Bradfordville Sector Plan

Appendices

Appendix 1:
Final Report of the
Bradfordville Stormwater Study
Peer Review Group

Final Report of the
Bradfordville Stormwater Study
Peer Review Board

to the
Leon County Board of County Commissioners

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The Bradfordville Stormwater Study Peer Review Board (PRB) was appointed by the Leon County Board of County Commissioners on August 31, 1999, to provide an independent review of the stormwater study prepared for the county by Environmental Research & Design, Inc. (ERD). The PRB conducted a series of five open meetings between October 1999 and May 2000 in which it reviewed the data, analytic methods, findings, and conclusions of the stormwater study prepared by ERD. A number of recommendations were provided to ERD for correcting minor errors and clarifying information in their March 2000 draft report.

The PRB conducted a public information meeting on March 16, 2000, at which preliminary findings were presented by ERD and questions posed by members of the public were answered by ERD staff and members of the PRB. In addition, the PRB conducted a workshop with the Board of County Commissioners on April 18, 2000, at which ERD and the PRB made formal presentations and responded to questions from commissioners.

Two memoranda, dated April 18 and May 9, 2000, have been transmitted to the Board conveying the PRB's preliminary findings concerning the stormwater study prepared by ERD. This report constitutes our final statement of findings and conclusions. It does not alter any of the major findings we reported in the two preceding communications.

Major Findings

The March 2000 *Bradfordville Stormwater Study* prepared by Environmental Research & Design, Inc. (ERD) provides important new insight into the state of lakes within the Bradfordville area and the probable effects of stormwater generated by new development on

those lakes. ERD performed competent and credible analysis of the available data and has drawn reasonable conclusions within the constraints imposed by time, money, weather conditions during the course of the study, and the data they were provided by the county. The net effect of these constraints is both a considerable amount of uncertainty in estimating the impacts of future development on the water quality of the Bradfordville lakes and very possibly an under-estimate of those impacts.

(1) Given these limitations, the PRB believes that it is prudent for the county to adopt performance standards based on the design criteria recommended by ERD in section 7.3.4 of their March 2000 report. These constitute a prudent approach to minimizing the negative effects of future development on the lakes within the study area. In our opinion, less stringent standards should not be considered for any portion of the study area without further analysis that addresses the limitations of the study. Details of our findings on these issues are presented in the next section.

(2) It is important that the proposed standards be applied uniformly throughout the study area because of the poor water quality of most of the lakes, their hydrologic interconnections, and the projected impacts of future development on the lakes.

(3) The recommended design criteria for new development will not be sufficient to completely prevent deterioration of lake water quality. They will slow the eutrophication process to varying degrees depending upon the relative contributions of nutrients from new versus existing development within individual lake watersheds.

(4) Stormwater loadings will continue to be generated by existing residential and commercial development. Thus, the new standards will have minimal impacts on lakes that have predominantly built-out watersheds. They will not provide the means to enhance lake water quality and reverse the degraded condition of lakes that already are experiencing eutrophic or hypereutrophic conditions as a result of existing development. Even if no new development occurs, the quality of water in these lakes will continue to get worse unless an effort is made to improve runoff from existing developments so that it is similar in quality to that from undeveloped sites as well.

(5) The full protection afforded by any set of performance standards will not be realized unless the County Commission provides the legal authority and resources to county staff to monitor stormwater management systems once they are constructed and to hold property owners accountable for proper operation and maintenance. Aggressive monitoring of stormwater treatment systems is appropriate not just in Bradfordville, but throughout the county. This will require additional county staff and resources.

(6) Given the uncertainties in the ERD study as well as the uncertainties of designing and operating stormwater treatment systems, it is very important that additional monitoring be conducted of the treatment efficiencies of stormwater systems constructed under the

county's new standards and the water quality conditions of the Bradfordville lakes over the next five to ten years to determine the adequacy of the protection measures that are adopted by the county.

(7) Because erosion and sedimentation can be the first and longest lasting product of new development, the county should pursue ERD's recommendations concerning development of proper erosion and sediment control plans for construction sites

(8) Because existing development has been and will continue to be a major source of pollutants entering the lakes in the Bradfordville area, initiatives must be taken to reduce loadings from these sources if the Comprehensive Plan objectives of protecting and enhancing lake water quality are to be attained. We recommend that the county pursue the specific initiatives described by ERD as well as others which we list in our Conclusions and Recommendations

(9) Further direction is needed to staff for acting on ERD's findings and recommendations concerning needed hydrologic model improvements and for initiating Phase II of the stormwater study to address the need for additional policies or regulations to reduce the cumulative flooding impacts from new development as required under Sections 8.1 and 8.2 of the Comprehensive Plan and the Publix mediation agreement.

Detailed Findings

Physical and Chemical Characteristics of the Bradfordville Area Lakes

(1) Despite a number of limitations, the water quality data analyzed by ERD are sufficient to conclude that the majority of the lakes in the Bradfordville study area are likely to be quite sensitive to increases in stormwater loadings of nutrients that would result from future changes in land use. It is likely, however, that the ERD analyses under-estimate the sensitivity of many of the lakes to future stormwater discharges.

(a) The water quality sampling conducted by ERD was limited in scope and duration and compromised in part by drought conditions during much of the study. They did, however, make use of supplemental historic data that were provided by the county and extended their sampling beyond the minimum required under their contract for the four designated lakes.

(b) ERD's reliance on chlorophyll a concentrations as the single indicator of trophic state represents a substantial simplification of the complex factors that determine the ecologic conditions of lakes and probably under-estimates to some extent the water quality problems in the lakes in the area. In part, however, this under-estimation is an inherent limitation of the use of trophic state indicators that was knowingly built into

the scope of services that governed ERD's work.

(c) The time of year during which the study was conducted and the time of day when most water quality samples were taken may have resulted in under-estimates of the occurrence of low or no dissolved oxygen conditions at the interface between the water column and lake sediments. As a result, existing or potential nutrient releases from bottom sediments may have been under-estimated and, therefore, the impacts on the lakes of additional loadings of nutrients from stormwater may have been under-estimated.

(2) Of 15 lakes for which water quality was studied in some detail, only four could be characterized as predominantly oligotrophic.[1] Two lakes have trophic states at the upper end of the oligotrophic range; four of the lakes are in the mesotrophic range; and five are at or above the mesotrophic-eutrophic boundary. Those that are at or near this boundary are likely to be more vulnerable to additional stormwater loadings of nutrients, particularly where the lakes have small volumes relative to the size of their watersheds.

(3) History and the current status of the lakes indicate that there is a general progression toward higher trophic states and that further stormwater loadings of nutrients will accelerate that progression. Of those lakes for which water quality data are available for a period of several years, four exhibit a trend toward a eutrophic or even hypereutrophic state over the past five to ten years - Lakes Tom John, Arrowhead, Dianne, and Monkey Business. These trends are statistically significant in all but Lake Tom John for which there were insufficient data for estimating a trend line (ERD March 2000, Table 2-22, p. 2-75).

Only three lakes exhibit trophic stability over this period - Pine Hill, McBride, and Petty Gulf. The most dramatic change appears to have occurred in Lake Arrowhead which shows evidence of having moved from oligotrophic to eutrophic conditions in five years or less.

(4) The apparent rapid rate of eutrophication in Lake Arrowhead has not been explained, but there appears to be a strong temporal correlation between water quality degradation in the

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[1] Oligotrophic lakes have low supplies of nutrients, low levels of biological productivity, and small quantities of algae and aquatic plants; the water in such lakes is typically clear. Eutrophic lakes have substantially higher supplies of nutrients with correspondingly higher levels of biological productivity; they may have extensive populations of rooted or floating aquatic plants or may experience nuisance algae "blooms." Mesotrophic lakes have intermediate conditions that are typically viewed as acceptable in terms of aesthetics and the quantity and quality of plants and fish. Hypereutrophic lakes have excessive aquatic plant or algae populations and may experience nuisance conditions such as fish kills and odors from decaying organic matter.

lake and construction of the Publix shopping center. Two of the stormwater detention ponds for that development discharge into Lake Arrowhead. The Publix shopping center has been the only new development in the Lake Arrowhead basin since 1995.

(5) It has been reported that substantial quantities of water were pumped into Lakes Carolyn and Anna during the period when water quality sampling was conducted by ERD. This may account for one or more of the water quality samples indicating oligotrophic conditions in these two lakes (see ERD March 2000, Figure 2-5, p. 2-59, and Figure 2-7, p. 2-61).

Land Use in Bradfordville Area Drainage Basins

(1) Current plans for development in Bradfordville are projected to result in conversions of undeveloped land to low-density residential development and, to a lesser extent, to commercial use.

(2) However, the existing land use information developed by county staff for the study was based on 1991 land use and, therefore, does not accurately depict land development conditions at the time that ERD analyzed lake water quality and stormwater loadings within the Bradfordville Lake watersheds. The use of 1991 data under-estimates the extent of existing development. As a result, loadings and discharge volumes are under-estimated for current land uses, and the estimated difference in loadings between the projected build-out scenario and current development has been over-estimated. The extent to which this affects subsequent calculations and figures in Chapters 4, 5, and 8 is unknown.

Hydrologic Inputs to Bradfordville Area Lakes

(1) All of the lakes in the study area are significantly influenced by stormwater runoff, both from direct sheetflow, and in some lakes, indirectly from inflow from upstream lakes to which they are connected. The importance of runoff in the general hydrologic budgets of these lakes makes them sensitive to land uses that alter the volume and chemical characteristics of runoff from those of undeveloped land.

The hydrologic budgets of the Bradfordville lakes are variable. Of the 13 lakes for which a detailed budget was prepared, nine lakes have runoff as their primary source of water; for several of these, runoff is the overwhelmingly dominant source of water. The remaining four lakes have inflow from upstream lakes as their primary source of water, with runoff as their second-most important source. These lakes receive water from lakes that themselves have runoff as their primary water source. ERD's field measurements indicate that seepage is the least important source of water for most lakes, although it is not negligible for the majority of them.

(2) None of the lakes in the study area appear to have been designed and engineered for storm water treatment. Many have been altered to enhance storm water rate control, but none have

structured flow paths and biological/chemical treatment systems so as to provide water quality improvement. Thus, regardless of origin, water quality in all of these lakes must be protected to prevent down-stream impacts.

(3) Most of the data for this study were gathered during the latter portion of a five-year period of below-normal rainfall. Because of the lack of rain and apparent low ground water levels, the amount of measured seepage to water bodies was very likely lower than normal. It is reasonable to assume that average or above average rainfall will result in higher seepage volumes and nutrient loadings including those resulting from subsurface wastewater disposal systems in nearby developments.

Nutrient and Pollutant Inputs to Bradfordville Area Lakes

(1) Several of the nutrient input estimates are uncertain because of data limitations. Details are explained further below.

(a) ERD was forced to use literature values to estimate runoff quality from undeveloped land because of low rainfall during the field study.

(b) ERD's estimates of phosphorus loadings from rural residential sites appear anomalous and require further verification.

(c) Low rainfall probably resulted in under-estimates of nutrient inputs from subsurface wastewater disposal systems through ground water seepage and "breakouts."

(d) ERD's method of sampling ground water seepage may have over-estimated seepage inputs and under-estimated nutrient recycling from sediments.

(2) Different land uses (highway, single family, rural residential, commercial) generate storm water runoff with different chemical characteristics. ERD measured the concentrations of suspended sediments, biochemical oxygen demand (BOD), nitrogen, and phosphorus in runoff samples from sites selected to represent these four land use categories. Because of the low rainfall conditions during the field study, no samples were collected for water quality analyses from the chosen undeveloped land site. ERD therefore used data from several studies at other locations in Florida and Texas to estimate the runoff characteristics for undeveloped land in the Bradfordville area (ERD March 2000, p. 5-18). Additional field studies under more typical rainfall conditions would be needed to verify that these estimated loadings are representative of undeveloped land in Bradfordville.

(3) ERD's data indicate that total suspended solids are highest for highway, which is followed in rank order by single family, commercial, and rural residential. Rural residential has a much lower and more consistent concentration of suspended solids than do the other categories.

BOD concentration is substantially higher and more variable for the commercial category than the other three categories which do not differ substantially among themselves in this measure.

Commercial use also produces runoff with higher and more variable concentrations of total nitrogen than do any of the other categories which also do not differ substantially.

The estimated total phosphorus concentration in runoff from undeveloped land is lower than that measured for any of the developed land categories. ERD's field data indicate, however, that the concentration of total phosphorus is much higher in the runoff from rural residential use than from single family use, which in turn is higher in total phosphorus concentration than highway or commercial uses. This is contrary to what would be expected (see ERD March 2000, Table 5-6, p. 5-21) and remains unexplained. It may be an artifact of the specific sampling site used in the study to characterize the runoff from rural residential land uses.

(4) ERD's data indicate that the overwhelming majority (over 75% in all cases) of the annual input of total phosphorus to the Bradfordville lakes comes from runoff. Seepage constitutes 3% or less of total phosphorus inputs to all lakes.

Runoff or transfer from upsteam lakes is the major source of nitrogen influx into the lakes. However, seepage is a substantial source of nitrogen input (20-30%) in many lakes and is almost as critical as runoff in Lake McBride (39% seepage versus 42% runoff).

(5) Much of the existing development uses septic tanks and drainfields to dispose of wastewater. Under average or above average rainfall conditions, groundwater levels and the amount of seepage into lakes are likely to be higher than those measured during the course of the ERD study. Under these conditions there is a greater likelihood that leachate from drainfields will move with ground water seepage or, where surface "breakouts" occur, with surface runoff. Thus the effects of subsurface wastewater disposal from existing (and new) development may have been under-estimated.

(6) The estimates of nitrogen and phosphorus inputs from seepage generated from the sampling methods employed by ERD most likely include both nutrients carried by ground water and nutrients released into the pore spaces of lake sediments under reducing conditions. To the extent that nutrient recycling has been under-estimated, the analyses under-estimate the effects of additional stormwater loadings.

(7) PRB members William Cooper and William Landing estimate that phosphorus is probably the limiting nutrient to biological productivity in most of these lakes, in other words, lake

water quality will be most sensitive to increases in phosphorus loadings.[2] Furthermore, it is the parameter that drives the storm water treatment performance standards evaluated in Chapter 7 (ERD March 2000, p. 7-23).

The probable greater importance of phosphorus suggests that the over- or under-estimation of nitrogen loadings from seepage probably has little effect on the final conclusions and recommendations of the ERD study. However, given the uncertainty about the estimates of nutrient loadings from both undeveloped land and rural residential land, any consideration of performance standards less stringent than those recommended by ERD should be informed by additional efforts to verify the actual storm water loadings of phosphorus from these land use categories.

Existing Stormwater Controls and Regulations

(1) The performance of the Publix stormwater treatment ponds during the study was atypical of a dry detention facility with filtration (ERD March 2000, pp. 6-22 - 6-24). This was likely due to the manner in which it was constructed but also may have resulted from the drought conditions during which its performance was monitored. As a result, ERD used data from one study of a dry detention facility with filtration in Orlando in which the underdrain was installed below the ground water surface elevation (Table 6-10, ERD March 2000, p. 6-38) and data from studies of dry detention facilities without filtration (Table 6-11, ERD March 2000, p. 6-40) to estimate the probable performance of dry detention systems with filtration in Leon County (p. 6-41).

Evaluation of Assimilative Water Quality Models

(1) PRB member Joseph Travis conducted a review of the methods upon which the Eutromod program models used by ERD are based. He determined that the author, Reckhow, "uses excellent statistical methods and has a history of developing good, rigorous empirical statistical models of lake parameters." Based on this review, Travis expressed confidence in ERD's Eutromod model results and the error bars reported in Figure 8-1 (ERD March 2000, p. 8-28).

(2) The point estimates and error bars shown in Figure 8-1 suggest that there is not likely to be any significant difference in water quality impacts in three of the four designated lakes from performance standards based on runoff quantity and quality from undeveloped land

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[2] ERD uses the ratio of total nitrogen to total phosphorus to assess whether biological production in lakes is likely to be limited by either of these nutrients (ERD March 2000, p. 2-48). PRB member William Cooper argues that a better measure is the ratio of available nitrogen to available phosphorus and that calculation of these ratios is likely to show that most lakes in the area are limited by phosphorus.

("existing"), single-family residential, or rural residential. In the case of Lake McBride, the point estimates show greater differences, but the error bars still overlap considerably.

Recommended Stormwater Standards

(1) PRB member Timothy Waddle reviewed the performance efficiency analyses presented in section 7.3.3 of ERD's March 200 report and concluded that the design criteria recommended by ERD (section 7.3.4) should accomplish the stated objective of a 95% reduction in phosphorus loading (p. 7-23), if stormwater treatment systems are properly constructed, operated, and maintained.

(2) Section 8.2 of the Comprehensive Plan stipulates that the stormwater management plan shall protect and enhance the water quality of natural surface water bodies within the Bradfordville study area.

The design criteria recommended by ERD (March 2000, section 7.3.4) will not achieve complete protection against further degradation. They will not completely eliminate stormwater loadings in excess of those from undeveloped land. Storms that exceed the design criteria will convey some additional pollutants to receiving waters, although the majority of pollutants are assumed to be flushed out by the runoff resulting from the initial 4 inches of rainfall (ERD March 2000, p. 6-57).

It is important, therefore, to recognize that the recommended design criteria will not be sufficient to completely prevent deterioration of lake water quality. They will slow the eutrophication process to varying degrees depending upon the relative contributions of nutrients from new versus existing development within individual lake watersheds.

(3) Stormwater loadings will continue to be generated by existing residential and commercial development. Thus, the new standards will have minimal impacts on lakes that have predominantly built-out watersheds, e.g. Lakes Carolyn and Warner in Basin 2 and all of the lakes in Basin 3 except the "farm pond" (Table 3-3, ERD March 2000, p. 3-19).

(4) The water quality data in ERD's report indicate that a number of the lakes already have degraded water quality. The recommended design criteria for new development will not provide the means to reverse this condition and enhance lake water quality.

Current water quality conditions were primarily caused by existing residential developments, with the possible exception of Lake Arrowhead. Even if no new development occurs, the quality of water in these lakes will continue to get worse unless an effort is made to improve runoff from existing developments so that it is similar in quality to that from undeveloped sites as well.

Recommended Hydrologic Model Improvements

(1) Task 10 of ERD's scope of services directed the consultant to review, summarize, and evaluate existing studies of stormwater hydrology and conveyance for all of the study basins and to describe and estimate the costs of any additional analyses needed to predict the potential for increases in the frequency, duration, stage, or extent of flooding within the study basins as a result of stormwater discharges from new development. This work was completed by Camp Dresser and McKee under subcontract with ERD. Recommended initiatives are presented in Section 7.4 of the draft final report (ERD March 2000), but cost estimates have not yet been developed.

Conclusions and Recommendations

(1) **Given the multiple sources of uncertainty in the data used** in the analyses conducted in this study, the PRB believes that **it is prudent for the county to adopt performance standards based on the design criteria recommended by ERD** (March 2000, section 7.3.4). These are conservative standards that substantially reduce the likelihood that stormwater discharges from future development will further degrade the lakes in the Bradfordville area. A summary of the major sources of uncertainty follows:

- probable under-estimation of the existing trophic states of many of the lakes that would result in under-estimates of the negative effects of additional stormwater discharges to them;

- use of 1991 data by county staff to characterize existing land use results in over-estimates of the effects of stormwater from new development on lake water quality;

- probable under-estimation of seepage and runoff loadings of nutrients from subsurface wastewater disposal systems because of low rainfall during the field studies that would result in under-estimates of the effects on lake water quality of these loadings from existing and new development;

- possible under-estimation of nitrogen releases from lake bottom sediments that would result in under-estimates of the negative effects of additional stormwater discharges to the lakes;

- the necessity of relying on literature estimates of nutrient loadings from undeveloped land that results in uncertainty about correct loadings from such land;

- apparently aberrant data from the rural residential site sampled during the study which probably are over-estimates of the phosphorus loadings from typical rural residential areas; these likely result in under-estimates of the relative impacts of more intense

development, i.e. single-family residential, commercial, and highway;

- substantial variances in runoff volumes and runoff concentrations that are reflected in the error bars in Figure 8-1 (ERD March 2000, p. 8-28).

(2) **If a stormwater performance standard is considered that provides less treatment than the recommended design criteria, the following measures are recommended** to minimize the likelihood that lake water quality will be compromised.

(a) The assimilative capacity models should be rerun using corrected data for existing land use and corrected values for all variables that are affected by those land use data.

(b) The loading calculations should be redone to determine the sensitivity of the study's conclusions to the apparently anomalously high phosphorus loadings measured from rural residential development and the use of a mean value derived from the literature to estimate nutrient loadings from undeveloped land.

(3) **It is important that the proposed standards be applied uniformly throughout the study area** because of the poor water quality of most of the lakes, their hydrologic interconnections, and the projected impacts of future development on the lakes.

(4) Reducing the amount of allowable impervious area is one of the most effective management strategies for protecting surface water quality. **Sole reliance on stormwater treatment performance standards has important implications for protecting the water quality of the Bradfordville lakes**:

(a) First, as noted, **there will be rainfall events that exceed the capacity of the stormwater management systems** that are designed to meet whatever performance standard is selected. Because many of these lakes act as sinks for nutrients, that is they retain most of what enters them, over time the cumulative impact of those storm events will likely result in measurable water quality degradation.

(b) **Stormwater management systems must not only be properly designed, they also must be properly maintained and operated.** The full protection afforded by any set of performance standards will not be realized unless the County Commission provides the legal authority and resources to county staff to monitor stormwater management systems both during and after construction and to hold property owners accountable for proper operation and maintenance. Aggressive monitoring of stormwater treatment systems is appropriate not just in Bradfordville, but throughout the county. This will require additional county staff and resources.

(c) Uncertainty is inherent to the science of predicting how aquatic ecosystems will react to changes in inputs from stormwater and other sources. Uncertainty also is inherent to the

design and operation of stormwater management systems. The limited duration of the ERD study, the drought conditions under which it was conducted, data limitations, and the resulting constraints on properly modeling the ecosystems of the lakes within the study area add further uncertainty to the conclusions that can be drawn. **It is**, therefore, **very important that additional monitoring be conducted of the treatment efficiencies of stormwater systems constructed under the county's new standards and the water quality conditions of the Bradfordville lakes** over the next five to ten years to determine the adequacy of the protection measures that are adopted by the county.

The Lake Watch Program parameters are a good and inexpensive start for monitoring water quality impacts. Turbidity and summer dissolved oxygen profiles also should be included. All parameters should be evaluated separately and seasonally instead of combined as mean TSI values. All water bodies should be monitored by the county until they can get into the Lake Watch Program.

(5) Erosion and sedimentation can be the first and longest lasting product of new development. Appropriate measures taken before construction begins, with periodic maintenance throughout the construction process, can help to assure that sediments leaving a developed site will be kept to a bare minimum. **The county should pursue ERD's recommendations concerning development of proper erosion and sediment control plans for construction sites** (ERD March 2000, section 7.2.2.1).

(6) Because existing development has been and will continue to be a major source of pollutants entering the lakes in the Bradfordville area, **initiatives must be taken to reduce loadings** from these sources if the Comprehensive Plan objectives of protecting and enhancing lake water quality are to be attained. Several strategies to reduce stormwater loadings **from existing development** are described in Chapter 7 of ERD's March 2000 report. These include the following:

(a) **public education**, particularly of residential property owners, to inform them about the impacts of wildfowl and pets, excessive or improper use of fertilizers, pesticides and herbicides, uncontrolled erosion, failed septic tanks and drainfields, and discharges of wastes such as used motor oil to storm sewers;

(b) increased attention to **sediment and erosion control**, including specific recommendations for improvements to Leon County's erosion and sediment control rules and practices governing construction sites (Table 7-3, p. 7-12);

(c) recommendations for improving Leon County's **regulation of stormwater management system operation and maintenance** (Table 7-6, p. 7-20) including additional monitoring and inspections (p. 7-18);

(d) formal **training and certification** of stormwater operation and maintenance personnel (Table 7-7, p.7-21).

Other options that are not described by ERD that may be worth further consideration include the following:

(a) **inspect** existing stormwater management systems and determine the need to **retrofit** those that provide inadequate removal of suspended sediments and nutrients;

(b) evaluate the need for and efficacy of **restoration initiatives** in lakes that have experienced significant water quality degradation including **retrofit** with additional stormwater management systems;

(c) examine the options for establishing **equitable assessment methods to finance initiatives to improve already degraded lakes.**

(7) It is important to note that the stormwater study called for in both the Comprehensive Plan (Sections 8.1 and 8.2) and the Publix mediation agreement is to address both water quality and flooding issues. The scope for the stormwater study approved by the County Commission in November 1997 includes a second phase that is to be based on the findings under Task 10 of this study. **Further direction is needed to staff for acting on the findings and recommendations concerning needed hydrologic model improvements** (section 7.4 of ERD March 2000) **and for initiating Phase II of the stormwater study** to address the need for additional policies or regulations to reduce the cumulative flooding impacts from new development as required under Sections 8.1 and 8.2 of the Comprehensive Plan and the Publix mediation agreement.