



## Memorandum

**TO:** Polk County Zoning Commission

**FROM:** Bret VandeLune, Planning and Development Manager

**DATE:** January 21, 2021

**RE:** Zoning Ordinance - Text Amendment - Stormwater

Polk County took part in the Capital Crossroads Stormwater initiative to work regionally to put together uniform stormwater management standards for the Des Moines metro. Staff proposes implementing a majority of the Crossroads recommendations to provide for improved stormwater management and increase stormwater quality within unincorporated Polk County.

Our current regulations are no longer sufficient and the new standards are needed in order to improve water quality and decrease the runoff onto adjacent downstream property owners. New design methods allow for improved implementation and management practices that provide immediate and long-term benefits to downstream property owners. Watershed Management Authorities (WMAs) are proactively working within their respective watersheds with ag, rural, suburban and urban land interests to address stormwater. These regulations are proposed for new development and redevelopment of existing properties. Does not include Agricultural land or individual single-family residential properties.

At the January Zoning Commission meeting, staff will share an overview of the proposed text amendments as part of the advertised Public Hearing. The text amendments modify Article 7 - Natural Resource Protection, Division 4, Section 2 – Streams and Article 8 - Stormwater and Erosion Control Management within the Polk County Zoning Ordinance. (See attached redline version of the proposed changes.)

Following the Zoning Commission meeting, there will be a presentation to the Board of Supervisors in mid-February with a public hearing before the Board of Supervisors on March 9, 2021.

## Section 4. Section 2. Streams

### (A) Intent and Purpose

The intent of this Section is to establish regulations and procedures that govern all land uses and related development activities adjacent to streams. The streams covered by this Section are identified on FEMA FIRM Flood Insurance Rate Maps (FIRMs), for Polk County and Incorporated Areas dated February 1, 2019, and later as revised as mapped floodplain Figure 3.2 and 5.1 from the Polk County 2030 Comprehensive Plan. These regulations shall require undisturbed buffers and impervious surface setbacks adjacent to streams.

The purpose of undisturbed buffers and impervious surface setbacks are:

- to protect, restore and maintain the chemical, physical and biological integrity of streams and their water resources;
- to remove pollutants delivered in urban storm water;
- to protect public water supplies;
- to maintain base flow of streams;
- to minimize erosion and control sedimentation;
- to provide infiltration for storm water runoff;
- to minimize impervious surfaces close to streams; and
- to provide riparian wildlife habitats and promote desirable aquatic habitat.

### (B) Protection Criteria

#### (1) Buffer Requirements

~~(a) Floodway - Mapped streams in all watersheds within unincorporated Polk County with floodway identified on effective FIRM maps shall require a minimum 50-foot undisturbed buffer on each side of the floodway boundary, measured from the edge of the floodway boundary.~~

(a) No Floodway - Mapped streams in all watersheds within unincorporated Polk County with no floodway identified on the effective FIRM maps shall require a minimum 50-foot undisturbed buffer on each side of the stream's belt width, which is the stream flows measured between the outsides of opposing meander bends. "Iowa Department of Natural Resources (IDNR) Method."

(b) Floodway - Mapped streams in all watersheds within unincorporated Polk County with floodway identified on effective FIRM maps shall require a minimum 50-foot undisturbed buffer on each side of the floodway boundary, measured from the edge of the floodway boundary, or using the method described above for No Floodway (a), whichever creates that largest stream buffer.

#### (2) Setback Requirements

(a) Septic tanks and septic tank drain fields are prohibited within the undisturbed buffer area;

(b) An additional 25-foot setback shall be maintained adjacent to the undisturbed buffer in which all impervious surfaces shall be prohibited.



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Storm water retention or detention facilities are permitted within this setback but prohibited within the stream channel.

- (c) ~~Within these watersheds, N~~ew hazardous waste treatment or disposal facilities are prohibited within the stream buffer and setback.



## Article 8. Stormwater and Erosion Control Management

**Stormwater and the management of stormwater runoff and erosion control are governed by the provisions of the following Sections.**

### **Division 1. Stormwater Runoff**

Development of property without disposition of stormwater runoff is prohibited. The owner of any parcel (s) who shall grade, fill, construct on or otherwise alter the existing stormwater runoff rates, velocities, volumes or drainage patterns shall be responsible for damages, inconveniences or distress resulting from such activities.

#### **Section 7. Section 1. Excess Stormwater Runoff**

Excess runoff shall be judged in comparison to the site in its predeveloped condition and shall include all increases in stormwater resulting from any of the following:

- (A) An increase in the impervious surface of the site, including all additions of buildings, roads and parking lots.
- (B) Changes in soil absorption caused by compaction during development.
- (C) Modifications in contours, including the filling or draining of small depression areas, alterations of drainageways, or regrading of slopes.
- (D) Destruction of woodlands.
- (E) Alteration of drainageways or installation of collection systems to intercept street flows or to replace swales or other drainageways.
- (F) Alteration of subsurface flows, including any groundwater dewatering or diversion practices such as certain drains.

#### **Section 2. Limitation of Stormwater Runoff**

No development shall cause downstream property owners, watercourses, channels, or conduits to receive stormwater runoff from the proposed development site at a higher peak flow rate, ~~at higher volumes~~, or at higher velocities than would have resulted from the same storm event occurring over the site of the proposed development with the land in its natural, predeveloped condition, unless sufficient capacity to convey the water through downstream ~~properties~~ ~~owners~~, watercourses, channels or conduits to receive stormwater runoff from the proposed development site is demonstrated.

(A) New Development. Any new development of land adding more than 10,000 square feet of new impervious surface shall provide stormwater management as outlined in this ordinance. This threshold is a cumulative amount of new square footage and may be reached over time in increments. At such time that a development site exceeds 10,000 cumulative square feet of new impervious surface the site will be required to be in full compliance with the Stormwater Runoff provisions of this ordinance. .

(B) Redevelopment. Any redevelopment adding more than 10,000 square feet of new impervious surface but disturbing less than 50% of the site shall provide stormwater



management at the Water Quality Volume standard and the Channel Protection standard for the entire site. Peak flow rates that occur during rainfall events greater than the 1-year, 24-hour event (Channel Protection) shall not exceed the peak flow rates of the existing site conditions at the time of redevelopment. This threshold is a cumulative amount of new square footage and may be reached over time in increments.

(1) Any redevelopment disturbing 50% or more of a site shall be required to meet the same stormwater management standards as a new development. This threshold is a cumulative amount of new square footage and may be reached over time in increments.

(C) Exemption. The following activities shall be exempted from meeting the stormwater management standards of this ordinance:

(1) New development adding less than 10,000 square feet of new impervious surface.

(2) Redevelopment adding less than 10,000 square feet of new impervious surface and less than 50% site disturbance and if in compliance with a previously approved stormwater management plan.

(3) Removal and replacement of impervious surface exactly matching location and square feet as approved on previously submitted site plan.

(4) Agricultural activity that is consistent with an approved soil conservation plan or prepared approved by the appropriate agency, as applicable.

(5) Additions or modifications to single family structures

(6) Repairs to any stormwater management infrastructure deemed necessary by the County

(7) Linear projects such as road construction

### **Section 3. Maintenance of Drainage Easement**

Platted or recorded drainage easements shall be maintained by the property owner and shall not be obstructed. An obstruction shall include but not be limited to trees, fences, retaining walls, and structures. Obstructions placed within a drainage easement that cause drainage ~~issues~~ impacts may be removed by Polk County, with proper notice, if it obstructs the flow of water to the extent that immediate damage is to occur to any property.

Crossings ~~provided in~~ through drainage easements shall be certified by an Iowa licensed engineer for proper sizing and placement. If the crossing is the sole egress/ingress to the property, it shall be designed to convey the 100 year peak flow, without overtopping.



#### Section 4. Runoff and ~~Downspout Controls~~Drainag

Drainage area and the outlet location of stormwater runoff in its natural, predeveloped condition shall not be altered with development activity. Stormwater runoff must be controlled on site and cannot be diverted or backed up onto adjacent property owners.

(A) Downspouts shall ~~be diverted~~have an outlet onsite to control stormwater runoff and not diverted onto adjacent properties ~~unless said property is provided with a drainage easement.~~

~~(A)(B)~~ Sump Pumps~~Downspouts~~ shall daylight a minimum of ten (10) feet from ~~the~~any property line, a drainage easement or drainageway or stream road ditch to allow for infiltration of stormwater.

#### Section 5. Stormwater Detention Required

Developments not able to directly discharge all flows as indicated in Section 2 above shall provide for detention and design the facility as follows:

- (A) If stormwater detention is required, the developer or applicant shall construct stormwater detention facilities designed by a registered professional engineer in the State of Iowa and meeting the criteria of this division.
- (B) Polk County shall determine if construction of stormwater detention facilities are required as a condition for plat approval, site plan approval or issuance of a grading or building permit. Factors to be considered in making such a determination include, but are not limited to:
  - (1) Preliminary plats, grading plans/sketches, or site plans/sketches submitted by the owner.
  - (2) Historical or potential localized drainage or flood problems adjacent to the site. This would include previous engineering studies that document flood elevations.
  - (3) Historical or potential area-watershed wide drainage or flooding problems ~~in the watershed.~~
  - (4) Location of the site relative to existing drainageways and/or stormwater conveyances.
  - (5) Extent of proposed site increase in impervious surface area.
  - (6) Anticipated future development of the site or overall watershed, ~~drainage basin.~~
  - (7) Existing site features which may facilitate or impede detention design and/or construction.
- (C) Polk County shall have no obligation to review, check, or otherwise verify the certified engineering calculations, method of design, or stormwater detention facility plans and as-built drawings required to be submitted. Acceptance of stormwater detention plans, calculations or as-built drawings and issuance or approval of any permit or plat shall be interpreted as satisfying the requiring that such plans, calculations and documents be submitted to Polk County. In no instance shall such permit issuance, plat approval or acceptance of such documents by Polk County be construed as approval of the Engineer's design methods, design calculations, detention facilities



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plan, as-built drawings, approval of detention construction, or concurrence by Polk County that all design criteria have been satisfied. The Engineer and developer shall be fully responsible for the design, construction, and damages resulting from concentrated discharge of stormwater detention facilities.



## Section 6. Design Criteria

- (A) Water Quality Volume - To reduce potential increases in downstream erosion and water pollution, practices or techniques shall be employed that capture and treat runoff from a 1.25" rainfall event. The volume can be infiltrated or detained and released over a 24-hour period. This standard addresses approximately 90% of the rainfall events that occur in Central Iowa.
- (B) Channel Protection Volume – To reduce potential increases in erosion and stream degradation, practices or techniques shall be employed that provide extended detention of the runoff that occurs during 1-year, 24-hour rainfall event. The volume shall be detained and released at a minimum over 24 hours and a maximum of 48 hours. This standard addresses approximately 98% of the rainfall events that occur in Central Iowa.
- (C) Overbank Flood Protection - To minimize surcharge of downstream storm sewer systems and reduce the frequency of flash flooding, practices and techniques shall be employed that limit peak release rates that are anticipated to occur post-development during the 2-, 5- and 10-year, 24-hour storm events to levels no greater than those expected to occur from natural conditions from a given site from the same storm event. Natural conditions are defined in Section 7 of this Division.
- (D) Extreme Flood Protection - To reduce the frequency and impacts caused by larger flood events, practices and techniques shall be employed that limit peak release rates that are anticipated to occur post-development during the 25-, 50- and 100-year, 24-hour storm events to levels no greater than those expected to occur from natural conditions from a given site from the same storm event. Natural conditions are defined in Section 7 of this division.
- (A) —~~Minimum design storm is a rainfall event having a return frequency of 100 years.~~
- (B) —~~Design storm duration is that critical duration of rainfall requiring the greatest detention volume.~~
- (C) —~~After development, the release rate of runoff for rainfall events having an expected return frequency of one (1) year to five (5) years shall not exceed the existing, predeveloped peak runoff rate from those storms.~~
- (D) —~~Method of analysis: see Precipitation Models and runoff models as detailed in SUDAS —current edition.~~

### Example #1

- (a) ~~A ten (10) acre site has a critical storm duration of six (6) hours after development.~~
- (b) ~~The peak rate of runoff generated from the site by a one (1) year, six (6) hour storm before development is 2 cfs.~~
- (c) ~~Discharge from detention during the one (1) year, six (6) hour storm after development shall not exceed 2 cfs.~~
- (E) —~~For rainfall events having an expected return frequency of five (5) years to 100 years, inclusive, the rate of runoff from the developed site shall never exceed the existing,~~





predeveloped peak runoff from a five-year frequency storm of the same duration.

**Example #2**

- (a) ~~The ten (10) acre site in Example #1 has a peak rate of runoff from a five (5) year, six (6) hour storm before development of 2.7 cfs.~~
- (b) ~~Discharge from detention during the 100-year, 50-year or 25-year, six (6) hour storm after development shall not exceed 2.7 cfs.~~

~~(F)(E)~~ Detention of runoff generated by upstream land is not required, but shall be managed through the site by providing adequate conveyance and management infrastructure. Release of runoff generated off-site shall not, however, be made in such a manner as to increase the allowable detention basin release rates ~~as stated in paragraphs D and E of this section.~~

~~(G)(F)~~ Release of stormwater runoff from the detention basins shall be made in such a manner as not to damage or devalue private or public properties.

~~(H)(G)~~ Road ditches and road right-of-ways will not be utilized as detention basins.

~~(H)(H)~~ Stormwater Management Plan (SWMP) - The purpose of a SWMP is to identify in detail how stormwater runoff will be managed from a site including specifications on what stormwater management techniques and facilities will be used and where they will be located. It is the policy of Polk County that stormwater management is planned and designed early in the development process so that developments are built in harmony with natural conditions versus forcing stormwater management to fit a development site design. A copy of the design engineer's SWMP and calculations contained therein for the site stormwater detention management shall include:

- (1) Cover sheet including project name, location, engineer and developer contact information.
- (2) Table of contents indicating sections and page numbers (page numbers shall be provided)
- ~~(1) Watershed area; describe overall watershed area and subareas on a drainage map.~~
- ~~(2) Inflow hydrographs; stage storage, stage discharge, and routing curves; and such other routing computations which are the basis of the design.~~
- ~~(3) Calculations of allowable discharge, required storage volumes and calculated ponding elevations.~~
- ~~(4) Such other calculations and materials required to complete the design.~~
- (3) Certification by a registered engineer that the stormwater detention facilities design and calculations were performed by them, or under their supervision, and that the facilities and design meet the criteria of this Division.
- (4) Summary of any previous studies or master plans
- (5) Natural Conditions and runoff analysis summary
- (6) Description and explanation of storm water analysis (ie. computer generated



- hydrographs, drainage area maps with topography, etc.)
- (7) Summary of stormwater management plan detailing compliance with design standards
  - (8) Calculation and tabulation that the site is in compliance with this stormwater runoff ordinance
  - (9) Natural Resources Inventory and wildlife areas (i.e. soils groups, forest cover, wetlands/prairie potholes, etc.)
  - (10) Soil Management Plan
  - (11) Streams, floodplains, and FEMA FIRM maps
  - (12) Environmentally Sensitive Areas, polluted areas, archeological and/or cultural resources
  - (13) Wellhead protection and drinking water supply management areas
  - (14) Areas of existing stormwater storage
  - (15) Geotechnical report, if applicable
- (l) Operation and Maintenance Plan - Prior to approval, the Engineer shall provide to the County an operation and maintenance plan detailing the operation and maintenance and repair procedures for all stormwater infrastructure. These plans will identify the parts of components of the stormwater infrastructure that will need maintained. The operation and maintenance plan will also identify the responsible party. The County shall have the right of access to all stormwater infrastructure and shall have the right, but not the obligation, to perform any necessary maintenance and repairs in the event the responsible party does not and shall charge or assess expense for said maintenance and repairs to the responsible party.
- (5)(1)

## **Section 7. Design Regulations**

All detention facilities and improvements required by this ~~Division~~Section shall comply with the following regulations. The Engineer shall review this Ordinance and Iowa SUDAS before determining methods to be used for peak flow and storage design calculations.

- (A) Natural Conditions - Defined as meadow in good condition, with Times of Concentrations (TCs) calculated and Curve Numbers (CNs) selected based on those natural surface conditions and drainage patterns. CNs shall be selected based on the Hydrologic Soil Group for site soils, but the weighted CNs used to determine allowable release rates for the site to be served by the detention practice shall not exceed a CN of 58 unless a report certified by a registered Professional Engineer in



the State of Iowa, with their practice being geotechnical engineering, certifies that a higher CN is warranted, however, in no case shall the curve number exceed 71.

- (1) Composite CN – Calculations shall be submitted to justify composite CNs used within the analysis.
- (B) Hydrologic Soil Group (HSG) - Soil Group information shall be determined from current County Soil maps as available through the NRCS. If a Soil Group type has not been identified for a given location, the natural condition shall be assumed to be HSG B. The post-developed condition shall be HSG C.
- (C) Time of Concentration (TC) –
  - (1) Calculations are required for detention analysis for each scenario (e.g. natural and developed) and for each drainage area. No assumed values will be accepted.
  - (2) When calculating TCs for intake calculations, at least one calculation shall be performed. Assumed values will be allowed for other intake drainage areas if they are similar in shape, size, and characteristic.
  - (3) Sheet flow will be limited to a maximum of 100 feet.
  - (4) Manning's "n" values shall be appropriate for the flow type and land use, existing or proposed, being calculated as shown in Iowa SUDAS Design Manual.
- (D) Routing and Detention Design – NRCS TR-55 Methodology shall be required with 24-hour duration distribution.
  - (1) Details – Discharge locations and structures including weirs, multi-stage outlets, orifices, etc. shall be accompanied by a detail (plan and section views) within the submitted plans.
  - (2) Freeboard - All detention and retention basins shall require one (1) foot of freeboard above the calculated 100-year high water elevation to the top of dam.
- (E) Conveyance Management – Rational Method is allowed for intake and pipe design.
  - (1) Interior Drainage – Site intakes and pipes shall be designed to manage the 10-yr storm, at a minimum, without ponding or by-pass. If an overland flow path to the stormwater management basin cannot be achieved, intakes and pipes shall be designed to manage up to the 100-year storm event and intake design shall minimize interior by-pass, ponding, and spread to a point where stormwater does not affect adjacent properties, parked vehicles, or onsite infrastructure.
- (F) Erosion Control & Seeding –
  - (1) Erosion control measures shall be accompanied by calculations or product documentation justifying its use at storm sewer and/or detention outlets.
  - (2) Depth and dimension of permanent erosion control shall be specified and detailed.



- (3) The type of seeding shall be specified by specific mix selected and listed by the Engineer.
- (4) The type of mulching shall be specified.
- (5) The type of Rolled Erosion Control Product (RECP) to be used, if applicable, shall be specified.

~~(A)~~(G) Outlet Control Structures. Outlet control structures shall be designed as simply as possible and shall operate automatically. ~~They shall be designed to limit discharges into existing or planned downstream channels or conduits so as not to exceed the flow from the site in its predeveloped condition.~~

(H) Dams – The Engineer shall review the Iowa DNR requirements for compliance with the requirement for an Iowa DNR Dam Permit, if applicable

~~(B)~~(I) Dry Bottom Basin. For basins designed without permanent pools:

(1) Interior Drainage. Provisions must be made to facilitate interior drainage, to include the provision of natural grades to outlet structures, longitudinal and transverse grades to perimeter drainage facilities or the installation of subsurface drains, so as to provide positive drainage of the basin.

~~(2) Multipurpose Features. Dry bottom basins may be designed to serve secondary purposes for recreation, open space, or other types of use which will not be adversely affected by occasional or intermittent flooding.~~

~~(3)~~(2) Cleaning. The basins shall be designed to allow periodic cleaning and removal of sediments, giving consideration for access of maintenance equipment, which shall be removed from the site or otherwise disposed of in an appropriate manner.

~~(C)~~(J) Wet Basins. For basins designed with permanent pools:

~~(1) Depth for Fish. If fish are desired, at least one-quarter (25%) of the surface area of the permanent pool must have a minimum depth of ten (10) feet, basin should be at least 0.5 acres, and should limit the amount of area that is less than 3 ft. deep. If fish are used to help keep the basin clean, at least one-quarter (.25) of the area of the permanent pool must have a minimum depth of ten (10) feet.~~

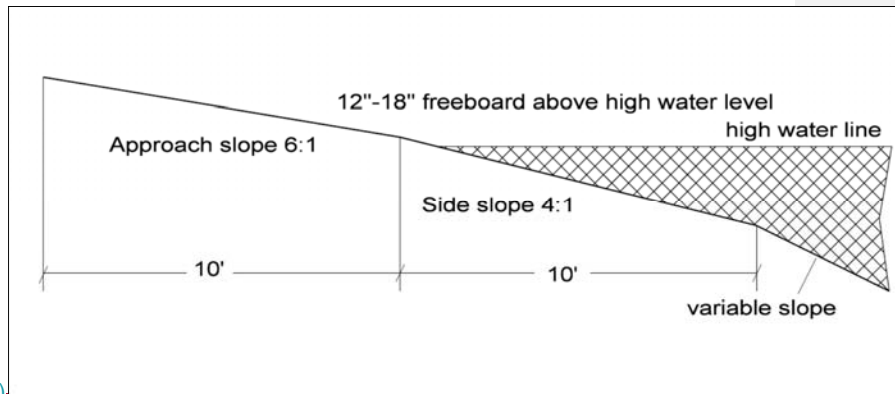
(1) Drawdown. For emergency purposes, dredging, cleaning, or shoreline maintenance, consideration shall be provided in the operation and maintenance plan for drawing down the normal pool.

~~(2) Facilities for Emptying. For emergency purposes, cleaning, or shoreline maintenance facilities shall be provided, or plans prepared for the use of auxiliary equipment, to permit emptying and drainage.~~

(2) Pollution Abatement. Aeration facilities may be required when the quality of the influent and detention time would result in a lowering of dissolved oxygen content in the basin. Aeration during the winter months is not recommended for fish habitat and other wildlife considerations.



- (3) Slopes. Approach slopes shall be at least 6:1 and shall be at least ten (10) feet wide and slope gently toward the basin. The side slopes shall be of non-erosive material with a slope of 4:1 or flatter. The ledge shall be ten (10) feet wide and slope gently toward the shore to prevent people or objects from sliding into deep water. ~~There shall be a freeboard of twelve (12) to eighteen (18) inches above the high water elevation on all retention basins. Alternate designs for side slopes may be considered under special circumstances where good engineering practice is demonstrated. See exhibit 8.1 Wet basin design.~~
- (4) ~~Exhibit 8.1 Wet basin design~~



- (5)(3)
- (6)(4) Cleaning. The basins shall be designed to include forebays, sediment basins, etc. to control sediment traps in all inlets. ~~Sediment traps shall be designed to permit periodic cleaning and maintenance. A basin maintenance~~ The operation and maintenance plan shall be developed to ensure that the discuss how design depths of the basin will be maintained ~~remain~~ over time.

#### (D)(K) Building Regulations

- (1) Roof-Top Storage. Roof storage shall only be allowed to accommodate Water Quality Volume treatment. Detention storage requirements may be met either in total or in part by detention on flat roofs. Design specifications of such detention shall be a part of the site plan review process. These specifications shall include the depth and volume of storage, design of outlet devices and down drains, elevations of overflow scuppers, design loadings for the roof structure, and emergency overflow provisions. Rooftop storage shall not be permitted to drain directly into sanitary sewers or streets.
- (2) Parking Lot Storage. Paved parking lots may be designed to provide temporary detention storage of stormwater on a portion of their surfaces not to exceed fifty twenty five (5025) percent. Outlets shall be designed to empty the stored waters slowly, and depths of storage must be limited so as to prevent damage to parked vehicles, 9 inches or less. Storage areas shall be posted with warning signs



~~and shall be designed to fill to maximum depth in not less than two (2) hours.~~

- (3) Underground Storage. All or a portion of the detention storage may ~~also~~ be provided in structurally adequate underground detention facilities. Design must account for high water table conditions.

~~(E)~~(L) Stormwater Storage shall be permitted in the floodway fringe or setback area. Stormwater Storage shall not be permitted in the stream channel, mapped floodway, or buffer.



### Section 8. Maintenance of Facilities

The owner of the property shall be responsible for the maintenance of all stormwater detention facilities. For cluster and planned developments, the developer shall be responsible for the maintenance of all improvements until such time as eighty (80) percent of the development is completed or until such time as eighty (80) percent of the lots in the development have been sold or rented. The transfer of these improvements for the purpose of maintenance by the homeowners shall not be effected until the developer has received final approval, final inspection, and a certificate of compliance from the County. Thereafter, any retention and detention improvements shall be maintained in perpetuity and cannot be developed for any other use which would limit or cause to limit their use for detention. Detention facilities maintenance shall be placed as a deed restriction to guarantee the proper maintenance and function of detention basins.

### Section 9. Inspection of Facilities

The developer's ~~e~~Engineer shall be required to inspect all drainage facilities under construction and post construction. Prior to occupying the building or premises, ~~if the Zoning Administrator determines a need~~, the owner's Engineer shall submit as-built drawings of the stormwater detention facilities to Polk County. Drawings must bear the certification of a registered professional engineer stating the detention facilities will perform in accordance with the previously submitted design plans and computations. In addition, a registered engineer, employed by the County, may inspect all drainage facilities while under construction and post construction. When facilities are not constructed according to approved plans or maintained to comply with this ordinance, the County has the explicit authority to compel compliance and require correction of any situations which are not according to the Engineer's certified plans and computations. approved plans.

