force the effluent up into this field. Here is a side view of the mound portion of this system:

Holding tanks

Holding tanks are normally the last resort of property owners for sewage disposal because of their relatively high maintenance cost. These tanks are used only where insufficient soil, high ground water, or some other site condition prohibits the use of other POWTS. Holding tanks do not treat sewage. They simply hold it until (when the tank is full) a licensed contractor pumps it out and hauls it to a nearby sewage treatment plant. Depending on water use in the building served by a holding tank, it may need frequent pumping and, thus, be expensive to maintain.

Dangerous Abuses of Holding Tanks

The high maintenance costs of holding tanks have inspired some of their owners to resort to hazardous (and, for this reason, illegal) methods of reducing these costs. The most common method is to pump the liquids from the tank onto the ground surface or into a nearby ditch or stream (using common sump pumps lowered by rope into the tanks). Doing this poses obvious health hazards both for humans and other species in or near these waterways. It poses less obvious but equally serious hazards to owners of private wells in the area. Pumping raw sewage onto land that has been deemed unsuitable for on-site treatment devices may introduce dangerous contaminants to the groundwater beneath it, thereby contaminating the well-water supplies of the neighboring area.

Efforts to curtail this dangerous practice include metering the water use of holding tank owners and/or installing locks on holding tank lids for which only licensed pumping contractors have keys. Metering is the only failsafe method, though implementing it has some obvious costs to the local sewage authority. Some local governments have resorted to banning holding tanks all together, only allowing development in areas served by municipal sewers or where other POWTS are permissible.

Implications of POWTS on land use

There are a number of restrictions on locations of POWTS regarding their proximity to lot lines, buildings, water wells, etc. that make development in traditional urban densities impossible in areas where POWTS are used. (See Table 83.43-1 “Horizontal Setback Parameters” of the Wisconsin Administrative Code, available online at [www.commerce.state.wi.us/SB/SB-POWTS Program.html](http://www.commerce.state.wi.us/SB/SB-POWTS Program.html). Go to the “Codes” section and click on Subchapter IV, “Comm 83.43 General Requirements”). However, recent changes in Chapter 83 of the Wisconsin Administrative Code (a.k.a. “Comm 83,” changes to take effect July 2000) will expand the possibilities for using mound systems and other recently approved POWTS technologies. These changes will make it easier to develop areas that could not have been developed under previous POWTS regulations.
Because POWTS require a lot of space to function properly and because recent code changes are making it easier to use them in a wider variety of site conditions, it will be easier for widely scattered (sprawling) development to take place in the future. Limiting this kind of development can only be achieved by local officials through zoning and land use planning.

Local government involvement in regulation of POWTS

Plans to install POWTS must be approved (in Wisconsin) by the Department of Commerce—Safety and Buildings Division. They must be installed by licensed contractors and inspected by local or regional plumbing inspectors. However, maintenance of POWTS is up to property owners. It is very simple and fairly cheap, and it is essential for their continued safe operation. It consists of getting the septic tank pumped out periodically by a licensed septic tank service contractor. The purpose of the pumping is preventing solid wastes from getting out into the absorption field and plugging things up (also known as “system failure”). If this happens, some fairly expensive and disruptive maintenance, repair, or replacement will likely be necessary. In some cases, the damage may not become obvious until sewage has emerged on the ground surface—a potential public health hazard. For this reason, some local governments are now requiring owners of POWTS to sign maintenance contracts prior to their installation. These contracts commit owners to pumping their septic tanks upon receiving maintenance notices (at pre-determined intervals), or allowing local authorities to commission the work at the property owner’s expense.

Section 83.32(2) of Wis. Administrative Code allows for local prohibitions of certain POWTS technologies (holding tanks, for instance) and applications thereof. See the same web site as above, but go to the “Codes” section and click on “Comm 83.32 Prohibitions and Limitations.”

For More Information On POWTS . . .

POWTS are regulated by state authorities. In Wisconsin, it is done by the Department of Commerce—Safety and Buildings Division. Contacts in the department’s state and regional offices can be found at http://www.commerce.state.wi.us/SB/SB-Contacts.html. You may also get valuable information on this subject from a local plumber, plumbing inspector and/or a local septic service contractor.
Development of Wetlands and Floodplains

Wetlands

A wetland, as defined by the Wisconsin state legislature, is “an area where water is at, near, or above the land surface long enough to be capable of supporting aquatic or hydrophytic (water-loving) vegetation and which has soils indicative of wet conditions.”

Wetlands perform a variety of important functions on which humans and many other species depend including flood protection, water quality protection, shoreline protection, etc. They also provide scenic value and recreational opportunities. Without wetlands performing these functions, human habitation in many areas would be impossible or a lot less desirable. For this reason, developments in or near wetlands are subject to regulation by the state under the auspices of the Clean Water Act (particularly section 404). Any person proposing to:

1) alter wetlands;
2) alter land adjacent to wetlands, or;
3) discharge anything into wetlands

must obtain Water Quality Certification as prescribed in Chapter NR 299 of the Wisconsin Administrative Code. Decisions made at the state level may supercede local land use decisions.

For more information on wetlands . . .

The Wisconsin Department of Natural Resources has some excellent publications on this subject. They contain information valuable both for developers and land use decision-makers. Among the titles are the following:

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<tr>
<th>Title</th>
<th>Publication</th>
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<tr>
<td>Building Near Wetlands—The Dry Facts</td>
<td>PUBL-WZ-021 97Rev</td>
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<tr>
<td>Wetland Functional Values</td>
<td>PUBL-WZ-026 93</td>
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<tr>
<td>Wisconsin Wetland Inventory Classification Guide</td>
<td>PUBL-WZ-WZ023 (Feb.1992)</td>
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<tr>
<td>Wetland Water Quality Certification (Permit Application For Altering Wetland)</td>
<td>FH-046(99) (Packet #20A)</td>
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<tr>
<td>Wetland Protection Programs In Wisconsin</td>
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<tr>
<td>Review Of Activities Under NR 103**</td>
<td>PUBL-FH-025-00REV</td>
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**This chapter (NR 103) of the Wis. Administrative Code sets water quality standards for wetlands.

These publications are available from Water Management Specialists at Department of Natural Resources Regional Offices.

**Locating Wetlands . . .

For copies of aerial photographs of specific locales with wetlands outlined on them, contact:

Calvin Lawrence, (608) 266-0756
Wisconsin Dept. of Natural Resources
Bureau of Fisheries Management and Habitat Protection, FH/6
Box 7921
Madison, WI 53707-7921

These photographs can help decide whether land development proposals will be subject to wetland protection review by the state.

**Floodplains

Floodplains consist of two principal components:

1) the floodway—includes the channel of the river or stream and, during regional floods, is covered by deep, fast moving waters, and;

2) the flood fringe—includes the area where flood waters are shallow and slow moving.

Floodplains are the area covered by the regional, or 100-year, flood. This is a flood that has a 1% chance of occurring in any given year. (The 100-year flood is sometimes confused as one that only happens every 100 years. Averaged over a long period of time this is true, but 100-year floods may occur in consecutive years. The chance of occurrence in any one year is 1 in 100. It should be added that human tampering with flood plains and development of the lands that drain onto them have, in many areas, drastically altered the elevation to which flood waters normally rise. In other words, what was once the 100-year flood in an undeveloped area
can become a 50- or 25-year flood after development occurs. The evolution of storm water management has done much to alleviate this problem. See “Storm Water Basics” above.) The following diagram may help.

(Source: Burnett and Hansen, “Floodplain/Shoreland Management—a guide for local zoning officials,” Dept. Of Natural Resources)
Mapping of Floodplains and the National Flood Insurance Program

The Federal Emergency Management Agency (FEMA) maps flood hazard areas (100-year floodplains) and provides copies of these maps to local governments. Communities that have had their flood hazard areas mapped are eligible to join the National Flood Insurance Program. This program provides federally subsidized flood insurance to residents of communities that have adopted adequate floodplain management ordinances. For questions about this program call FEMA’s Insurance Servicing Agent at 800-638-6620, or try www.fema.gov/mit/tsd.

Local Government’s Role in Development of Floodplains

The state of Wisconsin requires local and/or county governments to develop floodplain zoning ordinances. These should provide a permitting process for improvements to existing structures and for additional structures in local floodplains. The developments allowed in floodways and flood fringes are quite different. Developments allowed (by permit) in floodways should not suffer excessive damage if flooded. They often include:

1) agricultural;
2) golf courses, tennis courts, parks;
3) boat launching ramps, marinas, docks.

Developments which threaten human life, health or property, when flooded, or which will increase flood elevations are usually not allowed. These include:

1) human habitations;
2) storage of buoyant or hazardous materials;
3) water wells for human consumption;
4) septic tanks;
5) solid waste disposal.

For examples of floodplain zoning ordinances already drafted by other communities, contact you nearest Department of Natural Resources regional office.