Heritage Lake Association

Erosion Control and Drainage Channel/Bank Stabilization

September 16, 2004

Supersedes All Previous Versions

PURPOSE AND INTENT

The ravines and wooded slopes are an inherent natural resource which imparts a unique and substantial character to the Heritage Lake Association (HLA). This unique character along with the beauty of the lake itself has a direct relationship to property values, not only for lots containing or adjacent to the slopes and lake but for all lots throughout the HLA. It is vital to understand that all the drainage ways and slopes are interdependent throughout their reaches.

Surveys of the lake indicate that at the creation of the Heritage Lake Subdivision the original size of the lake was eighty eight acres, however, over the last thirty years the lake has been reduced to sixty five acres due to sedimentation. As a consequence the lake has been shrinking at almost one acre per year and the sedimentation of the lake continues. Many lots that were originally lake front lots no longer have direct access to the lake.

Erosion, slope failures, and loss of vegetation along one portion of a slope can have an adverse impact upon adjacent sloped areas, the lake, and the Mackinaw River. Because these areas may be abused (intentionally or unintentionally) so as to create conditions which jeopardize property values and the natural ecosystem, appropriate controls are necessary. It is the purpose and intent of this policy to promote the health, safety, and general welfare of the present and future residents of the HLA and downstream drainage areas by providing for the protection, preservation, proper maintenance, and use of the HLA watercourses, lake, floodplain, and wetland areas.

The HLA, Natural Resources Conservation Service, and Prairie Rivers Resource Conservation & Development conducted a sediment and erosion control inventory in 2003-2004. The purpose of the inventory was to estimate the total amount of sediment that reaches Heritage Lake and to identify the sources of the sediment. At the end of this policy is a summary of their findings. This policy will address establishment of buffer zones, filter strips, and stabilization of highly erodible slopes. A buffer zone / filter strip is a vegetated area adjacent to a waterbody (drainage channel, stream, wetland, lake). The buffer/filter area may be natural undeveloped land where the existing vegetation is left intact, or it may be land planted with vegetation. Its purpose is to protect streams and the lake from pollutants such as sediment, nutrients, and organic matter, prevent erosion, provide shade, leaf litter, and woody debris. Also presented will be the proper treatment of steep slopes, gully banks, and extended medium slope areas in order to ensure their stabilization.

APPLICABILITY TO THE CCE&R'S

This rules set forth in this policy are governed and authorized by several sections of the HLA CCE&R's including the following: The first is section 5.a.ii,c. Powers of the ECC which states that the ECC can deny any permit that conflicts with the interest of one or more members of HLA. The second is section 6.d Easements which states each lot shall further be subject to an easement for the maintenance

and permanent stabilization control of slopes. The third is section 4.i. Removal of Trees which prohibits the removal of trees over three inches in diameter without the approval of the ECC. The fourth is Section 11 Provisions with Respect to Lakes and Lots Contiguous Thereto which sets forth the rights of the HLA regarding the level of the lake and the lake shoreline. The fifth is section 2 regarding restrictions on size of dwelling units and setbacks. Other provisions of the CCE&R's may also apply to construction on the lots in the subdivision.

SPECIFICATIONS OF BUFFER ZONE, FILTER STRIP, ERODIBLE SLOPES AND PROTECTION OF TREES IN BUFFER ZONES AND ERODIBLE SLOPES

A buffer will need to be established between the foundation of the house/garage and all natural drainage banks and channels. The builder must follow all current construction site erosion regulations set by HLA, Tazewell County, and Illinois EPA. This policy will establish the permanent buffer zone required by HLA after all construction is done. Septic systems may be within the buffer zone as long as no part of the tank or field is within the bank area of a drainage channel. No construction equipment may enter the natural area of the buffer zone or come within ten feet of the top of a bank. Any slopes more than 25% must remain forested or other structures (in addition to the buffer) put in place to control the drainage.

As required by section 4I of the CCE&R's Trees over three inches in diameter shall not be removed without permission of the ECC. Trees located in buffer zones and on erodible slopes should be preserved and protected. This includes protecting the trees from damage during construction including root damage removal or compaction, placement of additional fill or soil within the tree's drip line or trimming or cutting the trees. The submitted plans should include a description of the protection to be placed around trees so that they will not be injured or damaged during the construction on the lot. The plan may also include the planting of additional trees or an assurance by the owner that any damaged trees will be replaced by the owner. The preservation or creation of site lines can be approved by the ECC after submission of plans by the owner.

In the document *Vegetated Riparian Buffers* (available from the HLA) on page 9 there is an example of buffer zones and the benefits received depending on the width. As many of our drainage ways are small intermittent streams, the recommended buffer width above the minimums has been reduced from published recommendations by the NRCS, EPA, and other published researchers (found in the bibliography). To figure minimum buffer width, HLA has adopted either the minimum distance set by the CCE&R's or the USDA. If the slope indicates a larger buffer, HLA uses a distance based on slope percent (drop divided by distance) (recommended by both the USDA and Wenger (U of G 1999) modified for HLA conditions as noted above) of 2 feet per % slope. HLA will use whichever distance is greater.

Every buffer will have two parts: a natural forested buffer zone and a low growth filter strip. This differs slightly from the three zone pattern recommended by Scheuler (1995) because the condensed area of HLA will not allow all three zones and still allow for placement of houses. The natural buffer zone is comprised of undeveloped natural vegetation; these plants should be trees and deep rooted bushes. The purpose of the natural buffer zone is to hold the soil and stabilize the area closest to the drainage channel. The minimum USDA recommended width is 25 feet from the drainage channel. The filter strip is comprised of low growth dense vegetation (usually thick grass) between the foundation of the construction or other developed area and the natural forested buffer zone. This width is set by the table published in the USDA Soil Conservation Service Technical Guide #326, *Buffer and Filter Strips*, available from HLA. This strip must be a minimum of 20 feet in all cases. The purpose of the filter strip is to filter the sediments, nutrients, and other pollutants caused by residential use of the land. The filter strip should not compose more than 50% of the entire buffer as long as all the minimum distances are met.

As a basic rule, home/garage construction and/or land clearing will not be allowed on the edge of or within wetland, lake, or drainage channel banks. This bank edge is the point where the slope changes from the surrounding typical slope (usually around 10 to 35% slopes) to the active eroding zone leading to the drainage channel (anything usually more than 45% slope). Any structures placed in or destruction of deep-rooted vegetation within this area cannot be permitted as it will greatly increase the erosion potential and will jeopardize the stability of the slope.

A buffer must be established according to the slope from the top of the bank. The buffer will be comprised of both a natural buffer zone and filter strip. The total distance of this buffer will be determined by the slope % (drop over distance) measured from the construction area to the edge of the bank. The rule of 2 feet per % slope will be used; at no time will the buffer width be less than 20 feet from the bank. All areas within a defined channel bank must be part of the natural forested buffer zone.

Where a defined bank cannot be established, the buffer will be measured according to the slope % between the construction area and the drainage channel at the bottom of the slope. The natural buffer zone starts at the edge of the ordinary high water mark and must be a minimum 25 feet; the filter strip is between the construction area and the natural buffer zone and must be a minimum 20 feet.

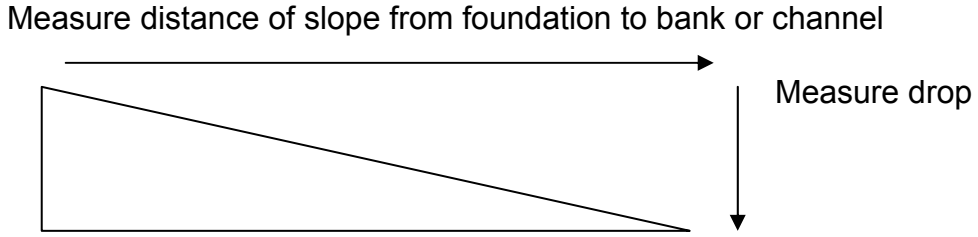
An exception will be granted if the slope from the center of the drainage channel to the construction zone is less than 25%. The 2 foot for every % slope rule will be used but the minimum buffer required will only be the minimum 20 foot filter strip from the 100 year rainfall event mark as long as the construction site

erosion control regulations can be met and the area drainage is not substantially altered.

Drainage channels with multiple tributaries will have a buffer set that considers the main channel and each tributary. A tributary is defined as a small erosive drainage channel that feeds a larger channel. The tributary or gathering area of a channel is the area where the most erosion continues to occur. These areas should only be developed if buffers and other erosion measures can be correctly set when considering the interrelationships of the drainage area. The slopes will be measured from the main channel or bank and each tributary and then mapped to determine any buildable areas.

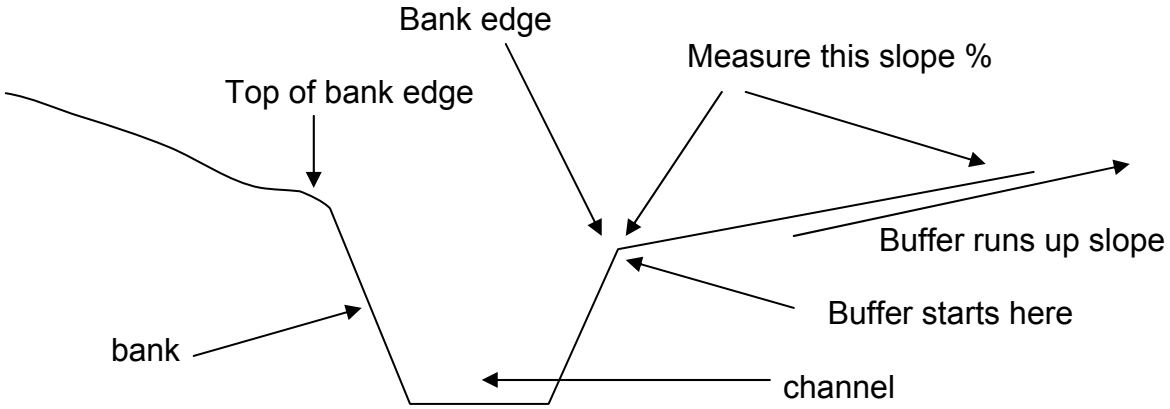
Examples

To measure slope %



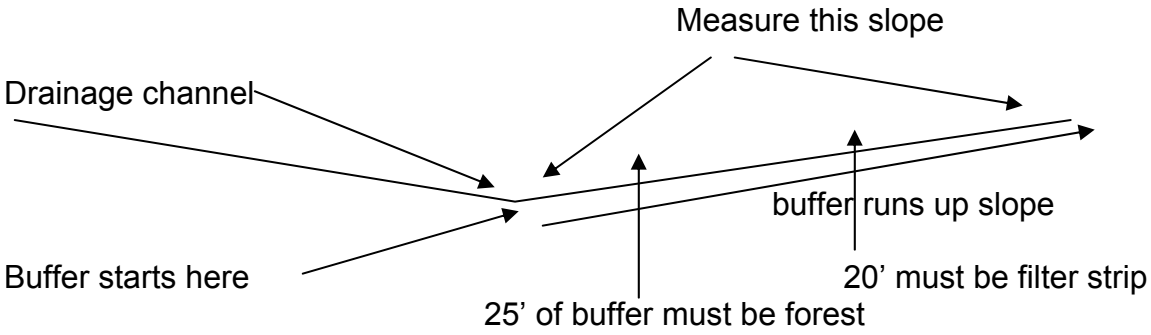
Divide drop by distance (drop/distance) = % slope

Channel with defined bank
Measure slope % from bank edge, use 2 feet for every % slope to set buffer width. Foundation must be at least 20 feet from bank edge. 20 feet of this buffer must be filter strip. Area on top of and within bank must remain forested.



Channel with no defined bank

Measure slope % from center of drainage channel, use 2 feet for every % slope to set buffer width. Buffer must be made up of at least 25 feet forest and 20 feet filter strip. The forest portion must be along the drainage channel.



BUILDING PERMIT

To ensure that proposed development activity can be carried out in a manner which is compatible and harmonious with the natural amenities of HLA and with surrounding land uses, a request for a Building Permit for such development activity must be submitted for approval by the ECC. No permit shall be approved unless the ECC finds that: 1. The development will not detrimentally affect or destroy natural features such as the lake, streams, wetlands and forested areas, nor impair their natural functions, but will preserve and incorporate such features into the development's site; 2. The location of natural features and the site's topography have been considered in the designing and siting of all physical improvements; 3. Adequate assurances have been received that the clearing of the site of topsoil, trees and other natural features will not occur before the commencement of building operations; only those areas approved for the placement of physical improvements may be cleared; 4. The development will not reduce the natural retention storage capacity of any watercourse, nor increase the magnitude and volume of flooding at other locations; and that in addition, the development will not increase stream velocities; and 5. The soil and subsoil conditions are suitable for excavation and site preparation, and the drainage is designed to prevent erosion and environmentally deleterious surface runoff.

The lot owner must stabilize areas left exposed after land surface modification with vegetation normally associated with the HLA area. The planting of native riparian vegetation is recommended as the preferred stabilization measure. Other techniques should be used only when and where vegetation fails to control erosion. The preferred alternative is riprap, using natural rock materials where practicable, installed on eroding back areas in a manner that provides interstitial space for vegetative growth and habitat for macro invertebrates and other stream organisms. Lining of stream channel bottoms is not permitted. The applicant shall

minimize access to the applicant's proposed development activity within all or part of the HLA where such access could adversely affect the streams, lake, wetlands, depress ional or related environmentally sensitive areas.

SITE DEVELOPMENT PLAN

A site development plan must be prepared for any proposed development within HLA and must indicate: 1. Dimension and area of parcel, showing also the vicinity of the site in sufficient detail to enable easy location, in the field, of the site for which the permit is sought, and including the boundary line, a legend, a scale and a north arrow (this requirement may be satisfied by the submission of a separate vicinity map); 2. Location of any existing and proposed structures; 3. Location of existing or proposed on-site sewage systems or water supply systems; 4. Location of any perennial or intermittent stream, lake or pond, and its ordinary high water mark; 5. Location and landward limit of all wetlands, isolated wetlands or depressionals; 6. Location of setback lines as defined in this policy and the CCE&R's; 7. Location of the 100-year floodway; 8. Location of existing or future driveways; 9. Such other information as reasonably requested by the HLA including topographical information as necessary to establish slopes and elevations.

When requested by the HLA board or the ECC, the applicant shall present evidence, prepared by a qualified professional, which demonstrates that the proposed development activity will not endanger health and safety, including danger from the obstruction or diversion of flood flow. The applicant shall also show, by submitting appropriate calculations and resource inventories, that the proposed development activity will not substantially reduce natural floodwater storage capacity, destroy valuable habitat for aquatic or other flora and fauna, adversely affect water quality or ground water resources, increase stormwater runoff velocity so that water levels on other lands are substantially raised or the danger from flooding increased, or adversely impact any other natural stream, floodplain, or wetland functions, increase erosion over existing conditions, and is otherwise consistent with the intent of this policy.

GEOLOGIC AND SOIL CHARACTERISTICS/GEOLOGIC AND SOIL REPORT

A report, prepared by a licensed professional engineer, geoscientist or soil scientist experienced in the practice of geologic and soil mechanics, shall be submitted with every application for development within the HLA that contains slopes of 45% or more that in the opinion of the ECC cover a substantial portion of the property. This report shall include a description of soil type and stability of surface and subsurface conditions. Any area which the investigation indicates as being subject to geologic or soil hazards shall not be subjected to development, unless the engineer or soil scientist can demonstrate conclusively that these hazards can be overcome.

HYDROLOGIC CONTROLS/DRAINAGE CONTROL PLAN

In the opinion of the ECC, if a lot contains substantial drainage areas, a drainage control plan may be required. A drainage control plan that describes the hydraulic characteristics of on-site and nearby watercourses as well as the proposed drainage plan, prepared by a registered professional engineer experienced in hydrology and hydraulics, shall be submitted with each application for land development within the HLA. Unless otherwise noted, the following restrictions, requirements and standards shall apply to all development within the HLA: 1. Natural open-channel drainage ways shall be preserved; and 2. Runoff from areas of concentrated impervious cover (e.g., roofs, driveways, streets, patios, etc.) shall be collected and transported to a drainage way (preferably a natural drainage way) with sufficient capacity to accept the discharge without undue erosion or detrimental impact. Vegetated drainage swales are preferred over conveyances constructed of concrete or other manufactured materials. The drainage control plan shall identify appropriate measures, such as terraces, and detention/retention basins, which will limit the quantitative and qualitative effects of stormwater runoff to predevelopment conditions.

SITE GRADING AND EXCAVATION PLAN

This section applies to the extent that grading and excavation and erosion control plans, which satisfy the following requirements, are not already required by Tazewell County. A site grading and excavation plan, prepared by a registered professional engineer, trained and experienced in civil engineering, shall be submitted with each application for Building Permit and shall include the following: 1. Details of the existing terrain and drainage pattern with one-foot contours; 2. Proposed site contours at one-foot intervals; 3. Dimensions, elevation and contours of grading, excavation and fill; 4. A description of methods to be employed in disposing of soil and other material that is removed from allowable grading and excavation sites, including location of the disposal site if on the property; 5. A schedule showing when each stage of the project will be completed, including the total area of surface to be disturbed during each stage, and estimated starting and completion dates. The schedule shall be prepared so as to limit, to the shortest possible period, the time soil is exposed and unprotected. In no case shall the existing natural vegetation be destroyed, removed or disturbed more than 15 days prior to initiation of the improvements; and 6. A detailed description of the revegetation and stabilization methods to be employed. This description should include locations of erosion control measures such as sedimentation basins, straw bales, diversion swales, etc. The grading and excavation plan must be consistent with all the provisions of this policy.

Unless otherwise provided in this policy, the following restrictions, requirements and standards shall apply to all development within the HLA: 1. Every effort shall be made to develop the site in such a manner so as to minimize the alteration of the natural topography; 2. No grading, filling, cleaning, clearing, terracing or excavation of any kind shall be initiated until final engineering plans are approved and the building permit is granted by the ECC; and 3. The depositing of any

excavation, grading or clearing material within a stream, the lake, pond, wetland area, isolated wetland area, or depressional shall be prohibited. In addition to locating all site improvements on the subject property to minimize adverse impacts on the streams, the lake, wetlands, isolated wetland or depressional, the applicant shall install a berm, curb or other physical barrier during construction and following completion of the project, where necessary, to prevent direct runoff and erosion from any modified land surface into a stream, the lake, pond, wetland, isolated wetland, or depressional. All parking and vehicle circulation areas should be located as far as possible from streams, the lake, pond, wetland, isolated wetland or depressional. The ECC may limit development activity within the HLA to specific months, and to a maximum number of continuous days or hours, in order to minimize adverse impacts. Also, the ECC may require that equipment be operated from only one side of a stream, the lake, pond, wetland, isolated wetland or depressional in order to minimize bank disruption. Other development techniques, conditions and restrictions may be required in order to minimize adverse impacts on streams, the lake, ponds, wetlands, isolated wetlands or depressionals, and on any related areas not subject to development activity.

WATERCOURSE RELOCATION AND MINOR MODIFICATIONS (INCLUDING CHANNELIZATION AND RELOCATION)

Watercourse relocation or modification is generally not permitted because these activities are not usually consistent with the purposes of this policy. Under certain circumstances, relocation and minor modification may be permitted through a special permit where certain problems can be mitigated by relocation and/or minor modification, specifically when: 1. Off-site hydrologic conditions are causing erosion, flooding and related problems; or 2. On-site soil and geologic conditions are resulting in unstable conditions that pose hazards to life, health and existing structures or property; or 3. The quality of previously modified or relocated streams can be improved through restoration; or 4. Officially adopted stormwater management plans call for placement of detention or retention facilities in a stream; or 5. Public utilities, including sanitary sewers, pipelines and roadways require stream crossing or relocation where there are not practical alternatives.

CONDITIONS AND RESTRICTIONS FOR PERMITTING STREAM MODIFICATION

Modification of watercourses as a convenience for site design purposes is not permitted. Stream modification, when permitted, is subject to the following conditions and restrictions: 1. Water quality, habitat and other natural functions must be significantly improved by the modification; 2. The amount of flow and velocity of a stream is not to be increased or decreased as the stream enters or leaves a subject property, unless this reflects an improvement over previous conditions in terms of reduced flooding, reduced erosion or enhanced low-flow conditions; 3. Prior to diverting water into a new channel, the ECC or a qualified

professional approved by the ECC shall inspect the stream modification, and issue a written report to the HLA board that the modified stream complies with the requirements in the above section and 4. Stream channel enlargement, or other modifications that would increase conveyance, shall not be permitted if the intended purpose is to accommodate development activities in the floodplain.

REQUIRED CONTENT OF STREAM MODIFICATION/RELOCATION PLAN
Stream relocation may be permitted in accordance with a stream relocation plan which provides for: 1. The creation of a natural meander pattern, pools, riffles and substrate; 2. The formation of gentle side slopes (at least four feet horizontally per one foot vertically), including installation of erosion control features; 3. The utilization of natural materials wherever possible; 4. The planting of vegetation normally associated with streams, including primarily native riparian vegetation; 5. Plans for sediment and erosion control; and 6. Establishment of a low-flow channel which reflects the conditions of a natural stream.

RETROACTIVITY
The requirements of this policy apply to all platted lots within the HLA. Existing development which does not comply with this policy will only be required to make noticeable progress towards erosion control and bank stabilization where in the opinion of the ECC, HLA board, and Conservation Committee, the area presents a substantial erosion problem and is detrimental to the ecological health of the lake and surrounding area.

ENFORCEMENT
The ECC will be responsible for the enforcement of this policy in conjunction with approving building permits. Appeals regarding decisions of the ECC shall be made to the HLA board at a regularly scheduled board meeting. The HLA board can overturn a decision made by the ECC.

STOP-WORK ORDER; REVOCATION OF PERMIT
In the event any person holding a building permit pursuant to this policy violates the terms of the permit, or carries on site development in such a manner so as to materially and adversely affect the health, welfare, or safety of persons residing or working in the neighborhood of the development site, or so as to be materially detrimental to the public welfare or injurious to property or improvements in the neighborhood, the ECC may suspend or revoke the building permit. 1. Suspension of a permit shall be by a written stop-work order issued by the ECC and delivered to the permit tee or his/her agent or the person performing the work. The stop-work order shall be effective immediately, shall state the specific violations cited, and shall state the conditions under which work may be resumed. A stop-work order shall remain in effect until the stated violations have been remedied or the stop-work order is appealed at a regularly scheduled meeting of the HLA board. 2. No building permit shall be permanently suspended or revoked until a motion is presented at a regularly scheduled meeting of the HLA board. Written notice of such meeting shall be served on the permit tee,

either personally or by registered mail, and shall state: a. The grounds for complaint or reasons for suspension or revocation, in clear and concise language; and b. The time when and place where such hearing will be held. Such notice shall be served on the permit tee at least five days prior to the date set for meeting. At such meeting, the permit tee shall be given an opportunity to be heard and may call witnesses and present evidence on his/her behalf. At the conclusion of the argument, the HLA board shall determine whether the permit shall be suspended or revoked.

VIOLATIONS AND PENALTIES

No person shall undertake or continue any development activity contrary to or in violation of any terms of this policy. Any person violating any of the provisions of this policy shall be issued a fine of $500 and each day during which any violation of any of the provisions of this policy is committed, continued or permitted shall constitute a separate offense. In addition to the penalty authorized by this section, any person, partnership, or corporation found guilty of violating any of the provisions of this policy shall be required to restore the site to the condition existing prior to commission of the violation, or to bear the expense of such restoration.

SOURCES

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DEFINITIONS

In addition to the definitions found within this policy, terms used herein for the purposes of this policy are defined as follows:

Armoring: A form of channel modification which involves the placement of materials (concrete, riprap, bulkheads, etc.) within a stream channel or along a shoreline to protect property above streams, lakes and ponds from erosion and wave damage caused by wave action and stream flow.

Bulkhead: A retaining wall that protects property along water.

Channel: A natural or artificial watercourse of perceptible extent that periodically or continuously contains moving water, or which forms a connecting link between two bodies of water. It has a definite bed and banks that serve to contain the water.

Channel modification/Channelization: To alter a watercourse by changing the physical dimension or materials of the channel. Channel modification includes damming, riprapping (or other armoring), widening, deepening, straightening, relocating, lining and significant removal of bottom or woody vegetation. Channel modification does not include the clearing of debris or trash from the watercourse. Channelization is a severe form of channel modification involving a significant change in the channel cross-section and typically involving relocation of the existing channel (e.g. straightening).

Control structure: A structure designed to control the rate of stormwater runoff that passes through the structure, given a specific upstream and downstream water surface elevation. Culvert: A structure designed to carry drainage water or small streams below barriers such as roads, driveways or railway embankments.

Depressional Area: Any area which is lower in elevation on all sides than surrounding properties (i.e., does not drain freely). A depressional area will fill with water on occasion when runoff into it exceeds the rate of infiltration into underlying soil. Large depressional areas may provide significant stormwater or floodplain storage.

Development: The carrying out of any building or the making of any change in the use or appearance of land.

Erosion: The general process whereby soils are moved by flowing water or wave action.
Filtered view: The maintenance or establishment of woody vegetation of sufficient density to screen developments from a stream or wetland, to provide for stream bank stabilization and erosion control, to serve as an aid to infiltration of surface runoff, and to provide cover to shade the water. The vegetation need not be so dense as to completely block the view. Filtered view means no clear cutting.
Floodplain: That land adjacent to a body of water with ground surface elevations at or below the 100-year frequency flood elevation.
Floodway: That portion of the floodplain (sometimes referred to as the base floodplain or Special Flood Hazard Area) required to store and convey the base flood. The floodway is the 100-year floodway as designated and regulated by the Illinois Department of Transportation/Division of Water Resources. The remainder of the floodplain which is outside the regulatory floodway is referred to as the flood fringe or floodway fringe.
Hydraulic characteristics: The features of a watercourse which determine its water conveyance capacity. These features include, but are not limited to: size and configuration of the cross-section of the watercourse and floodway; texture and roughness of materials along the watercourse; alignment of watercourse; gradient of watercourse; amount and type of vegetation within the watercourse; and size, configuration and other characteristics of structures within the watercourse. In low-lying areas the characteristics of the over bank area also determine water conveyance capacity. Isolated Wetlands: All waters such as lakes, ponds, streams (including intermittent streams), and wetlands that are not adjacent or navigable as defined in Section 404 of the Clean Water Act (33 CFR 320 through 330).
Lot: An area of land, with defined boundaries, that is designated in official assessor's records as being one parcel.
Lake/pond: Any inland water body, fed by spring or surface water flow.
Natural: In reference to watercourses, it means those stream channels, grassed waterways and swales formed by the existing surface topography of the earth prior to changes made by unnatural causes. A natural stream tends to follow a meandering path; its floodplain is not constrained by levees; the area near the bank has not been cleared, mowed or cultivated; the stream flows over soil and geologic materials typical of the area with no alteration of the course or cross-section of the stream caused by filling or excavating.
Ordinary high water mark (OHWM): The point on the bank or shore up to which the presence and action of surface water is so continuous so as to leave a distinctive mark such as by erosion, destruction or prevention of terrestrial vegetation, predominance of aquatic vegetation, or other easily recognized characteristics. Qualified professional: A person trained in one or more of the disciplines of biology, geology, soil science, engineering or hydrology whose training and experience ensure a competent analysis and assessment of stream, lake, pond and wetland conditions and impacts.

Registered Professional Engineer: A professional engineer registered under the provisions of “The Illinois Professional Engineering Act” and any act amendatory thereof.
Detention facility: A facility that provides for storage of stormwater and runoff and controlled release of this runoff during and after a flood or storm. Runoff: That portion of precipitation on the land that is not absorbed by the soil or plant material and which runs off the land.
Sedimentation: The processes that deposit soils, debris and other materials either on other ground surfaces or in water bodies or watercourses.
Setback: The horizontal distance between any portion of a structure or any development activity and the ordinary high water mark of a perennial or intermittent stream, the ordinary high water mark of a lake or pond, or the edge of a wetland, measured from the structure’s or development’s closest point to the ordinary high water mark, or edge.
Stream: A body of running water flowing continuously or intermittently in a channel on or below the surface of the ground. 7.5 minute topographic maps of the U.S. Geological Survey are one reference for identifying perennial and intermittent streams.
Structure: A house, garage or other permanent structure that is constructed erected or moved to or from any premise which is located above, on, or below the ground.
Vegetation: All plant growth, especially trees, shrubs, mosses and grasses.
Watercourse: Any river, stream, creek, brook, branch, natural or artificial depression, ponded area, slough, gulch, draw, ditch, channel, conduit, culvert, swale, grass waterway, gully, ravine, wash, or natural or man-made drainage way, which has a definite channel, bed and banks, in or into which stormwater runoff and floodwater flow either regularly or intermittently.
Wetland: Those areas that are inundated or saturated by surface water or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated conditions. Wetlands generally include swamps, marshes, bogs and similar areas.

SUMMARY OF HERITAGE LAKE SEDIMENT & EROSION INVENTORY AUGUST, 2004

The Heritage Lake Homeowners Association, Natural Resources Conservation Service, and Prairie Rivers Resource Conservation & Development conducted a sediment and erosion control inventory in 2003-2004. The purpose of the inventory was to estimate the total amount of sediment that reaches Heritage Lake and to identify the sources of the sediment. The watershed or the land area that drains into Heritage Lake is comprised of approximately 1,000 acres surrounding the lake that extends to the east almost to the small berg of Lilly.

The inventory involved going to randomly selected parcels of land to measure and collect information on the current land-use, steepness of slope, soil type, depth and length of gullies and ravines, and visible erosion. The data was compiled and provided to Roger Windhorn, Resource Soil Scientist, with Natural Resources Conservation Service for analysis.

The following types of erosion were considered in this inventory:

Sheet & Rill Erosion occurs on all land, it is a very natural, unending process that is measured in tons/acre/year. This type of erosion is almost invisible; for example 5 tons of soil loss is about the thickness of dime spread out over an acre of land.

Ephemeral Erosion occurs when small rills join together and form small channels that funnel water into concentrated flow. This type of erosion occurs annually and is destroyed each year with tillage on agricultural fields.

Gully Erosion was estimated in the entire watershed from selecting random reaches. Many steeper watersheds contain more gullies than expected.

Heritage Lake Watershed - Annual Erosion & Sediment Delivery

Sheet & Rill Erosion (tons/yr)	Ephemeral Erosion (tons/yr)	Gully Erosion (tons/yr)	Total (tons/yr)	Total Sediment Delivered to the lake annually
2,700	400	3,600	6,700	2,900

As a result of erosion, sedimentation occurs. However, only a portion of the sediment produced reaches a concentrated water source, such as the lake. This referred to as the sediment delivery rate. About 43 percent of 6,700 tons of annual erosion is deposited in Heritage Lake as sediment.

This is 2.1 acre-feet per year of sediment filling in the lake annually, in other words a depth of 2.1 feet of solids over one acre is decreasing the depth of water in the lake every year. These rates are high when compared to larger watersheds because small, steeper watersheds do not have a significant amount of flatter

land. The gullies surrounding the lake appear to be the greatest contributor of sediment. The flatter cropland and steep wooded areas are contributing the most sheet and rill erosion, thus sediment to the lake.

Considerations for Controlling Erosion & Sedimentation:

1. Concentrate land treatment on sloping land immediately adjacent to channels flowing into the lake and on gently sloping cropland farther up in the watershed.
2. Select as “pilot” sub watershed and concentrate land treatment and structural control efforts. From this base a better estimate of the effectiveness of these controls can be made for the remainder of the watershed.
3. Select highly visible or locally known sites for demonstration areas.
4. If structural measures are used it is important to remember they will only control the sediment produced in that sub watershed. It is the most effective and efficient, in general, to have structures as low in the watershed as possible.
5. In areas where land-use change is anticipated, monitoring the increased erosion and sedimentation is recommended.
6. Structural means of sediment control have been the most effective in small watersheds like Heritage Lake. Channel stabilization on the most severely eroding sites is encouraged.
7. Wetland storage could allow for surface water from drainage ways that exceed a certain designated discharge to flow into wetlands adjacent to the drainage way. The water has time to slow down and drop sediment before reaching the lake.