

## **PROCEDURE FOR ROADSIDE DITCH CLOSURE PERMITTING**

### **Step 1**

Pick up application from the County Engineer's office located in the Annex building, 2<sup>nd</sup> floor, located at 505 South Commerce Avenue, Sebring.

### **Step 2**

When completed, take to Highlands County Health Department to have plan approved by the Environmental Services Director. Be sure to include catch basin and septic drain field on Page 2 of permit.

### **Step 3**

Return the application to the Engineering office. The application will then be sent out to the R&B Department for their approval. After receiving the permit back, the driveway inspector will then go do a preliminary inspection and draw on the permit what needs to be done.

### **Step 4**

After receiving the permit back from the inspector, within 5 days of submittal, the County Engineer will review for approval. Permittee will then receive copy of permit by mail. Do not begin construction until you have received approved plans by the County Engineer's office.

### **Step 5**

The permittee is to call the County Engineer's office, (863) 402-6877, when ready for grades and before covering the culvert.

### **Step 7**

When construction complete, the permittee is to call the County Engineer's office for final inspection.

## **SECTION THREE: DRAINAGE SYSTEM DESIGN AND CONSTRUCTION STANDARDS**

### **DIVISION ONE: Technical Specifications**

**03.100. General:** The standards, regulations and procedures set forth herein represent the present stormwater management practices of the County. The contents of these regulations shall not be construed as a guarantee against all stormwater damage, but as a means to minimize the extent of apparent stormwater hazards to the public. These are minimum standards only and do not relieve the owner/developer or his engineer of record from their designated responsibility to meet the intent of these regulations, and to protect the rights of surrounding property owners and the public interest, in accordance with good engineering practices.

**03.101. Stormwater Management Systems:** 12.12.400 of the Highlands County Code of Ordinances, Land Development Code requires a Stormwater Management Plan for Commercial Structures and Subdivisions and detailed instructions for preparing and submitting a Stormwater Management Plan.

**03.102. All Systems:** Whenever stormwater runoff is designed to enter any body of water, including roadside swales, special engineering features designed to remove oils, suspended solids, and other objectionable materials shall be required. To the extent possible, designs shall include methods to retain stormwater in natural recharge areas.

#### **03.103. Drainage Design:**

**A. General:** In addition to meeting the requirements of these regulations, the design and performance of all stormwater management systems shall comply with applicable State regulations (Chapter 62-25, F.A.C.), requirements of SWFWMD (Chapters 40D-4 and 40D-40, F.A.C.), and/or SF WMD (Chapters 40E-4 and 40E-40). All development shall provide detention/retention systems in compliance with these State, District, and County requirements.

**B. Controlling Rules:** It is the intention of these regulations that there be no conflict between County requirements for stormwater design, retention, and management and those of the Florida Department of Environmental Protection and the Southwest Florida Water Management District or South Florida Water Management District, but should a discrepancy arise, the most stringent rule shall control.

**C. Drainage Easements:** All drainage swales, ditches, channels, closed storm drainage conduits, and detention/retention ponds which are designed to serve platted subdivisions and other dedicated public road rights-of-way shall lie within dedicated public drainage easements on or across private property. Such easements shall be provided and dedicated to the public as a condition to recording final plats. Unless there is no alternative, the County will not accept fee simple title to drainage

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STANDARDS****Table of Contents**

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**5. Minimum Right-of-way or Easement Widths:** A minimum right-of-way or easement of 30 feet width shall be provided for access to any runoff detention/retention basin from a dedicated road or street. In addition, a continuous 15 foot wide border serving as an access maintenance area around the perimeter of the basin shall be included in the basin area.

**D. Frequency:** The system shall be designed for a storm event having a frequency and duration as required by the appropriate water management district.

**E. Water Quality:** All development shall provide for the minimum water quality treatment volumes as prescribed by the appropriate water management district. Where the water management district is requiring, due to the total project area, impervious surface, etc., treatment for water quality and not water quantity, the same will be allowed by the County.

**F. Runoff:** Runoff and routing analysis shall be based on current hydrological procedures. Computations shall include a tabulation of inflow, discharge, storage capacity, minimum and maximum water depth and retention/detention time. Runoff is to be calculated using intensity minus abstraction. Basic hydrological calculations shall be based on commonly accepted procedures such as those of:

**1. Natural Resource Conservation Service (N.R.C.S.):**

- a. *Urban Hydrology for Small Watersheds*, U.S. Department of Agriculture, S.C.S. Technical Release No. 55.
- b. *National Engineering Handbook, Section 4, Hydrology*, U.S. Department of Agriculture, S.C.S.

**2. Rational Method:**

- a. *Drainage Manual*, Florida Department of Transportation.
- b. Standard Engineering Texts.

**3. Other Methods:** Other methods as accepted by good engineering practices and the water management district having jurisdiction.

**4. Runoff Coefficients:** Ultimate land usage shall be assumed for selection of proper runoff coefficients or curve numbers within the basins involved. Weighted runoff coefficients or curve number shall be applied where different coefficients or curve numbers apply within the areas comprising the basin.

facilities outside of road rights-of-way, nor will it maintain such facilities except on an as-needed basis to assure proper function and operation of a road right-of-way drainage system after the road itself has been accepted for maintenance. The minimum easement widths shall be as follows:

	Top of Bank Width	Maintenance Width	Minimum Easement Width
Channels & Ditches	25 feet or greater	25 feet each side	Varies - 50 feet plus top of bank width
Ditches	Less than 25 feet	25 feet one side only	Varies - 25 feet plus top of bank
Swales (except in Right-of-Way)			15 feet
Pipes & Culverts			20 feet minimum
Detention/Retention		15 feet each side	Varies - 30 feet, plus top of bank width. Connected to Right-of-Way by 30 foot easement.

**1. Channels:** Conveyance facilities having a minimum depth of 6 feet and a minimum bottom width of 10 feet. Side slopes shall not exceed a ratio of 3 feet horizontal to 1 foot vertical.

**2. Ditches:** Conveyance facilities having a minimum depth of 1-½ feet, a maximum depth of 6 feet, and a maximum bottom width of 10 feet. Side slopes shall not exceed a ratio of 3 feet horizontal to 1 foot vertical.

**3. Swales:** Vee-shaped conveyance facilities having a maximum depth of 1-½ feet and side slopes not to exceed 4 feet horizontal to 1 foot vertical.

**4. Pipes and Culverts:** Easement widths involving drainage pipe or culvert conveyance facilities shall have a width of 20 feet or 8 pipe diameters, whichever is greater. Centerline offset of pipe shall be a minimum of 5 feet, or 2 pipe diameters from either side of easement line.

these calculations shall be included with the drainage plan indicating the type of erosion control that will be required.

**4. Ditches and Channels:** Ditches and channels shall comply with minimum and maximum design velocities and erosion protection requirements of this paragraph. Soil conditions shall be considered in setting side slopes. Paved ditches or stabilized banks shall be provided to protect against scour where allowable velocities are exceeded. Concrete retaining walls may be used as an alternate to provide adequate capacity through constricted areas subject to approval of the County Engineer.

**5. Use of Open Channels:** Open channels and ditches in excess of 3 feet in depth within 100 feet of residential subdivisions or school sites or running through residential blocks may be permitted by the County Engineer when site conditions warrant and where designed to protect the public health and safety. Unless otherwise permitted, drainage plans shall provide that stormwater be collected in properly designed systems of underground pipes, inlets, and other appurtenances and be conveyed to an ultimate outfall beginning 100 feet beyond the outer edge of the division of land or school site, or at the nearest natural outfall. If permitted, open drainways shall retain natural design characteristics and be so designed and protected that they do not present a hazard to life and safety.

**6. Scour and Erosion:** Protection against scour and erosion shall be provided by sod or bagged concrete riprap for erosion protection of ditches and waterways. Concrete shall be used for the larger structures. Additional techniques that may be used are listed below:

- a. Paved gutters, ditches, channels, or channel side slopes using concrete or riprap;
- b. Sod cover in gutters and ditches;
- c. Wide channels with shallow bottom slopes using check dams; and
- d. Culverts with a break in grade to hold outlet velocity within the allowable limits; (when this method is employed, the position of the hydraulic jump must be determined to insure uniform flow occurring within the culvert).

**7. Erosion Control:** The development shall not allow erosion to affect or damage any adjacent areas. The Project Engineer shall show on the plans the proposed method of erosion control to be used within the development during construction. The Project Engineer must design sediment basins, strawbale dams, velocity checks, hydroseeding applications, etc., to confine all erosion within the limits of the developed site.

**G. Conveyance Facilities:**

**1. General:** General stormwater conveyance facilities include swales, ditches, channels, culverts, storm sewer, inlets and weirs. The collection of stormwater runoff shall be by positive gravity means without the use of siphons, pumps or similar devices.

**2. Onsite Percolation:** Certain soil types having excessively drained to moderately well drained characteristics comprise the prime aquifer recharge area of Highlands County. Development of land located on such soil shall include the design of stormwater systems which provide for onsite percolation of all rain water back into the ground to the same extent as when the land was in its undisturbed state.

**3. Roadside Swales:**

a. Roadside swales within street rights-of-ways shall have side slopes no steeper than 4 feet horizontal to 1 foot vertical; depths shall not exceed 24 inches below the edge of the shoulder unless otherwise approved by the County Engineer.

b. Runoff may be accumulated and carried in the swales in the right-of-way up to, but in no case above, the point where flooding of the shoulders or roadside property would occur. Water in excess of that quantity shall be diverted from the roadside swales and carried away by storm sewers, ditches or other approved means. Roadside swales shall be sloped to drain dry, be seeded and mulched, sodded, or paved and comply with minimum and maximum design velocities as follows:

<b>Allowable Velocity</b>	<b>Type of Cover</b>
0 - 2 ft/sec	Seeding & Mulching
> 2 - 6 ft/sec	Sodding
> 6 - 10 ft/sec	Asphalt or Concrete Ditch Bottom or Culverts
> 10 ft/sec	Concrete Ditch Bottom or Culverts

c. **Velocity Calculations:** Manning's Equation and/or other acceptable engineering standards and formulae shall be used to calculate swale, ditch, channel, and other waterway velocities, and

**2. Minimum Cover Height:** All pipes and culverts, including side drain pipes and driveway culverts, shall have a minimum cover height as established in the *Roadway and Traffic Design Standards*.

**3. Pipe End Treatments:** Concrete headwalls, either mitered end or straight, are required on certain roads listed in this subparagraph, unless otherwise noted herein. Headwall construction to be in accordance with *FDOT Road and Traffic Design Standards*, latest edition. All pipe end treatments must be selected to satisfy hydraulic suitabilities with proper consideration given to safety, economics, and ease of maintenance. Endwalls are required as follows:

Engineer

- a. Residential Driveways on Local Roads as required by County
- b. Residential Driveways on Collector and Arterial Roads . . . . . Mitered End
- c. All Commercial Driveways . . . . . Mitered End
- d. Side Drains at Road Intersections. (Construction shall be in the right-of-way of the main road across the secondary road.) Mitered End
- e. Cross Drains . . . . . Mitered End or Straight Headwall

**4. Acceptable Pipe Material:** Pipe and culvert material shall be in accordance with current *FDOT Standard Specifications for Road and Bridge Construction*, latest edition, or as approved by County Engineer.

**5. Roadside Ditch or Swale Modifications:** When a property owner desires to close a roadside ditch or swale in front of his property, it shall be modified as described in this Section for underdrains or as approved by the County Engineer. The pipe under the driveway shall be solid and connected to the perforated pipe(s) using the proper bands as described in *FDOT Standard Specifications for Road and Bridge Construction*, latest edition. At least one ditch bottom inlet shall be constructed for each lot or parcel, and inlets shall not be more than 100 feet apart. The proper ditch bottom inlet shall be selected from *FDOT Roadway and Traffic Design Standards*, latest edition. A special residential driveway permit for such modification shall be required. Pipes of dissimilar materials or sizes shall be connected by constructing a concrete band in place having a minimum 1 foot thickness around the pipes and a minimum length of 2-½ feet. See Section Six, of these regulations for typical drawings of *Road Ditch Enclosure* and *Connection of Pipes of Dissimilar Materials*. The County Engineer may approve the use of solid pipe in lieu of perforated pipe where required by the Health Department.

**6. Underdrains:** Where underdrains are to be used in the design of a storm sewer system, the materials and work shall be in compliance with *FDOT Standard Specifications for Road and Bridge Construction*, latest edition, Section 440. All pipe must be perforated and fitted with a filter fabric sock as described in the various



**H. Storm Sewer Systems:** The capacity of inlets should equal or exceed the tributary runoff of their individual drainage areas. The size, type, and location of storm sewer inlets, gratings or other openings into an enclosed storm drainage system shall be in accordance with the Florida Department of Transportation *Drainage Manual*, latest edition, unless otherwise noted below and/or approved by the County Engineer. All systems shall comply with the requirements of the appropriate water management district.

**1. Drainage Structures:**

a.. **Roadside Swales and Ditches:** Grate inlets shall be placed in accordance with good engineering practices so that the accumulation of runoff above the point where flooding of the shoulder or roadway property will not occur. They shall be designed for ease of maintenance.

b. **Roadway Inlets:** Roadway inlets in curb and gutter construction shall be designed and constructed to:

1. Avoid abrupt changes in hydraulic slope and velocity;
2. Limit the quantity of storm sewer water flowing in road to a depth of 1 inch below the crown of local roads and 2 inches below the crown of collector and arterial roads, but in no case shall it flood more than  $\frac{1}{2}$  the width of the outside lane on any road regardless of its functional classification;
3. Prevent design flows across street intersections without valley gutters;
4. Have single wing when gutter flow velocities exceed 5 cfs;
5. Have double wings when gutter flow velocities exceed 8 cfs;
6. Have formed inverts to  $\frac{1}{2}$  the pipe diameter;
7. Have pipes cut flush with inside wall;
8. Have no standing water when not functioning; and
9. Afford ease of maintenance.

**c. Pipe Standards:**

**1. Stormwater Conveyance:** The piping and appurtenances used in the storm water collection system shall be designed in accordance with the FDOT *Drainage Manual*, latest edition, unless otherwise approved by the County Engineer.

**14. Driveway Pipe Schedule:** Driveways across roadside swales may require the placement of a drainage culvert (sidedrain) under the driveway in order not to impede flow in the swale resulting in an increase of backwater onto upstream property. The size of the culvert shall be noted on the improvement plans.

subsections of the FDOT *Standard Specifications for Road and Bridge Construction*, latest edition.

**7. Minimum Pipe Sizes:** Minimum pipe sizes shall be 15 inches except as follows:

- A. Underdrains ..... 6 inches
- B. Box Culverts ..... 3 feet x 3 feet

**8. Pipes on Private Road Rights-of-Way:** Pipes and stormwater systems on private road rights-of-way and related drainage system shall meet the same requirements as those on public facilities.

**9. Pipes on Other Private Property:** Pipes and stormwater systems on private property other than road rights-of-way shall be **exempt from pipe material and size requirements**. The designing engineer shall incorporate standard engineering practices and make his or her own choice of pipe material and pipe size that will be used in the design of parking lots, driveways on private property, and other impervious surface site drainage systems.

**10. Minimum Velocity:** The minimum physical slope in the storm drain that will generate a minimum velocity of 2.5 feet per second (f.p.s.) to prevent deposition and subsequent loss of capacity

**11. Maximum Length between Structures:** The maximum length of pipe without an access structure shall be:

- 15 inch to 18 inch pipe ..... 200 feet
- 24 inch to 36 inch pipe ..... 300 feet
- 42 inch and over and all box culverts ..... 500 feet

**12. Hydraulic Gradient:** The standard hydraulic gradient elevation below the throat of inlets or manholes shall be 1.0 feet. The minimum and maximum allowable hydraulic slopes shall be those that produce the aforementioned minimum and maximum velocities. Manholes may be used as drop structures where necessary to lessen slopes in storm sewers.

**13. Culvert Capacity:** Culvert capacity shall be based on sound engineering practice. Detailed analysis and design shall be based on either inlet or outlet control, whichever is applicable, using appropriate entrance loss, coefficients and culvert nomographs. Culverts shall be designed to discharge a 25 year/24 hour storm utilizing available head at the entrance. Backwater curve data, flood profiles and other hydraulic information along a watershed reach, may be used to establish design water elevation and set the culvert crown elevation.

HIGHLANDS COUNTY TECHNICAL STANDARDS MANUAL

TYPICAL ROADSIDE SWALE/DITCH MODIFICATION  
(For Piping Full Width of Lot)

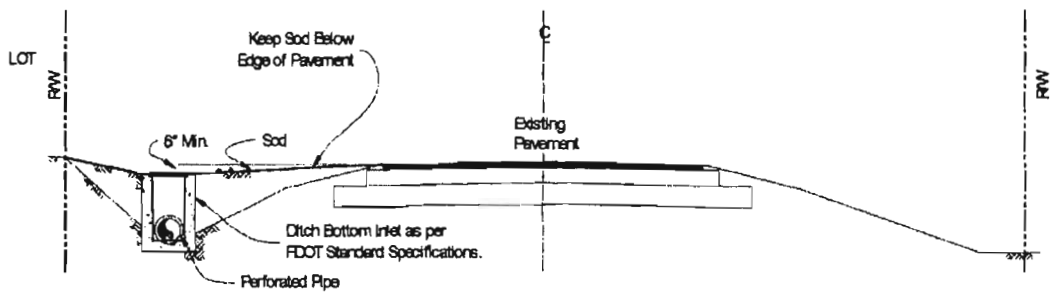
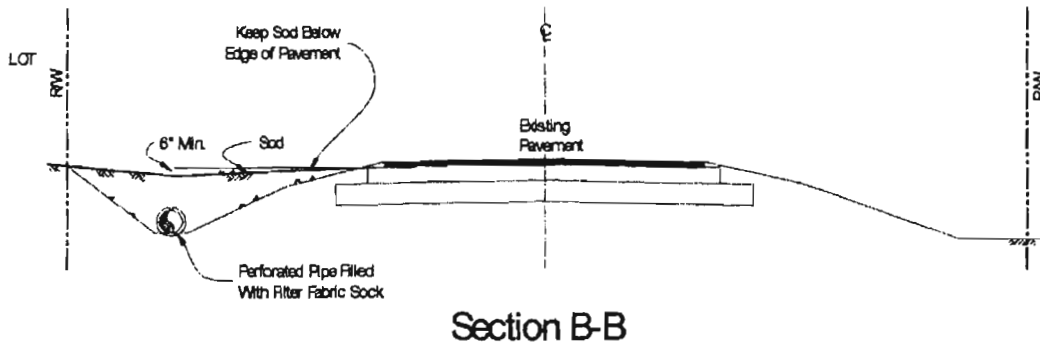


Illustration 6-DD

# ILLUSTRATIONS

## TYPICAL ROADSIDE SWALE/DITCH MODIFICATION (For Piping Full Width of Lot)

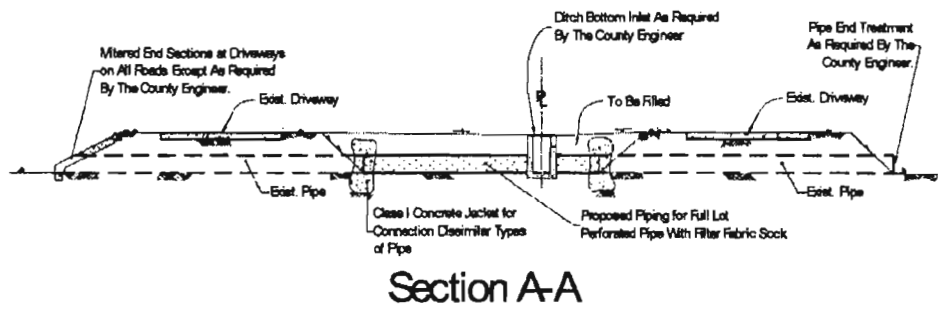
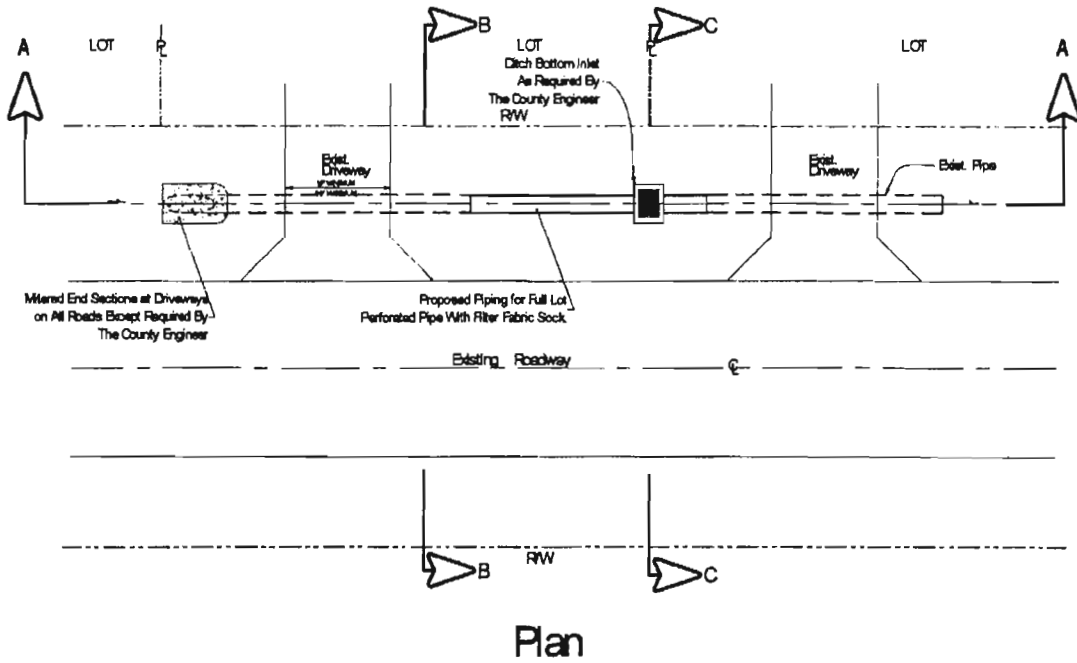



Illustration 6-CC



**HIGHLANDS COUNTY**  
**BOARD OF COUNTY COMMISSIONERS**  
**ENGINEERING DEPARTMENT**

Date: October 8, 2007

From:  Ramon D. Gavarrete, P.E., County Engineer/Utilities Director

Subject: Residential Site Drainage, and Retaining Walls

References: Section 12.09.103, 12.09.105, 12.09.114, 12.09.115, 12.09.116, of the *Highlands County Land Development Regulations (LDR's)*, Current Edition. Section 1806 Florida Building Code (FBC). *Manual of Uniform Minimum Standards for Design, Construction and Maintenance for Streets and Highways (Florida Greenbook)*, Current Edition.

To Whom It May Concern:

Licensed contractors and owner builders are still having applications denied for drainage issues with residential driveway permits in spite of requirements for boundary surveys and increased scrutiny of setbacks by the Zoning Department. The residential driveway permit includes construction of a residential driveway and grading of the lot. **The lot shall be graded in such a manner as to prevent flooding of or from adjacent properties.**

All Driveway Permit applications shall include the following drainage related information, as found in Section 12.09.114 of the *LDR's*.

- Show the general direction of flow across the lot and in the roadside swales and ditches to ensure that the runoff will be conveyed from the lot without flooding adjacent properties, and if applicable to ensure that the grading of the lot is in compliance with an approved stormwater management plan or an improvement plan.
- Provide the maximum proposed finished floor elevation, finished floor elevations of adjacent structures, and elevations of adjacent vacant lots.
- In accordance with the current edition of the *Manual of Uniform Minimum Standards for Design, Construction and Maintenance for Streets and Highways (Florida Greenbook)*, Chapter 3, Paragraph C.7, Geometric Design, Cross-section Elements, show existing elevations along the adjacent paved or unpaved roads.

Where the entire site in older subdivisions is filled for onsite sewer treatment, the lot elevation is often higher than adjacent lots. In order to retain storm water and convey it to roadside swales an unbalanced load retaining wall may be constructed with footings entirely within the site at the property line, in accordance with Section 1806 of the FBC, signed and sealed by a Florida registered professional engineer. In the alternative, as shown in Figure 1805.3.1 of the FBC, a smaller building or a larger site may be utilized to allow swale construction entirely on site, to prevent flooding adjacent properties.

**However, a retaining wall may not be constructed where drainage easements exist within a subdivision.** In this case the owner/builder should design a mound septic system and install a swale type storm water conveyance system with the center of swale being the property line. In cases where adjacent owners have constructed a fence or vegetative buffer encroaching within the adjacent drainage easement, allow code enforcement officials time to notify the adjacent owner to remove any obstacles to swale construction.

If you have questions regarding the residential site drainage requirements of the LDR's please contact this office.

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