

Eric,

Designing mosquito free stormwater treatment facilities has been a state goal since the late 70's, and it should continue. Good design prevents the production of mosquitoes, recovery of dry systems within 72 hours and permanently wet facilities that can maintain fish populations. Attached are a copy of our Land Development Code Ordinance (reference 72-776 #5 objective and 72-782 maintenance language) and some guidelines (out of the 2009 Mosquito Control White Paper) we provide to local engineers.

One thing that is really needed and that we have in our local ordinance, is the ability of local governments or permitting agency to notice property owners of a maintenance issue (mosquito or operational performance issue) and in the case of inadequate response, go in and clean up the issue and lien the property. We have this tool in Volusia County and have only had to use it a few times.

If done properly, use of pesticides to control mosquito larvae in these new stormwater facilities can be greatly reduced or eliminated. We do not want to add to nuisance and disease carrying mosquito problems in the future. Thanks for your time.

JCG

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Appendix II

BEST MANAGEMENT PRACTICES FOR MOSQUITO CONTROL IN STORMWATER MANAGEMENT FACILITIES

VOLUSIA COUNTY MOSQUITO CONTROL

The surface storage of stormwater required by state and local regulations has created mosquito larval habitats. Our goal is to eliminate larval mosquito production from stormwater management facilities. This effort requires a basic understanding of mosquito life cycles and habitats. The immature stages of mosquitoes (eggs, four instars of larvae, and pupae) use permanently or intermittently wet habitats. The most pestiferous mosquitoes lay eggs on damp ground that periodically floods. These eggs may survive for years between floodings. Primary disease vectoring mosquitoes lay eggs on the water's surface. Some mosquitoes can develop to adults in as few as six days. Top minnows are the most effective predator of immature mosquitoes in permanent or semi-permanent water bodies that are free of vegetation. The use of this information can result in proper design, construction, and maintenance of stormwater management facilities to prevent mosquito production.

Three elements are important to assure that a stormwater management facility does not produce mosquitoes:

- 1) **Design** of the proper facility for the site – based on soils and other site constraints
- 2) Proper **construction** and certification by the designer
- 3) Guaranteed **maintenance** of the system

These three elements, when done together, can achieve the goal of no mosquito production from stormwater facilities.

Design

The three basic types of designs are wet, dry, and intermittent systems. Designs should be based on site characteristics and sound engineering principles and include consideration of soils, seasonal high water table, and pre-development drainage characteristics. The Soil Survey of Volusia County provides good but less detailed information that should be field validated. Slopes should allow ease of maintenance and for small children to extricate themselves. Maintenance plans

should be carefully reviewed to prevent additional problems. The soil technician at the Volusia County Agriculture Center is available for free consultation on soil and water tables.

Wet system retention or detention facilities are usually used in a high water table situation. The permanent water table can maintain top minnows, provided there is eighteen inches of water during the driest periods. The bottom should be graded to avoid isolated pockets of standing water. A maintenance easement of at least fifteen feet should surround the facility above the high water line. Wetland plantings are discouraged as they cause mosquito or maintenance problems.

Dry systems (retention areas or swales) are best used in low water table, permeable soils. These areas should be designed to be dry within three days of a rainfall event based on a twenty-five year frequency storm of twenty-four hour duration. A good rule of thumb is to place the bottom one foot above the seasonal high water table. Where this minimum freeboard cannot be achieved by raising the retention area, a wet system should be used. We do **not** recommend the use of underdrains to control water elevations because of their expense, susceptibility to failure, and frequency of maintenance. As an alternative to surface storage, we have regularly approved underground exfiltration systems in low water table soils. The pipe should be placed at least one foot above the seasonal high water table. The inlet sumps may produce a few mosquitoes, but the maintenance value outweighs this easily treated problem. These systems can be maintained regularly and easily by jetting the pipe with a Vac-type truck unit.

The least desirable system is an intermittently wet/dry system. It is used at a site where overriding design criteria exist such as tree preservation in a high water table soil. These undesirable systems can be significantly improved by utilizing minnow reservoirs, constructed of Florida Department of Transportation type "C" catch basins. The tops of the catch basins are installed at ground level with a minimum depth of two feet with a solid bottom and grated top. The catch basin becomes a protected refuge for minnows when the retention facility is dry. Each individual depression within the retention area will require one reservoir. Maintenance of these reservoirs can be done by hand or with a jet/pump system. A small permanent water pond in one part of the facility could act in a similar fashion. Retrofitting existing facilities that function as intermittent wet/dry systems, contrary to the original design, would benefit from this revised design.

Construction

Inlets and outlets should be constructed with erosion protection devices. Construction should be done with hydraulic excavators or similar equipment to avoid depressions. A professional engineer should certify that the facilities have been constructed according to the proposed plans.

Maintenance

An agreement in the stormwater management permit should specifically identify the party responsible for maintenance. A maintenance schedule – and a procedure to insure that maintenance is carried out – also are important. Mandated maintenance is an important element in local stormwater regulations. Side slopes should be kept free of weeds. Grass should be properly managed to prevent erosion. Weed management (chemical and/or physical removal) should be used in permanent water facilities. Requests to stock top minnows in wet facilities can be made to Volusia County Mosquito Control. Tire tracks in roadside swales and other activities that cause ruts and depressions in dry facilities should be avoided.

This guidance allows professionals involved in stormwater management to prevent a problem with some simple solutions. It is possible to solve existing problems using the same information. It is our hope that this document will convince people to become a part of the solution – not part of the problem. Proper surface storage of stormwater to eliminate mosquito production is one of the most inexpensive and environmentally sensitive approaches to mosquito control available today.

(6) Verify and record the actual elevation (in relation to mean sea level) to which the new or substantially improved structures have been floodproofed, in accordance with subsection (a)(2).

(7) In coastal [high-]hazard areas, certification shall be obtained from a registered professional engineer or architect that the structure is designed to be securely anchored to adequately anchored pilings or columns in order to withstand velocity waters and hurricane wave wash.

(8) In coastal [high-]hazard areas, the enforcement official shall review plans for adequacy of breakaway walls in accordance with subsection 72-743(b)(5)h.

(9) When floodproofing is utilized for a particular structure, the enforcement official shall obtain certification from a registered professional engineer or architect, in accordance with subsection 72-743(b)(5)e.

(10) Where interpretation is needed as to the exact location of boundaries of the areas of special flood hazard (for example, where there appears to be a conflict between a mapped boundary and actual field conditions), the enforcement official shall make the necessary interpretation. The person contesting the location of the boundary shall be given a reasonable opportunity to appeal the interpretation as provided in this division.

(11) When base flood elevation data or floodway data have not been provided in accordance with subsection 72-743(a), then the enforcement official shall obtain, review and reasonably utilize any base flood elevation and floodway data available from a federal, state or other source, which may include a State of Florida registered engineer, in order to administer the provisions of section 72-743.

(12) All records pertaining to the provisions of this division shall be maintained in the office of the enforcement official and shall be open for public inspection.

(Ord. No. 2008-25, § III, 12-4-08)

Sec. 72-745. Warning and disclaimer of liability.

The degree of flood protection required by this division is considered reasonable for regulatory purposes and is based on scientific and engineering considerations. Larger floods can and will occur on rare occasions. Flood heights may be increased by manmade or natural causes. This article does not imply that land outside the areas of special flood hazard or uses permitted within such areas will be free from flooding or flood damages. This article shall not create liability on the part of the county or by any officer or employee thereof for any flood damages that result from reliance on this article or any administrative decision lawfully made thereunder.

(Ord. No. 2008-25, § III, 12-4-08)

Secs. 72-746--72-775. Reserved.

DIVISION 8. STORMWATER MANAGEMENT*

*Code references--Environmental protection standards relating to stormwater management, § 50-101 et seq.; stormwater utility, § 122-151 et seq.

Sec. 72-776. Purpose and objectives.

(a) *Statement of purpose.* The Volusia County Council has determined that the management of stormwater runoff and the preservation of the water resources of the County of Volusia is critical to the public health, safety and welfare. Uncontrolled stormwater runoff causes erosion, sedimentation and flooding and prevents recharge of the aquifer upon which the public depends for potable, fresh water. The county council finds it is necessary to impose reasonable restrictions to control stormwater runoff and conserve the water resources of the County of Volusia.

(b) *Objectives.* The requirements hereafter will allow landowners reasonable use of their property while promoting the following objectives:

- (1) Protect the quantity and quality of ground and surface waters;
- (2) Prevent the lowering of existing water table elevations to the detriment of these other stated objectives;
- (3) Perpetuate recharge into the groundwater system;
- (4) Prevent and reduce salt water intrusion;
- (5) Minimize the production of nuisance and disease vectoring mosquitoes;
- (6) Discourage reliance on drainage systems which depend on the use of electrical energy or petroleum fuels to move water, remove pollutants or maintain the systems;
- (7) Reduce wind or water-caused erosion loss of valuable topsoils and subsequent sedimentation of surface water bodies and damage to adjacent properties;
- (8) Alleviate downstream flood hazards;
- (9) Prevent significant loss of life and property due to runoff from any foreseeable rainfall event;
- (10) Reduce the capital expenditures associated with floodproofing and the installation and maintenance of storm drainage systems;
- (11) Minimize the adverse impact of development on the water resources of the County of Volusia; and
- (12) Maximize protection of class II waters.

(c) *Intent.* This division is intended to allow landowners reasonable use of their property, provided stormwater runoff peak rates and volumes and the quality of stormwater retained after development shall approximate existing predevelopment conditions and precautions will be taken to prevent erosion, sedimentation and flooding.

(d) *Jurisdiction.* This division shall apply in the unincorporated areas of the County of Volusia, Florida. Any municipality in Volusia County, which has previously adopted and implemented a stormwater management ordinance subject to county council approval, reflective of the conditions in the corporate jurisdiction in accordance with the previous Volusia County Ordinance No. 78-32, shall continue in effect, and may amend its ordinance to comply with this division. In the event a municipality has not adopted a stormwater management ordinance in compliance with the previous Volusia County Ordinance No. 78-32, then the County of Volusia will administer this division within such municipality. Within such municipalities which have not adopted said stormwater management ordinance, no permits which may cause a violation of this division shall be issued without having made application, paid required fees, and obtained approval of the stormwater management plan, in accordance with the provisions of this division.

(Ord. No. 88-40, §§ VI, VII, 12-15-88; Ord. No. 2008-25, § III, 12-4-08)

Sec. 72-777. Prohibitions and exemptions.

(a) *Prohibitions.* No person may develop or make any change in the use of land or construct a structure or change the size of a structure, except as exempted in subsection (b) herein, without first obtaining a stormwater management development permit as provided herein. For the purposes of this division, the following development may potentially alter or disrupt existing stormwater runoff patterns, and as such, will, unless exempt pursuant to subsection (b) hereof, require a permit prior to the commencement of construction:

- (1) Clearing and/or drainage of land as an adjunct to construction;
- (2) Clearing and/or draining of nonagricultural land for agricultural purposes;
- (3) Converting agricultural lands to nonagricultural uses;
- (4) Subdividing land;
- (5) Replatting recorded subdivisions and the development of recorded and unrecorded subdivisions;
- (6) Changing the use of land and/or the construction of a structure or a change in the size of one or

more structures;

(7) Altering the shoreline or bank of any surface water body;

(8) The permanent (long period) lowering of the water table; and

(9) Filling of depressional areas.

(b) *Exemptions and concurrent review.*

(1) Except as provided in subsection (b)(3) below, the following activities shall be exempt from this division:

a. Single-family and duplex residences and accessory structures;

b. Bona fide agricultural pursuits, including forestry, except where an artificial drainage system will be used to increase the flow of surface water from the applicant's land;

c. Maintenance work performed on existing mosquito control drainage canals for the purpose of public health and welfare;

d. Maintenance work on utility or transportation system; provided such maintenance work does not alter the purpose and intent of the drainage system as constructed;

e. Any maintenance to an existing structure not changing or affecting rate or volume of stormwater runoff;

f. The one-time construction of any structure or pavement not otherwise exempt and not exceeding 1,000 square feet of impervious area on or parallel to the ground;

g. Publicly owned landfills permitted under state regulations.

h. Subdividing of lands into four lots or less, each being one acre or larger in size where no new paved streets are proposed.

(2) Developments which are subject to subdivision and/or site plan approval pursuant to divisions 2 and/or 3 of this article, shall not be required to submit a separate permit application for review pursuant to this article. Compliance herewith shall be included as a part of the review process pursuant to said divisions 2 and 3.

(3) Notwithstanding any other provisions of this article, there shall be no harmful erosion by water of any soil or fill onto any adjacent public or private property.

(Ord. No. 88-40, §§ VIII, IX, 12-15-88; Ord. No. 96-32, §§ LIX, LX, 12-19-96; Ord. No. 2006-02, § II, 2-2-06; Ord. No. 2008-25, § III, 12-4-08)

Sec. 72-778. Stormwater management permit review.

An application for a stormwater management development permit shall be filed, processed and approved in the following manner:

(1) *Preliminary application.* In cases where it is not clear that a proposed development is exempt from this article, a preliminary application may be submitted.

a. The preliminary application shall be filed with the land development division (LDD).

b. The preliminary application shall contain two copies of the following information:

1. A statement signed by the owner/developer which certifies that the development will:

i. Not obstruct any existing flow of stormwater runoff; and

ii. Not drain stormwater onto adjacent lands not now receiving runoff from the proposed development area.

2. An application form containing the following information and exhibits:

i. Name, address and telephone number of the applicant;

ii. Location map, address and legal description of the proposed development;

iii. Statement expressing the scope of the proposed development;

iv. Schedule of proposed development; and

v. Sketch showing existing and proposed structures, paving and drainage patterns.

3. It is the responsibility of the applicant to include in the preliminary application sufficient information for the county to evaluate the application and the acceptability of those measures proposed.

c. Within three working days after filing, the LDD shall determine whether or not the preliminary application is complete. If it is determined that it is complete, the LDD shall transmit it to the CDE. If it is determined to be incomplete, it shall be returned to the applicant.

d. After receiving the preliminary application, the CDE, shall, within ten working days, determine and then notify the LDD that either the proposed development is exempt or that a permit shall be applied for.

e. Considerations for exemption from a permit. The CDE, in making a determination of exemption of the application from the permitting procedures, shall consider:

1. Whether or not the proposed project is exempt pursuant to subsection 72-777(b);
2. Whether or not the proposed project will increase the rate or volume of runoff from the existing site;
3. Whether or not the proposed project will adversely affect water quality;
4. Whether or not there are other criteria which would require an application; and
5. Whether or not a St. Johns River Water Management District permit is required.

f. Upon receiving notification of the CDE's determination under subsection e., above, the LDD will immediately notify the applicant.

g. Upon notification, the applicant may appeal the determination of the CDE that a permit shall be applied for by filing a request with the LDD, within ten working days, that the DRC make a final determination of exemption. A final determination shall be made by the DRC within ten working days of the request.

h. If it is determined that the proposed development is exempt, the applicant is authorized to commence and complete construction of only the development described in the preliminary application. No construction shall commence until a St. Johns River Water Management District permit is approved, if required.

(2) *Concurrent review.* Where a standard application for stormwater review is required for a project undergoing subdivision or site plan review pursuant to divisions 2 or 3, all review shall be done concurrently. All performance standards and requirements of this division shall be met in addition to those required in other divisions of this article during the concurrent review. Plans and exhibits required by this article may be combined with other plans and exhibits required for concurrent review. However, it is the responsibility of the applicant to include in the concurrent application submittals sufficient information for the county to evaluate the application and acceptability of those measures proposed pursuant to the requirements of this article.

(3) *Stormwater management requirements.*

a. For the purposes of this division, developments requiring a standard permit application shall be either a "lesser development" or a "standard development", defined as follows:

1. A lesser development is: (1) A proposed development that has a lot size less than one acre in area and consists of more than 1,000, but less than 5,000 square feet of impervious area, or the impervious area proposed is less than 25 percent of the total lot area; or (2) is a proposed lot division with a minimum lot size of one acre or larger with no new roadways or streets.

2. A standard development is a proposed development of any lot area that consists of 5,000 or more square feet of impervious area; or the impervious area is 25 percent or more of the total lot area; or the lot area of the proposed development is one acre or larger regardless of the impervious area.

b. An application for a stormwater management development permit and sufficient copies of the required plans and information shall be filed with the LDD and the proper fee paid. Sufficient copies shall be determined as follows:

1. For a lesser development, three copies are required.
2. For a standard development, nine copies are required.
3. The LDM may require additional sets of plans and information as deemed necessary for additional agency review.

c. The following plans and information, prepared by a Florida registered engineer, shall be submitted with the application:

1. A detailed site plan, including a general location map and the location of all existing and proposed pavement and structures;
2. Topographic maps of the site and all adjacent contributing areas before and after the proposed alterations;
3. Information regarding the types of soils and groundwater conditions existing on the site, including a geotechnical investigation report signed by an engineer or geologist registered in the State of Florida and experienced in soils, hydrogeology and groundwater hydrology and an evaluation of seasonal high-water table elevations which contains:
 - i. A representative number of soil boring profiles;
 - ii. Depth measurements to the water table for each soil profile;
 - iii. Depth estimations to seasonal high water table elevations, for each soil profile;
 - iv. Surveys of soil borings, using both horizontal and vertical controls;
 - v. A comparison of estimated seasonal high groundwater elevations to other data such as rainfall, estimated depth to seasonal high-water table by national resource conservation service (f/k/a soil conservation service);
 - vi. If submitted estimates of seasonal high groundwater elevations differ by more than six inches from the values published in the official soil survey of Volusia County, Florida, additional evaluations explaining the discrepancy are required. The following additional information may also be required at the discretion of the county development engineer:
 - A. A water table elevation contour map for elevations measured at the site;
 - B. Predevelopment seasonal high-water table elevation contour map of the site; and
 - C. Postdevelopment seasonal high-water table elevation contour map of the site.
4. General vegetation maps of the site before development and a plan showing proposed ground cover after development;
5. Construction plans, specifications and computations necessary to indicate compliance with the requirements of this division;
6. Additional information necessary for determining compliance with this division as the CDE may require; and
7. Additionally, for a standard development, a hydrograph for the proposed development may be required, particularly in those areas where the cumulative impact of the outflows on downstream flows are of concern.

d. Within three working days of filing of the application the LDD will determine whether or not the application is complete. If the application is determined to be incomplete it will be returned to the applicant.

e. If the application is determined to be complete, the LDD will immediately distribute the application to the DRC.

1. For a lesser development, the application shall immediately be transmitted to the CDE;

2. For a standard development, the application shall immediately be distributed to the DRC.

f. Within 20 days of receipt of an application for a lesser development from the LDD to the CDE or within 20 days of any amendment thereto, the county engineer shall approve, approve with conditions, or deny the application. After the county engineer has rendered his/her decision, the CDE will immediately notify the LDD of the decision rendered.

g. Within ten working days of receipt of an application for a standard development, each member of the DRC shall have reviewed and transmitted their comments or suggestions concerning the application to the CDE.

h. Within 30 days of receipt of an application for a standard development, the CDE shall approve, approve with conditions, or deny the application. The CDE shall state the reasons for denial in writing. After the CDE has rendered a decision, the CDE will immediately notify the LDD of the decision rendered. The CDE may issue an intent to approve or approve with conditions an application in the absence of any required St. Johns River Water Management District permit, but no development order shall be issued unless a St. Johns River Water Management District permit has been approved.

(Ord. No. 94-2, § 62, 4-7-94; Ord. No. 96-32, §§ LXI--LXIII, 12-19-96; Ord. No. 2006-02, § II, 2-2-06; Ord. No. 2008-25, § III, 12-4-08)

Sec. 72-779. Performance, review and design standards.

(a) *Performance standards.*

(1) For applications for a lesser or a standard development, the following performance standards shall be followed in the design of the project:

a. Stormwater runoff shall be subjected to best management practice prior to discharge into natural or artificial drainage systems. "Best management practice" shall mean a practice or combination of practices determined by the DRC to be the most effective, practical means of preventing or reducing the amount of pollution generated by the project to a level compatible with Florida water quality standards found in chapter 17-3, Florida Administrative Code.

b. 1. No site alteration shall cause siltation of wetlands, pollution of downstream wetlands or reduce the natural retention or filtering capabilities of wetlands.

2. No site alteration shall allow water to become a health hazard or contribute to the production of mosquitoes.

3. All site alteration activities shall provide for such water retention and settling structures and flow attenuation devices as may be necessary to insure that the foregoing standards and requirements are met.

c. Design of water retention or detention structures and flow attenuation devices shall be subject to the approval of the CDE pursuant to the standards hereof. Detention structures shall be designed to release runoff to the downstream drainage system over a period of time so as not to exceed the capacity of the existing downstream system. Under no case shall open retention areas (ponds, etc.) have side slopes steeper than four horizontal to one vertical (4:1) to a depth of two feet of water at seasonal low pond elevation, at which point the side slope may be increased to two horizontal to one vertical (2:1). Retaining walls may be utilized to accommodate field conditions.

In order to maintain good water quality in stormwater management detention ponds and maximize the provision of fish and wildlife habitat, stormwater management systems with permanently wet detention ponds should be designed, operated and maintained so as to resemble a natural pond to the greatest extent practical. A natural pond design should include:

A littoral zone comprised of native emergent and submersed aquatic macrophytic vegetation; a deep open water limnetic zone free of rooted emergent and submersed vegetation; and, where feasible, an upland buffer of native trees, shrubs and under story vegetation in accordance with St. John's River Water Management District requirements.

d. A positive drainage system shall be provided which will not adversely impact downstream owners or adjacent lands.

e. Where possible, natural vegetation shall be used as a component of the drainage system. The water table should not be manipulated so as to endanger natural vegetation beneficial to water quality unless natural vegetation can be replanted and survive with a lowered water table condition.

f. Runoff from higher adjacent lands shall be considered and provisions for conveyance of such runoff shall be included in the drainage plan.

g. Runoff shall be treated to remove oil and floatable solids before discharge from the site in a manner approved by the CDE.

h. Erosion by wind or water shall be prevented by the developer throughout the construction process.

i. Direct discharge to class II waters is prohibited. A workable filter system must be provided prior to any discharge to class II waters.

j. For the purpose of this division, it is presumed that the lowering of the water table for the purpose of constructing detention/retention basins and for the purpose of permanently protecting road construction does not conflict with the stated objectives of this article if all of the following are met:

1. The development site is not in an area known to the county, based on data collected and interpreted by the U.S. Geological Survey, the St. Johns River Water Management District, the county and other professional investigators, as important to recharge or to prevention of discharge of the Florida aquifer.

2. The proposed lowering of the water table shall be over no more than 15 percent of the site to a depth of five feet below the surface of the existing undisturbed ground, or an equivalent volume, said area to be measured at the overflow elevation of the retention area(s).

3. If ditches, underdrains or similar devices are used to lower the water table, the lateral volumetric effect will be calculated, and the volume will be deducted from that allowed for retention areas.

4. The high-water table may be lowered up to two feet below the undisturbed ground in the vicinity of roads for the purpose of protecting the subbase and base of the roadway and/or for the purpose of preventing mosquito production in the roadside swales.

5. The lowering of the water table has no adverse affect on wetlands as defined herein.

6. The lowering of the water table does not increase flows to the detriment of neighboring lands.

(2) For applications for a lesser development, the following additional performance standards shall be followed in the design of the project:

- a. The minimum volume of retention to be provided shall be equivalent to one-half inch of depth over the entire project area. For certain soil conditions or groundwater table conditions which do not permit the percolation of this volume within the five days following a storm event, the county engineer may approve detention with filtration systems in lieu of retention.

(3) For application for a standard development, the following additional performance standards shall be followed in the design of the project:

- a. [*Retention standards.*] The discharge hydrograph produced for the developed or redeveloped site shall not exceed, in terms of peak flow and total volume, the hydrograph produced by conditions existing before any development occurred on-site for a 24-hour, 25-year frequency storm, unless the intent of this recharge provision will be met through detention of the difference between said volumes, in which case said volume difference may be released over

not less than a 24-hour, nor greater than a 72-hour period of time. However, the design standards for wet retention areas, when approved by the CDE shall prevail. This requirement may be waived by the CDE for sites consisting predominately of poorly drained soils having permanently and naturally impaired recharge potentials. In addition, the cumulative impact of the outflow hydrograph on downstream flow shall be considered. Runoff rates and volumes resulting from the project, in excess of existing amounts, shall be accommodated on-site. Off-site retention may be permitted if, in the opinion of the CDE, the recharge requirements of this division are met.

b. *Runoff computations.* Runoff computations shall be based on the most critical situation (rainfall duration, distribution and antecedent soil moisture condition) and conform to acceptable engineering practices using rainfall data and other local information applicable to the affected area.

c. *Closed basins* : The discharge hydrograph produced for the developed or redeveloped site shall not exceed, in terms of peak flow and total volume, the hydrograph produced by conditions existing before any development occurred on site for a 24-hour, 100-year frequency storm.

(b) *Review standards.* The CDE in reviewing and/or approving the application shall consider, where appropriate, the following minimum standards:

- (1) The characteristics and limitations of the soil at the proposed site with respect to percolation and infiltration;
- (2) The existing topography of the sites and the extent of topographical changes after development;
- (3) The existing vegetation of the site, the extent of vegetational changes after development and the threat posed to vegetation endangered or indigenous to wetlands;
- (4) The plans and specifications of structures or devices the applicant intends to employ for on-site stormwater retention/detention with filtration, erosion control and flow attenuation;
- (5) The effect the proposed stormwater management system will have upon mosquito breeding habitat;
- (6) The adequacy of easements for drainage systems in terms of both runoff conveyance and maintenance;
- (7) The method of handling upland flow which presently discharges through the site;
- (8) The effectiveness of wind and water erosion control measures during construction;
- (9) Standards and requirements of any other governmental jurisdiction;
- (10) The maintenance entity responsible for upkeep of the system upon its completion;
- (11) The continuity of phased projects; phased projects will require the submission of an overall plan for the applicant's total land holdings;
- (12) The existing hydrologic cycle of the proposed site and the impact of the proposed alterations on the existing hydrologic cycle;
- (13) The impact the proposed project will have on the natural recharge capabilities of the site; and
- (14) The impact the proposed project will have on downstream water quantity and quality and specifically the potential for downstream flooding conditions.

(c) *Design standards.*

(1) Open swales, ditches or other waterways shall require complete engineering data showing the adequacy of design and the effect within the particular drainage area to the satisfaction of the CDE. The cost of designing and installing drainage systems shall be borne by the developer.

(2) Pipe shall be either class 3 reinforced concrete with patented rubber gasketed joints, fully asphalt-coated corrugated steel pipe of appropriate highway gauge, ADS, PVC, elliptical concrete pipe or other type approved by the CDE. Subject to acceptable soil and groundwater conditions, corrugated aluminum pipe may be considered, provided the minimum cover from top of pipe to the top of subgrade at any point under a roadway shall be equal to the diameter of the pipe, but, in no case, less than 24 inches. In all other locations, the minimum cover shall be equal to the diameter of the pipe, and shall depend upon location and type of pipe.

(3) Sizes of drainage culverts, ditch sizes and inlet spacings shall be derived from computations required and shall be submitted to the CDE for approval.

(4) In cases where there is a prevalence of soils that exhibit adverse water table characteristics, underdrains and/or fill or other acceptable alternative that will provide necessary measures to maintain the structural integrity of the road will be required. The determination of need shall be made by reference to applicable portions of the most recent edition of the Soil Survey and Supplement for Volusia County, Florida, as prepared by the U.S. Department of Agriculture, Natural Resource Conservation Services, or whatever subsequent authoritative soil survey may be published for Volusia County after adoption of these regulations, or according to information generated by developers.

(Ord. No. 90-4, § VI, 1-18-90; Ord. No. 96-32, §§ LXIV--LXVI, 12-19-96; Ord. No. 2006-02, § II, 2-2-06; Ord. No. 2008-25, § III, 12-4-08)

Sec. 72-780. Issuance of development permit.

Upon notification of the determination of the CDE, the LDD will immediately notify the applicant of that determination.

(1) *Determination of approval.* Where there has been a determination of approval of the application, the LDM shall issue the development permit; and thereafter the applicant may commence construction of the development provided all other requirements of this article are complied with.

(2) *Determination of approval with conditions.* Where there has been a determination of approval of the application with conditions, the LDM shall first ensure that those conditions are satisfied, and then shall issue the development permit; and thereafter the applicant may commence construction of the development provided all other requirements of this division are complied with.

(3) *Determination of denial.* Where there has been a determination of denial of the application, the LDM shall immediately notify the applicant, in writing, stating the reasons for denial.

(Ord. No. 96-32, § LXVII, 12-19-96; Ord. No. 2008-25, § III, 12-4-08)

Sec. 72-781. Plan adherence.

The applicant shall be required to adhere strictly to the issued development permit. Any changes or amendments to the approved plans must be approved by the CDE. If the completed development appears to deviate from the approved plans, the enforcement official may require the developer to submit as-built plans of the completed project. County inspectors shall be granted inspection rights and right-of-entry privileges in order to ensure compliance with the requirements of this division.

(Ord. No. 96-32, § LXVIII, 12-19-96; Ord. No. 2008-25, § III, 12-4-08)

Sec. 72-782. Maintenance.

The installed system(s) required by this division shall be maintained by the owner except that the county may accept certain systems for county maintenance. The selection of critical areas and/or structures to be maintained by the county shall be recommended to the county council by the DRC. All areas and/or structures to be maintained by the county must be conveyed to the county by plat or separate instrument and accepted by the county council. The system(s) to be maintained by the owner shall have adequate easements to permit the county to inspect and, if necessary, to take corrective action should the owner fail to maintain the system(s). Should the owner fail to properly maintain the system(s) the enforcement official shall give such owner written notice of the nature of the corrective action necessary. Should the owner fail, within 30 days from the date of the notice to take, or commence taking, the necessary corrective action, the county may pursue code enforcement action, or may enter upon the property, take corrective action and place a lien on the property of the owner for the costs thereof.

(Ord. No. 96-32, § LXIX, 12-19-96; Ord. No. 2008-25, § III, 12-4-08)

Sec. 72-783. Variance.

Upon request by any person required to obtain a permit hereunder and where it may be shown that an increase in the rate or volume of surface runoff shall not be harmful to the water resources of the County of Volusia, the county council, after recommendations by the DRC, may grant or deny a variance to this division. Variances shall be applied for with the LDD on forms supplied by the LDD.

(Ord. No. 2008-25, § III, 12-4-08)

Sec. 72-784. Emergency exemption.

(a) This division shall not be construed to prevent the doing of any act necessary to prevent material harm to or destruction of real or personal property as a result of a present emergency, including, but not limited to, fire, infestation by pests, or hazards resulting from violent storms or hurricanes or when the property is in imminent peril and the necessity of obtaining a permit is impractical and would cause undue hardship in the protection of the property.

(b) A report of any such emergency action shall be made to the LDD by the owner or person in control of the property upon which emergency action was taken as soon as practicable, but not more than ten days following such action. Remedial action may be required by the enforcement official subject to appeal to the county council in the event of dispute.

(Ord. No. 2008-25, § III, 12-4-08)

Secs. 72-785--72-815. Reserved.

DIVISION 9. REFERENCE TO THE ZONING ORDINANCE OF VOLUSIA COUNTY, FLORIDA

Sec. 72-816. [Compliance required.]

Herein referenced is the Volusia County Uniform Zoning Ordinance No. 80-8, as amended [article II, of this chapter]. Development activity undertaken pursuant to this division shall comply with said zoning ordinance.

(Ord. No. 90-33, § LI, 9-27-90; Ord. No. 2008-25, § III, 12-4-08)

Secs. 72-817--72-830. Reserved.

Editor's note: Sections X--XIII of Ord. No. 88-40, adopted Dec. 15, 1988, amended §§ 901--904 by deleting the word "designated" from the term "Volusia County Designated Thoroughfare System." For the sake of consistency, the editor has removed the word from the article title. Subsequently, § L of Ord. No. 90-33, adopted Sept. 27, 1990, changed the title to "Reference to the Zoning Ordinance of Volusia County, Florida." Section LI enacted a new § 901, and §§ LII--LVII repealed §§ 902--904, which was further renumbered to division 9, § 72-816, by Ord. No. 2008-25, § III, adopted Dec. 4, 2008.

DIVISION 10. VOLUSIA COUNTY TREE PRESERVATION ORDINANCE*

***Editor's note:** Ord. No. 02-13, § I, adopted July 18, 2002, repealed former art. X, §§ 1001--1011, which pertained to tree permits, and enacted provisions designated as a new art. X, §§ 1001--1019, to read as herein set out. See the Code Comparative Table for a detailed analysis of inclusion, which was further renumbered to division 10, §§ 72-831--72-849, by Ord. No. 2008-25, § III, adopted Dec. 4, 2008.

Code reference--Environmental protection standards relating to trees, § 50-161 et seq.
