ALABAMA DEPARTMENT OF TRANSPORTATION

1409 Coliseum Boulevard, Montgomery, Alabama 36110

Robert Bentley
Governor

John R. Cooper
Transportation Director

January 29, 2016

Mr. Lance LeFleur, Director
Alabama Department of Environmental Management
1400 Coliseum Boulevard
Montgomery, Alabama 36110-2059

Attn: Mr. Jeffery Kitchens, PE, Water Division

Re: **MS4 Annual Report FY 2015**
NPDES Permit No. ALS000006

Dear Mr. LeFleur:

Attached is the Fiscal Year 2015 annual report for the ALDOT MS4 Stormwater Management Program (SWMP). This submission maintains ALDOT compliance with Part IV of the ALDOT MS4 permit (NPDES Permit No. ALS000006). The report details the MS4-applicable actions performed by ALDOT and the status of each activity designated by the SWMP Plan (SWMPP) during the period of October 1, 2014, to September 30, 2015.

The SWMPP has undergone revision since the version dated September 30, 2014. Part IV of the attached report provides explanations for SWMPP modifications. The updated SWMPP is included in this submission, and it can be found online at http://www.dot.state.al.us/dsweb/Stormwater/doc/MS4SWMPP.pdf.

If you should have any questions concerning the report or wish to discuss any of the content in the report, please contact Mr. Wade Henry, PE, at (334) 242-6464.

Sincerely,

Don T. Arkle, PE
Chief Engineer

DTA/ WFA/WDH/swr

Attachments:
FY 2015 MS4 Annual Report
SWMPP (Last Updated September 30, 2015)

Cc: Region Engineers
Mr. William Adams, PE
Mr. Stacey Glass, PE
Mr. Curtis Vincent, PE
Mr. Scott George, PE
Ms. Maxine Wheeler
Mr. Tony Harris
Mr. Ronald Pruitt
DB File

MS4
STORMWATER
MANAGEMENT
PROGRAM

ANNUAL REPORT
Fiscal Year 2015
(October 1, 2014 – September 30, 2015)

NPDES Permit No. ALS000006

Certification Statement

I certify under the penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the persons who manage the system, or those persons directly responsible for gathering the information, the information is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Don T. Arkle, PE
Chief Engineer

1-26-16
Date

Primary Contacts

Wade D. Henry, PE, CMS4S, CPESC
Stormwater Engineer
Phone: (334) 242-6464
Fax: (334) 353-6555
E-mail: henryw@dot.state.al.us

Scott W. Rogers, PhD, PE, CMS4S
MS4 Permit Engineer
Phone: (334) 353-6214
Fax: (334) 353-6555
E-mail: rogerssc@dot.state.al.us

ALABAMA DEPARTMENT OF TRANSPORTATION
MS4 STORMWATER MANAGEMENT PROGRAM
NPDES Permit No. ALS000006

ANNUAL REPORT
Fiscal Year 2015

I. Introduction

A. Background

The U.S. Environmental Protection Agency (EPA) regulates urban stormwater management under the National Pollutant Discharge Elimination System (NPDES). Urban stormwater collects in, flows through, and discharges from a "municipal separate storm sewer system" (MS4). Thus, EPA refers to the mechanism for regulated urban stormwater management as the "MS4 program." The Alabama Department of Environmental Management (ADEM) carries out the MS4 program at the State level and regulates urban stormwater management for qualifying public entities in Alabama. (The acronym "MS4" can also refer to such a public entity.)

On March 21, 2013, ADEM issued an individual MS4 permit (NPDES No. ALS000006) to the Alabama Department of Transportation (ALDOT). This MS4 permit is designed specifically for ALDOT and replaces regulatory coverage of ALDOT under MS4 permits issued previously. (Hereinafter, the MS4 Permit will be referred to as simply "the Permit.") The Permit went into effect on April 1, 2013, and is intended to stay in effect for a term of five years (i.e., through March 30, 2018).

The Permit applies to areas of the State as specified by Permit item I.A. Requirements of the Permit largely fall under six minimum control measures: Structural Controls Operation, Public Education & Public Involvement (PEPI), Illicit Discharge Detection & Elimination (IDDE), Construction Site Stormwater Runoff Control, Post-Construction Stormwater Management, and Pollution Prevention / Good Housekeeping (PPGH). In addition, the Permit also contains specific MS4 monitoring requirements.

ALDOT developed a stormwater management program (SWMP) to address the requirements of the Permit and other MS4 stormwater management objectives. The document containing details of the SWMP is the "Stormwater Management Program Plan" (SWMPP). The SWMPP explains the ALDOT MS4 stormwater management activities to be conducted over the Permit term, the ALDOT parties responsible for particular activities, the goals corresponding to the activities for the Permit term, and the intended timeframes for the completion of activities. The first version of the SWMPP was submitted to ADEM on March 20, 2014. The SWMPP has been modified during the Permit term and will continue to be modified as appropriate.

B. Purpose of the Annual Report

ALDOT provides updates with respect to SWMPP implementation through annual reporting. As required by Permit item IV.A.1, ALDOT will submit an annual report to ADEM by January 31 of each year during which the Permit is in effect. Each annual report will cover the previous fiscal year (i.e., October 1 – September 30). Generally, the material included in the report will be governed by Permit items IV.A.3 and IV.B. In addition, the report will describe and provide rationale for modifications made to the SWMPP, in accordance with Permit items II.C.2 and II.C.3.

This document is the annual report covering Fiscal Year (FY) 2015 (i.e., October 1, 2014 – September 30, 2015). MS4-applicable stormwater management actions ALDOT performed during FY 2015 and the statuses of SWMPP-identified activities during FY 2015 are explained in Part II of this report. Part III of this report provides ALDOT's evaluation of its SWMP given actions performed and data collected through the end of FY 2015. In Part IV, the future direction of the SWMP is discussed; the discussion in part addresses modifications made to the SWMPP during FY 2015. Appendices that contain information to supplement Parts II through IV are included in this annual report as well. The appendix structure used in this report is designed to largely mirror that of the SWMPP in order to facilitate connectivity between the SWMPP and this report.

II. Actions Performed & Statuses of Activities during FY 2015

In this section, summaries of FY 2015 actions and statuses are presented for each SWMPP activity category. Emphasis is placed on certain actions and statuses rather than on others, as judged appropriate. A comprehensive list of SWMPP activities with corresponding FY 2015 actions and statuses ("ALDOT MS4 Stormwater Management Activities: Fiscal Year 2015 Actions & Statuses Summary") is provided in Appendix A to supplement the discussion that follows. The list also contains expected tracking data for activities as well as references for finding additional information.

A. Stormwater Management Program Plan

ALDOT modified the SWMPP during FY 2015. Explanations of those modifications are provided in Part IV of this report.

The timely submission of this annual report will satisfy the annual report submission requirement for Calendar Year 2016. Annual reports for the Permit term to date have been submitted on time.

B. Structural Controls Operation

Beyond the actions taken as part of the Post-Construction Stormwater Management program discussed below in II.F, no action was taken with regard to structural BMPs during FY 2015 as there were no fully operational structural BMPs within MS4 areas prior to or during FY 2015.

C. Public Education & Public Involvement

Regarding interactions with the general public, ALDOT maintained Web-based mechanisms as means to educate and engage with the public, including the Environmental Concerns Reporting Tool that allows citizens to report stormwater concerns. Fourteen citizen reports were received through the Environmental Concerns Reporting Tool during FY 2014. (Details about the citizen reports and follow-up actions can be found in the "ALDOT Environmental Concerns Log: Fiscal Year 2015" in Appendix C.) Also, ALDOT participated in community outreach group meetings for Safe98 (one meeting), the Coliseum Boulevard Plume (four meetings), and the Birmingham Northern Beltline (three meetings). The table "ALDOT Community Outreach Group Meetings: Fiscal Year 2015" in Appendix C gives more information about the community outreach group meetings.

ALDOT maintained its agreement with the litter-oriented organization Alabama People Against a Littered State (PALS) throughout FY 2015, and an agreement with another litter-oriented organization, Keep Alabama Beautiful (KALB), went into effect during FY 2015. This ALDOT-KALB agreement can be found in Appendix C. ALDOT contributed $274,410 to PALS and $43,279 to KALB for FY 2015 activities. ALDOT processed 35 applications for the Adopt-a-Mile program during FY 2015. As of the end of FY 2015, over 800 parties were active participants in Adopt-a-Mile performing litter pickup on a total of approximately 900 miles of roadway.

ALDOT supported multiple restoration projects during FY 2015. ALDOT continued to support the Cypress Nature Park development and restoration in Montgomery. In addition, ALDOT supported restorations of Parkerson's Mill Creek in Auburn and Joe's Branch in Spanish Fort.

For the employee and contractor education, ALDOT carried out its Qualified Credentialed Inspector (QCI) training and vegetation management training programs as expected during FY 2015. The outcomes of these programs are discussed below in II.E and II.G, respectively. ALDOT also conducted good housekeeping training for its support facility employees; outcomes of this training are discussed in II.H below.

An addition to employee training during FY 2015 was the ALDOT Area-level MS4 overview and discussion sessions conducted in order to orient field office personnel to the ALDOT MS4 program. During FY 2015, such sessions were conducted in the Montgomery and Troy Areas comprising the ALDOT Southeast Region. The agenda for the Troy Area session is provided in Appendix C to indicate the content expected to be covered in a session.

ALDOT employees participated in 28 tracked professional educational events (e.g., conferences, seminars, workshops). The table "ALDOT MS4-Applicable Employee Education: Fiscal Year 2015" in Appendix C lists these events. Beyond those tracked events, employees also participated in events, such as webinars viewed on an individual basis, that were not officially tracked.

Other than the PEPI actions that are explicitly tracked for the purposes of the SWMPP, ALDOT continued its participation in the Montgomery County Water Festival in FY 2015. ALDOT's

funding of stormwater management-related university research continued in FY 2015 as well. Research at the Auburn University Erosion and Sediment Control Testing Facility was supported as planned. Other research funded pertained to roadside vegetation management practices.

D. Illicit Discharge Detection & Elimination

The overarching IDDE policies and procedures pertaining to non-stormwater discharge included in the initial version of the SWMPP were revised and made official by March 31, 2015. Those policies and procedures were incorporated into the revised SWMPP (Section 4.2). Also, the procedure to notify ADEM of possible illicit discharges was revised during FY 2015. Part IV below summarizes the revised procedure and provides rationale for it. The revised procedure has been incorporated into the SWMPP (Section 4.7).

Major outfall inventory was carried out in the Auburn/Opelika, Phenix City, Montgomery, and Tuscaloosa MS4 areas during FY 2015. Also, major outfalls identified during the FY 2014 pilot study in the Dothan MS4 area were verified and added to the inventory during FY 2015. The number of locations studied for major outfall candidates and the number of major outfalls identified for each MS4 area are given in the table "ALDOT Major Outfall Inventory & Screening Summary" in Appendix D. Through the end of FY 2015, 343 locations were studied, and 90 major outfalls were added to the inventory. Major outfalls in the inventory as of the end of FY 2015 were depicted on maps, updating the set of preliminary maps included in the initial version of the SWMPP. The particular maps in the set updated are provided in Appendix D. No structural BMPs were depicted on the maps because there were no fully operational structural BMPs within MS4 areas as of the end of FY 2015.

Screening of major outfalls was conducted in the Auburn/Opelika, Phenix City, Montgomery, and Tuscaloosa MS4 areas concurrently with the major outfall inventory. Major outfall screening results from the FY 2014 pilot study of the Dothan MS4 area were made official during FY 2015, as well. In sum, 90 major outfalls were screened as of the end of FY 2015. During the FY 2015 screenings, 21 possible illicit discharges were discovered and investigated appropriately, leading to various outcomes. The aforementioned table "ALDOT Major Outfall Inventory & Screening Summary" in Appendix D summarizes screening efforts and the outcomes regarding possible illicit discharges discovered during screening.

The schedule for the inventory (and screening) of major outfalls was revised with greater specificity during FY 2015. This revised schedule is provided in Appendix D.

One other possible illicit discharge was initially reported by the City of Bessemer and addressed by ALDOT during FY 2014, but the City of Bessemer renewed the concern during FY 2015. The City of Bessemer observed sedimentation emanating from ALDOT property and suspected it was due to ground cover and runoff flow management deficiencies. ALDOT addressed the erosion and sedimentation potential at the site in question in response. Additional details about this possible illicit discharge can be found in the "ALDOT Environmental Concerns Log: Fiscal Year 2015" in Appendix C.

ALDOT began using two forms to aid in the investigation of possible illicit discharges during FY 2015. The "ALDOT Illicit Discharge Incident Tracking Form" is now used in the initial evaluation of a possible illicit discharge; it replaces the "ALDOT Illicit Discharge Concern Investigation Form" draft that was included in the initial version of the SWMPP. The "ALDOT Non-Stormwater Discharge Investigation Form" is a more in-depth form used in follow-up illicit discharge investigations. Both forms can be found in Appendix D.

E. Construction Site Stormwater Runoff Control

In FY 2015, ALDOT continued to oversee Construction General Permit coverage and compliance as described in the SWMPP. There were 60 permitted construction projects in MS4 areas during FY 2015. Those projects are listed in the table "ALDOT MS4 Active Construction Projects: Fiscal Year 2015" in Appendix E.

ALDOT received three submissions of construction activity concerns. These concerns were addressed by ALDOT appropriately. Details regarding the concerns and follow-up actions taken by ALDOT are given in the "ALDOT Environmental Concerns Log: Fiscal Year 2015" in Appendix C.

As noted above, QCI training was carried out as expected during FY 2015. ALDOT facilitated QCI recertification for 760 employees and other individuals over 23 sessions as well as provided the means for 51 employees to obtain initial QCI certification. Information about QCI recertification course sessions is given in "ALDOT QCI Recertification Training: Fiscal Year 2015" in Appendix C.

ALDOT formalized a policy to refer unauthorized construction activity to ADEM by March 31, 2015, and incorporated it into the SWMPP (Section 5.5). ALDOT has the legal authority to require third parties performing construction activity to undergo the authorization process, so ALDOT should have the ability in all cases to rectify any instances of unauthorized construction activity. However, if for some reason the unauthorized activity is not rectified within 30 days of discovery by ALDOT, then ALDOT will refer the unauthorized activity to ADEM. Indeed, no referrals to ADEM were needed during FY 2015.

F. Post-Construction Stormwater Management

ALDOT completed development of its Post-Construction Stormwater Management program by March 31, 2015. The program includes "GFO 3-73: Post-Development Stormwater Management," a set of policies that provide general guidance. Also included are design guidance documents "Determining Runoff for Small Storm Events" and "Post-Development Stormwater Risk Assessment." These program components are provided in Appendix F. While policies and design guidance were implemented during FY 2015, no post-construction BMPs were fully operational in MS4 areas as of the end of FY 2015.

G. Pollution Prevention / Good Housekeeping

Support facility PPGH was implemented throughout FY 2015. Standard operating procedures (SOPs) for support facility PPGH were in the process of formalization during FY 2015, and thus PPGH remained governed under informal SOPs. Eighteen facilities were inspected, and the deficiencies noted during inspections were resolved or are in the process of resolution in accordance with facility SPCC plans. The table "ALDOT MS4 Support Facility Annual Inspections: Fiscal Year 2015" in Appendix G lists the facility inspections performed, and deficiencies observed during inspections are indicated in the attachment to the table.

With respect to support facility good housekeeping training, sixteen training sessions covering SPCC and universal waste concepts were held; a total of 293 ALDOT employees participated in the training. A breakdown of training sessions is provided in "ALDOT MS4 Support Facilities SPCC & Universal Waste Training: Fiscal Year 2015" in Appendix C.

Regarding transportation facility PPGH, applicable maintenance activities (snow & ice control, litter pickup, herbicide treatment & surveillance, drainage structure maintenance, and erosion control) continued to be performed in manners intended to reduce negative stormwater runoff impacts. Estimates of work amounts performed during FY 2015 in particular MS4 areas for specific activities are given in "ALDOT MS4 Transportation Facility Maintenance: Fiscal Year 2015" in Appendix G.

As noted above, vegetation management training continued throughout FY 2015. Seven sessions of the vegetation management training course were held for a total of 296 participants. Details about individual vegetation management training course sessions are provided in the table "ALDOT Vegetation Management Training Course: Fiscal Year 2015" in Appendix C. Agendas for this training (for specific Calendar Years 2014 and 2015) are also provided in Appendix C. Also, four vegetation management training newsletters were distributed during FY 2015. In addition, a total of 27 employees over two sessions participated in the "Review for Commercial Applicator Examination" course.

H. MS4 Monitoring

ALDOT began field implementation of its MS4 Monitoring program during FY 2015. Equipment (i.e., continuous monitoring sonde) selection and specific monitoring location selection took place prior to any field deployment of sondes. Monitoring commenced and completed for two locations during FY 2015. Sondes were deployed at a selected location in Montgomery in January 2015 and at a location in Auburn in February 2015. Both sets of sondes remained active through August 2015. In other words, monitoring occurred at both locations continuously for over six months, in accordance with the SWMPP. Because of external factors beyond ALDOT's control, the data collected at both locations does not allow ALDOT to draw viable conclusions about the impact ALDOT MS4 drainage has on a receiving water. Thus, there is no definitive evidence of ALDOT contribution to pollution resulting from the completed monitoring work done during FY 2015.

Monitoring commenced at locations in Mobile and Daphne in August 2015 and is ongoing as of the end of FY 2015. Of note is the monitoring at the Daphne location which is being done jointly with the City of Daphne; such coordination with other MS4s is encouraged by the Permit. Outcomes of monitoring at those locations will be discussed in the FY 2016 MS4 annual report.

Further discussion regarding the monitoring work performed, the data collected, the factors influencing data integrity, and the FY 2015 outcomes of the monitoring work is provided by a summary report in Appendix H.

III. Evaluation of the Stormwater Management Program

Many aspects of the ALDOT SWMP continued functioning in FY 2015 largely as they had in previous years. Other aspects, however, were still in development or commenced in terms of field implementation during FY 2015. Consequently, ALDOT can confidently assess the well-established aspects of the SWMP, but more time is needed before ALDOT can completely and validly assess the other aspects of the program. With the proper perspective provided, ALDOT's evaluation of its SWMP as of the end of FY 2015 follows.

A. Overall Program Compliance Status

Actions expected by either the Permit or the SWMPP to be performed during FY 2015 were performed by ALDOT mostly in a timely manner. From the beginning of the Permit term through the end of FY 2015, ALDOT experienced no instances of significant non-compliance with the Permit or the SWMPP.

However, ALDOT did deviate from the SWMPP in minor ways when appropriate or necessary with respect to a few activities. For example, the prior versions of the SWMPP called for accelerated notifying of ADEM for more "severe" cases of possible illicit discharge, but during implementation it is more sensible to notify the adjacent MS4, as explained in Part IV below. Another example is the ongoing development of policies and procedures for the inspection and maintenance of post-construction BMPs. While prior versions of the SWMPP stated that these policies and procedures would be developed by the end of the second year of the Permit term, ALDOT believes further development and pilot-testing should be done when some post-construction BMPs are fully operational in the field and before the policies and procedures are finalized.

B. Major Findings Resulting from the Program

Data from field implementation remained somewhat limited through the end of FY 2015, and thus ALDOT's ability to report major findings is limited. However, encouraging signs of a functional SWMP have been observed from program implementation to date. While viable conclusions about the ALDOT MS4 contribution to stream pollution cannot be drawn from the MS4 monitoring data collected to date (as explained in the report in Appendix H), it is noteworthy that no definitive evidence of such contribution was found during FY 2015. Moreover, findings from environmental concerns reporting, major outfall screening, and good housekeeping on ALDOT property indicate no major or widespread deficiencies in ALDOT

MS4 stormwater management practices. New citizen groups began participating in the PALS Adopt-a-Mile program during FY 2015, and more citizens used of the Environmental Concerns Reporting Tool in FY 2015 than used it in FY 2014. These data indicate increasing success in ALDOT's outreach to the general public.

C. Program Strengths & Weaknesses

ALDOT considers its well-established MS4-applicable activities to be noteworthy strengths of its SWMP. In particular, education of employees, education of the public, involvement with the public, construction stormwater management, and PPGH for transportation facilities are typically conducted in highly proficient manners and usually achieve expected outcomes and even outcomes beyond those required by the Permit. The IDDE program became significantly stronger during FY 2015 with the successful field implementation of major outfall inventory and screening. With the commencement of field implementation of the MS4 Monitoring program under the Permit, ALDOT's MS4 Monitoring program is stronger, but more data will need to be collected before monitoring data can be used to assess the ALDOT MS4 program as a whole, and ALDOT will need to better preserve the integrity of that data, if possible, so that viable conclusions can be drawn. The Post-Construction Stormwater Management program took significant steps forward in FY 2015 with the creation and implementation of new policies, especially in view of policies emphasizing on Low Impact Development and Green Infrastructure (i.e., LID/GI), but it is too early to see the tangible effects of those policies in the field.

D. Overall Program Effectiveness

Despite limited field implementation data, the ALDOT SWMP shows potential for long-term effectiveness. This assessment is based on the success of the implemented aspects of the program and the progress made through the end of FY 2015 with respect to the development of other aspects of the program.

IV. Future Direction of the Program

In general, ALDOT will continue to conduct activities as indicated in the initial version of the SWMPP, given the progress that largely met expectations during FY 2015 and the absence of significant setbacks.

With the development of most SWMP programs complete at the end of FY 2015, ALDOT updated the SWMPP to reflect the current states of the programs. Other modifications were needed as well given observations and findings from program implementation. A new version of the SWMPP was published on September 30, 2015. The ways in which the SWMPP was revised are explained below:

- During FY 2015, ALDOT completed conversion of its "division" and "district" geographically-based organizational subunits into "regions," "areas," and "districts." The SWMPP was adjusted accordingly.

- Some SWMPP responsibilities were reassigned to more appropriate parties. The Office of Environmental Coordination was incorporated into the Design Bureau at the end of FY 2015. Responsibilities previously assigned to the Office of Environmental Coordination were reassigned to either the Design Bureau or the Maintenance Bureau, as appropriate. Also, ALDOT has found it more efficient to track support facility good housekeeping training through the Materials & Tests Bureau and the ALDOT region field offices jointly as opposed to through the Training Bureau.

- In the previous versions of the SWMPP, the procedure for addressing more "severe" possible illicit discharges included notifying ADEM within 72 hours of the confirmed discovery of the possible illicit discharge. In practice, though, notifying the adjacent MS4 when the source of the possible illicit discharge is beyond ALDOT property is seen as more reasonable and effective. The adjacent MS4 would be able to more thoroughly investigate the possible illicit discharge and would be required to notify ADEM quickly in "severe" cases. The procedure in the SWMPP (Section 4.7) has been revised to call for timely notification of the adjacent MS4 and notification of ADEM by ALDOT via MS4 annual report.

- Specific monitoring locations for monitoring (i.e., sonde deployment) were selected during FY 2015. The listing of these six locations has been incorporation into Section 8.5 of the SWMPP.

- Several SWMP programs have undergone significant development or implementation since the initial version of the SWMPP was developed, as expected provided the schedules set in the SWMPP. Some aspects of programs have been revised as needed during the Permit term; revisions to programs are discussed in this annual report and the FY 2014 MS4 annual report. ALDOT modified the SWMPP so that it reflects the states of SWMP programs as of the end of FY 2015. While all SWMPP chapters were revised to various degrees in this effort, Chapter 6 (Post-Construction Stormwater Management) was extensively revised because of the development of the Post-Construction Stormwater Management program that occurred over the first two years of the Permit term; most modifications were to Section 6.4. Chapter 4 (Illicit Discharge Detection & Elimination) also required significant revision due to much refinement of the IDDE program.

- Various minor revisions were made to the prose in order to enhance clarity, correct grammar, and address other issues that do not pertain to the actual commitments ALDOT made in the SWMPP.

Appendix A:

Supplemental Material for Section II.A

ALDOT MS4 Stormwater Management Activities:
Fiscal Year 2015 Actions & Statuses Summary

ALDOT MS4 Stormwater Management Activities:
Fiscal Year 2015 Actions & Statuses Summary

Permit Requirement(s)	Activity	Associated ALDOT Personnel	Permit Term Goal	Actions / Status During FY 2015	Supplemental Information
Stormwater Management Program Plan					
II.A.1; II.A.2; II.C.1; II.C.2; II.C.3	Development & updating of Stormwater Management Program Plan (SWMPP)	State Design Engineer	Develop SWMPP. Revise SWMPP as needed throughout Permit term.	SWMPP developed. Two revisions (dated 09/30/2014 and 09/30/2015, respectively) made to SWMPP to date.	See Part IV for explanations of revisions made to SWMPP. (All citations of SWMPP below refer to the 09/30/2015 revision.)
IV.A.1; IV.A.3; IV.B	Annual reports	State Design Engineer	Compile and submit to ADEM an annual report for the previous fiscal year by January 31 of every year during which Permit is in effect.	Annual report for FY 2015 compiled and submitted to ADEM. Annual reports for Permit term to date have been submitted on time.	
Structural Controls Operation					
II.B.1.b; II.B.1.c	Inspections of structural BMPs	State Maintenance Engineer; Equipment Bureau Chief; Region Engineers	Inspect each BMP after fully operational at least every 2 years.	No action. (No fully operational BMPs during FY 2015.)	
II.B.1.b; II.B.1.c	Non-emergency maintenance of structural BMPs	State Maintenance Engineer; Equipment Bureau Chief; Region Engineers	Track work reports completed for each BMP.	No action. (No fully operational BMPs during FY 2015.)	
II.B.1.b; II.B.1.c	Structural BMP emergency maintenance	State Maintenance Engineer; Equipment Bureau Chief; Region Engineers	Track work reports completed for each BMP.	No action. (No fully operational BMPs during FY 2015.)	
Public Education & Public Involvement					
II.B.2.a	Development of PEPI program	Media & Community Relations Bureau Chief	Develop program. Adjust program if needed after future program evaluation.	Program developed. No major revisions during FY 2015.	See SWMPP (c. 3) for a description of the PEPI program.
II.B.2.b.1	Identification of potential pollutants to be targeted by PEPI program	Media & Community Relations Bureau Chief	Identify potential pollutants.	Pollutants identified.	See SWMPP (s. 3.2) for discussion regarding pollutant identification.
II.B.2.b.2; II.B.2.b.3; II.B.2.c.1.a; II.B.2.c.1.b; II.B.2.c.1.d	Coordination with litter-oriented organizations to support litter awareness campaigns & litter pickup activities	State Maintenance Engineer	Maintain agreement with at least 1 organization throughout Permit term.	Agreement with Alabama PALS maintained. Agreement with Keep Alabama Beautiful went into effect during FY 2015.	See SWMPP (App. C) for PALS agreement. See App. C and SWMPP (App. C) for Keep Alabama Beautiful agreement.
II.B.2.c.1.d	Support of environmental restoration activities	State Design Engineer	Support at least 1 activity during Permit term.	Supported Cypress Nature Park (Montgomery) development and restoration, Parkerson's Mill Creek (Auburn) restoration, and Joe's Branch (Spanish Fort) restoration during FY 2015.	

ALDOT MS4 Stormwater Management Activities:
Fiscal Year 2015 Actions & Statuses Summary

Permit Requirement(s)	Activity	Associated ALDOT Personnel	Permit Term Goal	Actions / Status During FY 2015	Supplemental Information
II.B.2.b.2; II.B.2.b.3	Mechanism to provide public with stormwater management information & opportunities for involvement	State Design Engineer	Develop and maintain Web site.	Web site developed. Maintained throughout FY 2015.	Link to Web site: http://www.dot.state.al.us/ecweb/OfficeofEnvironmentalCoordination.html.
II.B.2.b.4; II.B.2.d.2	Mechanism to engage public in the development of SWMPP	State Design Engineer	Develop and maintain Web site.	Web site developed. Maintained throughout FY 2015.	Link to Web site: http://www.dot.state.al.us/ecweb/ALDOT%20MS4.html.
II.B.2.c.1.c	Mechanism for citizen reporting of concerns	State Design Engineer	Develop and maintain Web reporting tool.	Web reporting tool developed. Maintained throughout FY 2015.	Link to Web reporting tool: http://aldotapps.dot.state.al.us/EcConcern/webform1.aspx.
II.B.2.c.2; II.B.2.c.3	Development of construction stormwater awareness program	State Construction Engineer	Develop QCI training program.	QCI training program implemented.	See SWMPP (ss. 3.3.2 & 5.4) for details regarding the QCI training program.
II.B.2.c.3	Development of vegetation management training program	State Maintenance Engineer	Develop vegetation management training program.	Vegetation management training program implemented.	See SWMPP (ss. 3.3.2 & 7.3.6) for details regarding the vegetation management training program.
II.B.2.c.3	Development of training program for potential pollutants from support facilities	Materials & Tests Engineer	Develop program. Adjust program if needed after good housekeeping procedures formalized.	Program developed. No revisions during FY 2015.	See SWMPP (ss. 3.3.2 & 7.2.5) for details regarding support facility employee training program.
II.B.2.d.3	Tracking of group/individual applications for Adopt-a-Mile program	State Maintenance Engineer	Track applications while ALDOT-PALS agreement is in effect.	35 applications processed during FY 2015.	See SWMPP (App. C) for PALS agreement.
II.B.2.d.3	Tracking of employee initial QCI certification	Training Bureau Chief	Track employees certified.	51 employees certified during FY 2015.	See App. C for "ALDOT MS4-Applicable Employee Education: Fiscal Year 2015."
II.B.2.d.3	Tracking of participants in QCI recertification training	Training Bureau Chief	Track participants.	760 participants (474 ALDOT for recertification, 262 non-ALDOT for recertification, 24 "audit-only") during FY 2015.	See App. C for "ALDOT QCI Recertification Training: Fiscal Year 2015."
II.B.2.d.3	Tracking of vegetation management training course participants	Training Bureau Chief	Track participants.	296 participants (224 ALDOT, 72 non-ALDOT) for training purposes during FY 2015.	See App. C for "ALDOT Vegetation Management Training Course: Fiscal Year 2015."
II.B.2.d.3	Tracking of participants of "Review for Commercial Applicator Examination" course	Training Bureau Chief	Track participants.	27 participants during FY 2015.	See App. C for "ALDOT MS4-Applicable Employee Education: Fiscal Year 2015."
II.B.2.d.3	Tracking of support facility employees participating in good housekeeping training	Materials & Tests Engineer; Region Engineers	Track employees participating.	293 employees participated during FY 2015.	See App. C for "ALDOT MS4 Support Facilities SPCC & Universal Waste Training: Fiscal Year 2015."
II.B.2.d.3	Tracking of professional educational events (e.g., conferences, seminars, workshops) in which employees participate	Training Bureau Chief	Track events with ALDOT participation.	ALDOT participated in at least 28 events during FY 2015.	See App. C for "ALDOT MS4-Applicable Employee Education: Fiscal Year 2015."
II.B.2.d.3	Tracking of citizen reports received by reporting mechanism	State Design Engineer	Track reports received.	14 reports received via Web reporting tool during FY 2015.	See App. C for "ALDOT Environmental Concerns Log: Fiscal Year 2015."
II.B.2.d.4	Tracking of funding of litter-oriented organizations (for PSAs, brochures, litter pickup logistics, etc.)	State Maintenance Engineer	Track total dollars of support.	$274,410 contributed to PALS during FY 2015. $43,279 contributed to Keep Alabama Beautiful during FY 2015.	See SWMPP (App. C) for PALS agreement. See App. C and SWMPP (App. C) for Keep Alabama Beautiful agreement.
II.B.2.d.4	Tracking of QCI recertification training sessions	Training Bureau Chief	Track sessions facilitated.	23 sessions facilitated during FY 2015.	See App. C for "ALDOT QCI Recertification Training: Fiscal Year 2015."
II.B.2.d.4	Tracking of vegetation management training course sessions	Training Bureau Chief	Track sessions facilitated.	7 sessions facilitated during FY 2015.	See App. C for "ALDOT Vegetation Management Training Course: Fiscal Year 2015."

ALDOT MS4 Stormwater Management Activities:
Fiscal Year 2015 Actions & Statuses Summary

Permit Requirement(s)	Activity	Associated ALDOT Personnel	Permit Term Goal	Actions / Status During FY 2015	Supplemental Information
II.B.2.d.4	Tracking of vegetation management training newsletters created & distributed	State Maintenance Engineer	Track newsletters distributed.	4 newsletters distributed during FY 2015.	See SWMPP (App. C) for example newsletter.
II.B.2.d.4	Tracking of sessions of "Review for Commercial Applicator Examination" course	Training Bureau Chief	Track sessions facilitated.	2 sessions facilitated during FY 2015.	See App. C for "ALDOT MS4-Applicable Employee Education: Fiscal Year 2015."
II.B.2.d.4	Tracking of support facility good housekeeping training sessions	Materials & Tests Engineer; Region Engineers	Track sessions facilitated.	16 sessions facilitated during FY 2015.	See App. C for "ALDOT MS4 Support Facilities SPCC & Universal Waste Training: Fiscal Year 2015."
II.B.2.d.4	Tracking of community outreach meetings with ALDOT participation	Media & Community Relations Bureau Chief	Track meetings with ALDOT participation.	ALDOT participated in 1 Safe98 meeting, 4 Coliseum Boulevard Plume meetings, and 3 Birmingham Northern Beltline meetings during FY 2015.	See App. C for "ALDOT Community Outreach Group Meetings: Fiscal Year 2015."
Illicit Discharge Detection & Elimination					
II.B.3.a.1; II.B.3.b.4	Development & updating of MS4 major outfall / structural BMP maps	State Design Engineer	Develop preliminary maps. Update maps as needed annually.	Preliminary maps developed during development of initial SWMPP version. Maps updated with major outfalls on inventory as of 09/30/2015.	See App. D for specific maps updated with major outfalls on inventory. See SWMPP (App. D) for the complete set of maps consisting of updated maps and the remaining preliminary maps.
II.B.3.a.1	Development & updating of MS4 mapping schedule	State Design Engineer	Develop general schedule. Update schedule as needed annually.	Schedule updated during FY 2015.	See App. D and SWMPP (App. D) for updated schedule.
II.B.3.a.1; II.B.3.b.4	Major outfall inventory	State Maintenance Engineer; Equipment Bureau Chief; Region Engineers	Inventory all major outfalls existing at start of Permit term by 03/31/2018. Expecting preparation during 2nd year of Permit term and inventory conducted during balance of term.	Inventory completed for Auburn/Opelika, Phenix City, Montgomery, and Tuscaloosa MS4 areas during FY 2015. Major outfalls identified during FY 2014 Dothan MS4 area pilot study added to inventory during FY 2015. In total, 90 major outfalls added to inventory during FY 2015.	See App. D for "ALDOT Major Outfall Inventory & Screening Summary (through Fiscal Year 2015)." Inventory is kept on file at ALDOT.
II.B.3.a.2	Development of non-stormwater discharge policies & procedures	State Maintenance Engineer	Develop policies and procedures. Make policies and procedures official by the end of the 2nd year of Permit term.	Policies and procedures made official during FY 2015 and incorporated into SWMPP.	See SWMPP (s. 4.2) for policies and procedures.
II.B.3.a.3; II.B.3.b.3	Development & updating of IDDE training program	State Design Engineer; State Maintenance Engineer	Develop general program. Update program as needed annually. Expecting training materials to be prepared during 2nd year of Permit term.	No inventory or screening training material developed. (Inventory and screening implementation through FY 2015 was delegated to consultant; consultant handles training internally.)	See SWMPP (s. 4.8) for discussion regarding IDDE training.
II.B.3.a.3	Facilitation of IDDE training sessions	Training Bureau Chief	Track sessions facilitated.	No action (due to delegating of inventory and screening to consultant).	
II.B.3.a.4	Dry-weather screening of "normal" major outfalls	State Maintenance Engineer; Equipment Bureau Chief; Region Engineers	Pilot-test screening method. Screen each major outfall on inventory not in a priority area at least once during Permit term.	Screening performed during inventory of major outfalls in the Auburn/Opelika, Phenix City, Montgomery, and Tuscaloosa MS4 areas. Screening data from the FY 2014 Dothan MS4 area pilot study post-processed and made official during FY 2015. In total, 90 major outfalls (100% of major outfalls on inventory) have been screened through the end of FY 2015.	See App. D for "ALDOT Major Outfall Inventory & Screening Summary (through Fiscal Year 2015)." Comprehensive screening data kept on file at ALDOT.

ALDOT MS4 Stormwater Management Activities:
Fiscal Year 2015 Actions & Statuses Summary

Permit Requirement(s)	Activity	Associated ALDOT Personnel	Permit Term Goal	Actions / Status During FY 2015	Supplemental Information
II.B.3.a.4	Dry-weather screening of "priority area" major outfalls	State Maintenance Engineer; Equipment Bureau Chief; Region Engineers	Designate priority areas as warranted according to inventory and screening data collected during Permit term. Screen each major outfall on inventory in a priority area at least once during Permit term.	No action. (No priority areas designated as of the end of FY 2015.)	
II.B.3.a.4; II.B.3.b.2	Follow-up major outfall dry-weather screening	State Maintenance Engineer; Equipment Bureau Chief; Region Engineers	Track follow-up screenings of each major outfall on inventory.	No action.	
II.B.3.a.5	Development of illicit discharge tracing procedure	State Design Engineer	Develop and pilot-test procedure.	Procedure developed and in-use during major outfall screening.	See SWMPP (s. 4.5.1) for discussion regarding tracing procedure. See SWMPP (App. D) for "ALDOT Major Outfall Screening Form."
II.B.3.a.6	Development of indicator monitoring strategy for evaluating suspect illicit discharges	State Design Engineer	Develop and pilot-test strategy.	Strategy developed and in-use during major outfall screening.	See SWMPP (s. 4.5.1) for discussion regarding indicator monitoring strategy. See SWMPP (App. D) for "ALDOT Major Outfall Screening Form."
II.B.3.a.7	Development of procedures to notify ADEM of possible illicit discharges	State Maintenance Engineer	Develop procedures.	Procedures revised during FY 2015.	See SWMPP (s. 4.7) for the revised discussion regarding reporting procedures. See Part IV for details regarding modifications made to procedures.
II.B.3.a.8	Mechanism for citizens to report possible illicit discharges	State Design Engineer	Develop and maintain Web reporting tool.	Web reporting tool maintained throughout FY 2015.	Link to Web reporting tool: http://aldotapps.dot.state.al.us/EcConcern/webform1.aspx.
II.B.3.b.2	Compilation & updating of IDDE "priority area" candidates list	State Design Engineer	Compile initial list. Update list as needed annually.	No action. (No priority areas designated as of the end of FY 2015.)	
II.B.3.b.5	Recordkeeping of possible illicit discharges reported / discovered	State Maintenance Engineer	Track reports processed.	21 discoveries of possible illicit discharge made during major outfall screening in FY 2015. 1 report of possible illicit discharge processed during FY 2015.	See App. C for "ALDOT Environmental Concerns Log: Fiscal Year 2015" and App. D for "ALDOT Major Outfall Inventory & Screening Summary (through Fiscal Year 2015)."
Construction Site Stormwater Runoff Control					
II.B.4.a.1; II.B.4.b.1	Development of procedures to require Construction General Permit coverage for construction sites	State Construction Engineer; State Design Engineer	Develop procedures.	Procedures developed.	See SWMPP (s. 5.2) for discussion regarding procedures.
II.B.4.a.2; II.B.4.b.2	Development of contract requirements for erosion & sediment control	State Construction Engineer	Develop requirements.	Requirements developed.	See SWMPP (s. 5.2) for discussion regarding requirements.
II.B.4.a.3	Development of internal policies for proper permit coverage of construction activities	State Construction Engineer; State Maintenance Engineer	Develop policies.	Policies developed.	See SWMPP (ss. 5.2 & 5.5) for discussion regarding policies. See SWMPP (App. D) for Forms MB-05 and MB-07.
II.B.4.a.4	Mechanism for citizen reporting of construction site discharge concerns	State Design Engineer	Develop and maintain Web reporting tool.	Web reporting tool developed. Maintained throughout FY 2015.	Link to Web reporting tool: http://aldotapps.dot.state.al.us/EcConcern/webform1.aspx.
II.B.4.a.5; II.B.4.b.3	Development of construction stormwater BMP training program	State Construction Engineer	Develop QCI training program.	QCI training program implemented.	See SWMPP (ss. 3.3.2 & 5.4) for details regarding the QCI training program.
II.B.4.a.6; II.B.4.b.4	Referral of unauthorized construction activity to ADEM	State Maintenance Engineer	Formalize referral policy by 03/31/2015. Track referrals.	Policy formalized and incorporated into SWMPP during FY 2015. No referrals during FY 2015.	See SWMPP (s. 5.5) for formal policy and discussion regarding policy.

ALDOT MS4 Stormwater Management Activities:
Fiscal Year 2015 Actions & Statuses Summary

Permit Requirement(s)	Activity	Associated ALDOT Personnel	Permit Term Goal	Actions / Status During FY 2015	Supplemental Information
II.B.4.c.2	Compilation & updating list of construction sites in MS4 areas	State Construction Engineer	Maintain list with updates as needed annually.	List updated for FY 2015. (60 permitted projects in MS4 areas during FY 2015.) List updates on schedule for Permit term to date.	See App. E for "ALDOT MS4 Active Construction Projects (Transportation Facilities): Fiscal Year 2015."
II.B.4.d.1	Recordkeeping of submitted citizen concerns & follow-up actions	State Design Engineer	Track reports submitted and follow-up actions.	3 reports relating to construction site stormwater runoff control in some way submitted during FY 2015. Appropriate follow-up actions taken by ALDOT.	See App. C for "ALDOT Environmental Concerns Log: Fiscal Year 2015."
II.B.4.d.2	Tracking of QCI recertification training sessions	Training Bureau Chief	Track sessions facilitated.	23 sessions facilitated during FY 2015.	See App. C for "ALDOT QCI Recertification Training: Fiscal Year 2015."
II.B.4.d.2	Tracking of employee initial QCI certification	Training Bureau Chief	Track employees certified.	51 employees certified during FY 2015.	See App. C for "ALDOT MS4-Applicable Employee Education: Fiscal Year 2015."
II.B.4.d.2	Tracking of participants in QCI recertification training	Training Bureau Chief	Track participants.	760 participants (474 ALDOT for recertification, 262 non-ALDOT for recertification, 24 "audit-only") during FY 2015.	See App. C for "ALDOT QCI Recertification Training: Fiscal Year 2015."
Post-Construction Stormwater Management					
II.B.5.a.1	Development of post-construction program with specific stormwater management goals	State Design Engineer	Develop program by 03/31/2015.	Program, including "GFO 3.73: Post-Development Stormwater Management" and design guidance components, developed by 03/31/2015.	See SWMPP (c. 6) for discussion regarding post-construction program. See App. F and SWMPP (App. F) for "GFO 3-73: Post-Development Stormwater Management," "Determining Runoff for Small Storm Events," "Post-Development Stormwater Risk Assessment," Form HYD-100, and Form HYD-101.
II.B.5.a.2	Development of LID/GI SOP for transportation & support facilities	State Design Engineer	Develop SOP by 03/31/2015.	SOP ("GFO 3-73: Post-Development Stormwater Management") developed and made effective on 11/24/2014.	See SWMPP (c. 6) for discussion regarding post-construction program. See App. F and SWMPP (App. F) for "GFO 3-73: Post-Development Stormwater Management."
II.B.5.a.3	Implementation of LID/GI practices	State Design Engineer	Track practices as implemented.	LID/GI SOP ("GFO 3-73: Post-Development Stormwater Management") made effective on 11/24/2014. Projects let for construction on or after 04/01/2015 must be implemented in accordance with GFO 3-73.	See App. F and SWMPP (App. F) for "GFO 3-73: Post-Development Stormwater Management."
II.B.5.a.4	Development of management policies (inspection & maintenance) for post-construction BMPs at new transportation & support facilities	State Design Engineer	Develop policies by 03/31/2015.	Policies remain in development. (No BMPs fully operational as of the end of FY 2015. Will modify policies using findings from field implementation of BMPs prior to finalization of policies.)	See SWMPP (ss. 6.6-6.7) for discussion regarding forthcoming post-construction inspection and maintenance policies. See SWMPP (App. F) for draft of "ALDOT Post-Construction BMP Inspection Form."
II.B.5.a.5; II.B.5.c.2; II.B.5.d.1	Inspections of structural BMPs	State Maintenance Engineer; Equipment Bureau Chief; Region Engineers	Inspect each BMP after fully operational at least every 2 years.	No action. (No BMPs fully operational as of end of FY 2015.)	
II.B.5.b.1	Development of general approach for meeting II.B.5.a.1	State Design Engineer	Develop general approach.	General approach developed and included in 03/20/2014 version of SWMPP. Program developed by 03/31/2015 as required.	
II.B.5.b.2	Scheduling for LID/GI SOP development	State Design Engineer	Develop schedule.	Scheduled developed and included in 03/20/2014 version of SWMPP. SOP developed by 03/31/2015 as scheduled.	
II.B.5.b.3	Scheduling for post-construction policy-making	State Design Engineer	Develop schedule.	Scheduled developed and included in 03/20/2014 version of SWMPP. Policies developed by 03/31/2015 as scheduled.	

Permit Requirement(s)	Activity	Associated ALDOT Personnel	Permit Term Goal	Actions / Status During FY 2015	Supplemental Information
II.B.5.b.4	Develop procedures for post-construction BMP inspection	State Design Engineer	Develop and pilot-test procedures.	Procedures developed. No pilot-testing performed. (No BMPs fully operational as of the end of FY 2015.)	See SWMPP (s. 6.6) for discussion regarding inspection procedures. See SWMPP (App. F) for draft of "ALDOT Post-Construction BMP Inspection Form."
II.B.5.b.5	Develop procedures to require post-construction BMP maintenance	State Design Engineer	Develop procedures. Formalize procedures with GFO.	Procedures remain in development. ("GFO 3-73: Post-Development Stormwater Runoff Management" developed, but BMP maintenance procedures not addressed in GFO. Will modify procedures using findings from field implementation of BMPs prior to finalization of procedures.)	See SWMPP (s. 6.7) for discussion regarding forthcoming maintenance procedures. See SWMPP (App. F) for draft of "ALDOT Post-Construction BMP Inspection Form."
II.B.5.c.1	Inventory of post-construction BMPs	State Design Engineer	Develop and pilot-test method. Update inventory with fully operational BMPs.	Method developed. No pilot-testing or inventory additions during FY 2015. (No BMPs fully operational as of the end of FY 2015.)	See SWMPP (s. 6.5) for discussion regarding inventory method. See SWMPP (App. F) for drafts of "ALDOT Post-Construction BMP Inventory Form for Transportation Facilities" and "ALDOT Post-Construction BMP Inventory Form for Support Facilities."
II.B.5.c.2; II.B.5.d.1	Inspections of non-structural BMPs	State Maintenance Engineer; Equipment Bureau Chief; Region Engineers	Inspect each BMP after fully operational at a frequency TBD by post-construction program.	No action. (No BMPs fully operational as of the end of FY 2015.)	
II.B.5.c.3	Non-emergency maintenance of structural BMPs	State Maintenance Engineer; Equipment Bureau Chief; Region Engineers	Track work reports completed for each BMP.	No action. (No BMPs fully operational as of the end of FY 2015.)	
II.B.5.c.3	Non-emergency maintenance of non-structural BMPs	State Maintenance Engineer; Equipment Bureau Chief; Region Engineers	Track work reports completed for each BMP.	No action. (No BMPs fully operational as of the end of FY 2015.)	
II.B.5.c.3	Structural BMP emergency maintenance	State Maintenance Engineer; Equipment Bureau Chief; Region Engineers	Track work reports completed for each BMP.	No action. (No BMPs fully operational as of the end of FY 2015.)	
II.B.5.c.3	Non-structural BMP emergency maintenance	State Maintenance Engineer; Equipment Bureau Chief; Region Engineers	Track work reports completed for each BMP.	No action. (No BMPs fully operational as of the end of FY 2015.)	
Pollution Prevention / Good Housekeeping					
II.B.6.a.1; II.B.6.b.1; II.B.6.c.1	Inventory of support facilities with pollution potential	Materials & Tests Engineer	Develop inventory. Update inventory as needed annually.	Inventory revised during FY 2015.	See App. G and SWMPP (App. G) for "ALDOT MS4 Support Facilities."
II.B.6.a.2; II.B.6.b.2; II.B.6.c.2	Development & updating of support facility PPGH inspection program	Materials & Tests Engineer	Develop program. Adjust program as needed after good housekeeping SOPs formalized. Update program as needed annually.	Program developed. No revisions to program made. (SOPs not formalized as of the end of FY 2015.)	See SWMPP (s. 7.2) for discussion regarding program.
II.B.6.a.3; II.B.6.b.3; II.B.6.c.3	Development & updating of good housekeeping SOPs for support facilities	Materials & Tests Engineer	Formalize SOPs by 03/31/2016. Update formalized SOPs as needed annually.	Informal SOPs in place; formalization in progress.	See SWMPP (s. 7.2.2) for discussion regarding SOPs.

ALDOT MS4 Stormwater Management Activities:
Fiscal Year 2015 Actions & Statuses Summary

Permit Requirement(s)	Activity	Associated ALDOT Personnel	Permit Term Goal	Actions / Status During FY 2015	Supplemental Information
II.B.6.a.4; II.B.6.b.4	Development of support facility good housekeeping training program	Materials & Tests Engineer	Develop program. Adjust program as needed after good housekeeping SOPs formalized.	Program developed. No revisions to program made. (SOPs not formalized as of the end of FY 2015.)	See SWMPP (s. 7.2.5) for discussion regarding training program.
II.B.6.a.5; II.B.6.b.5; II.B.6.c.4	Development & updating of support facility spill prevention & response program	Materials & Tests Engineer	Develop program. Update program as needed annually.	Program developed. No revisions to program made.	See SWMPP (s. 7.2.3) for discussion of SPCC plans employed by ALDOT support facilities. See SWMPP (App. G) for an example of an SPCC plan.
II.B.6.a.6	Transportation facility maintenance: Condition assessments	State Maintenance Engineer	Conduct assessments according to established procedure.	Conducted assessments as expected.	See SWMPP (s. 7.3) for overview of assessment procedure.
II.B.6.a.6	Transportation facility maintenance: Snow & ice control	State Maintenance Engineer	Track work reports completed.	905 work reports completed during FY 2015 (estimated using ALDOT District data).	See App. G for "ALDOT MS4 Transportation Facility Maintenance: Fiscal Year 2015." See SWMPP (s. 7.3.1) for discussion regarding how work is performed.
II.B.6.a.6	Transportation facility maintenance: Litter pickup (full-width)	State Maintenance Engineer	Track pass miles cleaned.	22,332 pass miles cleaned during FY 2015 (estimated using ALDOT District data).	See App. G for "ALDOT MS4 Transportation Facility Maintenance: Fiscal Year 2015." See SWMPP (s. 7.3.2) for discussion regarding how work is performed.
II.B.6.a.6	Transportation facility maintenance: Spot litter pickup	State Maintenance Engineer	Track work reports completed.	1,637 work reports completed during FY 2015 (estimated using ALDOT District data).	See App. G for "ALDOT MS4 Transportation Facility Maintenance: Fiscal Year 2015." See SWMPP (s. 7.3.2) for discussion regarding how work is performed.
II.B.6.a.6	Transportation facility maintenance: Herbicide treatment	State Maintenance Engineer	Address in work for Pesticides General Permit.	Addressed in PGP work.	See SWMPP (s. 7.3.3) for discussion regarding how work is performed.
II.B.6.a.6	Transportation facility maintenance: Spot herbicide treatment	State Maintenance Engineer	Address in work for Pesticides General Permit.	Addressed in PGP work.	See SWMPP (s. 7.3.3) for discussion regarding how work is performed.
II.B.6.a.6	Transportation facility maintenance: Herbicide treatment surveillance	State Maintenance Engineer	Address in work for Pesticides General Permit.	Addressed in PGP work.	See SWMPP (s. 7.3.3) for discussion regarding how work is performed.
II.B.6.a.6	Transportation facility maintenance: Cleaning minor drainage structures	State Maintenance Engineer	Track structures inspected / cleaned.	6,340 structures inspected / cleaned during FY 2015 (estimated using ALDOT District data).	See App. G for "ALDOT MS4 Transportation Facility Maintenance: Fiscal Year 2015." See SWMPP (s. 7.3.4) for discussion regarding how work is performed.
II.B.6.a.6	Transportation facility maintenance: Repairing minor drainage structures	State Maintenance Engineer	Track work reports completed.	419 work reports completed during FY 2015 (estimated using ALDOT District data).	See App. G for "ALDOT MS4 Transportation Facility Maintenance: Fiscal Year 2015." See SWMPP (s. 7.3.4) for discussion regarding how work is performed.
II.B.6.a.6	Transportation facility maintenance: Erosion control	State Maintenance Engineer	Track work reports completed.	207 work reports completed during FY 2015 (estimated using ALDOT District data).	See App. G for "ALDOT MS4 Transportation Facility Maintenance: Fiscal Year 2015." See SWMPP (s. 7.3.5) for discussion regarding how work is performed.
II.B.6.d.1	Support facility PPGH inspections	Materials & Tests Engineer	Conduct inspections at each facility at least annually. Reporting inspection results for MS4 purposes beginning 2nd year of Permit term.	18 facility inspections during FY 2015. Inspection findings addressed in accordance with SPCC plans.	See App. G for "ALDOT MS4 Support Facility Annual Inspections: Fiscal Year 2015."
II.B.6.d.2	Tracking of support facility good housekeeping training sessions	Materials & Tests Engineer; Region Engineers	Track sessions facilitated.	16 sessions facilitated during FY 2015.	See App. C for "ALDOT MS4 Support Facilities SPCC & Universal Waste Training: Fiscal Year 2015."
II.B.6.d.2	Tracking of support facility employees participating in good housekeeping training	Materials & Tests Engineer; Region Engineers	Track employees participating.	293 employees trained during FY 2015.	See App. C for "ALDOT MS4 Support Facilities SPCC & Universal Waste Training: Fiscal Year 2015."

ALDOT MS4 Stormwater Management Activities:
Fiscal Year 2015 Actions & Statuses Summary

Permit Requirement(s)	Activity	Associated ALDOT Personnel	Permit Term Goal	Actions / Status During FY 2015	Supplemental Information
II.B.6.d.2	Tracking of vegetation management training course sessions	Training Bureau Chief	Track sessions facilitated.	7 sessions facilitated during FY 2015.	See App. C for "ALDOT Vegetation Management Training Course: Fiscal Year 2015."
II.B.6.d.2	Tracking of vegetation management training newsletters created & distributed	State Maintenance Engineer	Track newsletters distributed.	4 newsletters distributed during FY 2015.	See SWMPP (App. C) for example newsletter.
II.B.6.d.2	Tracking of sessions of "Review for Commercial Applicator Examination" course	Training Bureau Chief	Track sessions facilitated.	2 sessions facilitated during FY 2015.	See App. C for "ALDOT MS4-Applicable Employee Education: Fiscal Year 2015."
II.B.6.d.2	Tracking of vegetation management training course participants	Training Bureau Chief	Track participants.	296 participants (224 ALDOT, 72 non-ALDOT) for training purposes during FY 2015.	See App. C for "ALDOT Vegetation Management Training Course: Fiscal Year 2015."
II.B.6.d.2	Tracking of participants of "Review for Commercial Applicator Examination" course	Training Bureau Chief	Track participants.	27 participants during FY 2015.	See App. C for "ALDOT MS4-Applicable Employee Education: Fiscal Year 2015."
MS4 Monitoring					
II.D.3; II.D.4; II.D.[5]; III.A.6	Determination of the ALDOT MS4's potential as a practical source of POCs for 303(d) & TMDL waters	State Design Engineer	Assess ALDOT potential impacts with respect to various POCs on 303(d) and TMDL waters in MS4 areas. Reassess ALDOT impact as needed considering future research findings or collected monitoring data.	Assessment performed using data collected through the development of the 03/20/2014 version of the SWMPP.	See SWMPP (s. 8.3) for discussion regarding assessment.
II.D.[5]	Determination of the effectiveness of stormwater management practices in achieving TMDL performance requirements	State Design Engineer	Use monitoring data to determine if the ALDOT MS4 is significantly contributing to pollution of ALDOT-applicable TMDL waters. Adjust practices as needed if contribution is significant.	Complete sets of monitoring data collected through the end of FY 2015 provide no definitive evidence of significant ALDOT contribution. No adjustment to practices made based on monitoring findings.	See App. H for a summary of monitoring activities for FY 2015.
III.A.1; III.B	Annual assessments of the overall effectiveness of stormwater management practices using monitoring data & adjust practices accordingly	State Design Engineer	Provide annual assessments. Adjust practices as needed in response to assessment.	No adjustment to practices made based on monitoring findings. Will continue to collect and analyze monitoring data in order to make a viable assessment of effectiveness.	See App. H for a summary of monitoring activities for FY 2015.
III.A.2	Development & updating of monitoring plan	State Design Engineer	Develop monitoring plan. Update plan as needed annually.	Monitoring plan revised (with an updated sonde deployment schedule) during FY 2015.	See SWMPP (c. 8) for revised monitoring plan. See Part IV for details regarding modifications made to monitoring plan during FY 2015.
III.A.3	Analysis of monitoring data	State Maintenance Engineer	Analyze monitoring data collected after field implementation.	Analyses of complete sets of monitoring data collected through the end of FY 2015 (representing 2 of 6 monitoring locations) performed.	See App. H for a summary of monitoring activities for FY 2015.
III.A.4	Tracking of monitoring activities	State Maintenance Engineer	Track monitoring activities.	Monitoring at 2 of 6 selected locations completed during FY 2015. Monitoring at 2 additional locations commenced during FY 2015 and is ongoing as of the end of FY 2015.	See App. H for a summary of monitoring activities for FY 2015.
III.A.5	Coordination of monitoring with other MS4s	State Maintenance Engineer	Coordinate with other MS4s as necessary.	Coordinated data collection with City of Daphne so that monitoring at the selected Baldwin County location is a joint effort. (Monitoring at this location commenced during FY 2015 and is ongoing as of the end of FY 2015.)	See App. H for a summary of monitoring activities for FY 2015.

Appendix B:

Supplemental Material for Section II.B

(reserved)

Appendix C:

Supplemental Material for Section II.C

ALDOT-Keep Alabama Beautiful Agreement
(February 2015 – September 2017)

ALDOT MS4-Applicable Employee Education:
Fiscal Year 2015

ALDOT QCI Recertification Training:
Fiscal Year 2015

ALDOT Vegetation Management Training Course:
Fiscal Year 2015

ALDOT MS4 Support Facility SPCC & Universal Waste Training:
Fiscal Year 2015

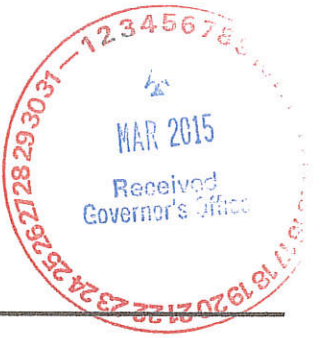
Vegetation Management Training Agendas
(2014 & 2015)

MS4 Overview & Discussion Agenda:
Troy Area

ALDOT Environmental Concerns Log:
Fiscal Year 2015

ALDOT Community Outreach Group Meetings:
Fiscal Year 2015

Reviewed
3/6/15



February 23, 2015

FOR: **DEPUTY DIRECTOR, TRANSPORTATION DIRECTOR, and GOVERNOR**

RETURN TO: **MARK WAITS**
MAINTENANCE BUREAU

RE: **Keep Alabama Beautiful (KALB)**
Agreement

AGREEMENT

BETWEEN KEEP ALABAMA BEAUTIFUL (KALB)
AND
THE STATE OF ALABAMA
DEPARTMENT OF TRANSPORATION (ALDOT)

This agreement is made and entered into by and between the State of Alabama, (acting by and through the Alabama Department of Transportation), hereinafter referred to as ALDOT; and Keep Alabama Beautiful, hereinafter referred to KALB, for the purpose of providing public promotion of the ALDOT anti-litter program.

A. **KALB agrees to provide the following:**

1. Oversee and promote the KALB affiliate network

2. Create and maintain a KALB online presence with a website

3. Develop and maintain a social media presence via Facebook and Twitter

4. Coordinate and notify all KALB affiliates of statewide events including the Great American Cleanup

5. Organize and implement programs to increase awareness to reduce littering

6. Develop and hold public education events

7. Submit quarterly itemized invoices with all supporting documentation, covering actual costs of providing public promotion of the KALB Program

8. Provide two part-time employees to be paid by KALB. These employees, along with KALB's State Leader, will serve as liaisons to ALDOT to ensure that the program is fully serviced to provide exposure statewide, as well as ensuring that maximum compliance of the program is serviced including the following:

    a) Keep Alabama Beautiful Assistant Director

    b) Keep Alabama Beautiful Affiliate Coordinator

9. The employees listed in Section 8 shall also:

    a) Oversee the Keep Alabama Beautiful education and cleanup events

    b) Perform annual site visits to KALB affiliates

    c) Keep records of all KALB cleanup events and education events to include specifics on number of volunteers, volume of litter collected, volume of recyclables collected, list of material collected for recycling, number of education events held, number of volunteers assisting with education events,

number of adult attendees, number of student attendees. These lists shall be submitted on a collective statewide basis, unless otherwise requested by ALDOT.

d) Provide quarterly updates to ALDOT on new KALB affiliates and any KALB affiliates that become inactive

e) Recruit new KALB affiliates to maximize the number of cleanups across the state and increase the awareness and education programs parameters

10. Provide a written quarterly report to ALDOT of KALB activities to include:

a) List of cleanups held, volumes of litter collected, number of volunteers, list of partner organizations

b) List of education events held, number of volunteers, list of partner organizations, number of attendees

c) List of new KALB affiliates, inactivated affiliates, etc.

d) List of all public service announcements that air to include air schedules

e) List of all billboard messages and locations

11. Provide safety vests for all individuals participating in cleanup events and participating in other KALB activities where litter will be removed. KALB will also be responsible for informing all participants that safety vests should be worn when they are picking up litter. KALB is also responsible for making sure that KALB affiliates are aware that Hold Harmless documents should be signed and maintained by KALB affiliates holding cleanup events.

B. <u>ALDOT agrees to provide the following:</u>

1. Oversee KALB oversight and promotion of the affiliate network

2. Provide litterbags for KALB participants as required

3. Provide removal and disposal of litter collected by KALB participants as required

4. Reimburse KALB a maxim for the fiscal year in accordance with the proposed budget listed below:

Salaries	
KALB Assistant Director	$ 24,000
KALB Coordinator	$ 9,000

Travel (Actual Expenses)**

State Leader	$ 7,000
Assistant Director	$ 3,000
Coordinator	$ 3,000
Other (Actual Expenses)**	
Statewide Cleanup Materials, Storage, Supplies, & Shipping	$ 100,000
Promotion*	$ 30,000
Public Service Announcements*	$ 40,000
Safety Vests	$ 34,000
Total Yearly Budget	**$ 250,000**

*KALB agrees that all promotional materials and programs must receive final approval of ALDOT prior to distribution or implementation.

**KALB agrees that all reimbursed expenses will be for those expenses solely expended for the public promotion of the ALDOT anti-litter program.

C. **Funds shall not be constituted as a debt:**

It is agreed that the terms and commitments contained herein shall not be constituted as a debt of the State of Alabama in violation of Article 11, Section 213 of the Constitution of Alabama 1901, as amended by Amendment Number 26. It is further agreed that if any provision of this Agreement shall contravene any statute or Constitutional provision of amendment, either now in effect of which may, during the course of this Agreement, be enacted, then the conflicting provision in the Agreement shall be deemed null and void.

D. **Termination due to Insufficient funds:**

1. If the Agreement term is to exceed more than one fiscal year, then said Agreement is subject to termination in the event that funds should not be appropriated for the continued payment of the Agreement in subsequent fiscal years.

2. In the event of proration of the fund, from which payment under this Agreement is to be made, Agreement will be subject to termination.

3. This Agreement can be terminated by either party upon thirty days written notice to the other party.

E. **ADR Clause:**

For any and all disputes arising under the terms of this contract, the parties hereto agree, in compliance with the recommendation of the Governor and Attorney General, when considering settlement of such disputes, to utilize appropriate forms of non-binding alternative dispute resolution including, but not limited to, mediation by and through the

Attorney General's Office of Administrative Hearings or where appropriate, private mediators.

F. Hold Harmless:

KALB, its employees, agents, affiliates, successors, assigned, contractors, or subcontractors shall defend indemnify and hold harmless the State of Alabama, Department of Transportation and their officials, employees, contractors, servants, or agents, in both their officials, employees, contractors, servants, or agents, in both their official and individual capacities, from and against any and all claims, damages, losses, actions, causes of actions, losses or expenses of any nature whatsoever, regulatory actions, administrative actions, quasi-administrative or quasi-judicial actions or procedures, State, Federal, or otherwise, of any nature whatsoever, whether known or unknown, including but not limited to compensatory damages, punitive damages, damages for any injury to person or property, tangible or intangible, or any form of monetary or compensatory relief declaratory or injunctive relief, or any nature whatsoever, whether known or unknown, or attorney fees, costs, or expenses, caused by or rising out of, resulting from or in any way related to the performance of any work, conduct or activity performed or failed to be performed by KALB in connection with the performance of any of the provisions of this Agreement.

G. Non-Agent Clause:

By entering into this agreement, KALB is not an agent of the State, its officers, employees, agents or assigns. KALB is an independent entity from the State and nothing in this agreement creates an agency relationship between the parties.

H. Merit Law:

KALB employees and affiliates will not be subject to the provisions of, nor entitled to, the benefits of the State merit law or State employee benefits, including State employee health insurance.

I. Information and Reports:

KALB will permit access to its books, records, accounts, other sources of information and its facilities as may be determined by the ALDOT to be pertinent to ascertain compliance with its instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish this information, KALB shall so certify to ALDOT and shall set forth what efforts he has made to obtain the information.

J. Period of Agreement:

THIS AGREEMENT is in effect for the period beginning February 3, 2015 and ending September 30, 2017.

IN WITNESS WHEREOF, the parties hereto cause this agreement to be executed by those officers, officials, and persons thereunto duly authorized, and the agreement is deemed to be effective on the date stated hereinafter as the date of the approval of the Governor of Alabama.

BY: _____
Joy McKee, KALB Director

APPROVED AS TO FORM:

_____
Jim R. Ippolito, Jr., Chief Counsel

Funding for this project has been approved and obligated.

_____
Stacey N. Glass, State Maintenance Engineer

STATE OF ALABAMA
ACTING BY AND THROUGH THE
ALABAMA DEPARTMENT OF TRANSPORTATION

_____
Deputy Director
John E. Lorentson

_____
Transportation Director
John R. Cooper

THE WITHIN AND FOREGOING AGREEMENT IS HEREBY APPROVED ON THE 6th DAY OF March , 20 15 .

_____
GOVERNOR OF ALABAMA
ROBERT BENTLEY

ALDOT MS4-Applicable Employee Education:
Fiscal Year 2015

Event	Date(s)	Total Employee Attendees
Professional Education Events		
AASHTO NTPEP Annual Meeting	05/17/2015	1
ADEM Nonpoint Source Conference	01/15/2015	28
Alabama ASCE Summer Meeting	07/27/2015	18
Alabama ASCE Winter Meeting	02/19/2015	5
Alabama Chapter Soil & Water Conservation Society Annual Conference	06/22/2015	17
Alabama Clean Water Partnership Annual Watershed Conference	02/18/2015	15
Alabama Geological Society Field Trip	12/11/2014	2
Alabama Invasive Plant Council Annual Conference	05/07/2015	11
Alabama Vegetation Management Society Annual Meeting	02/24/2015	147
Alabama's Water Environment Association Annual Conference	04/13/2015	2
Alabama Water Resources Conference & Symposium	09/04/2015	2
Alabama Water Watch Certification Course	05/12/2015	6
ALDOT Annual Maintenance Management Meeting	08/05/2015	172
ALDOT Annual Pre-Construction Conference	05/06/2015	85
ALDOT Construction & Materials Engineers' Conference	09/01/2015	189
Annual NACC Environmental & Safety Conference	05/19/2015	1
Annual Transportation Conference	02/09/2015	450
Attorney's Guide to Stormwater Runoff Issues & Compliance	06/10/2015	4
Clear Water Alabama (2014)	10/08/2014	28
Clear Water Alabama (2015)	09/02/2015	21
EnviroCert BOD Meeting	02/07/2015	1
EPA/SEIECA Annual MS4 Stormwater Conference	06/15/2015	4
Gadsden-Etowah MS4 Conference	04/15/2015	4
IECA Environmental Connection Conference	02/15/2015	1
Low Impact Development BMP Workshop	01/28/2015	2
National Roadside Vegetation Management Association Annual Conference	10/07/2014	33
T2 - Designing for Effective Construction Stormwater Management	10/20/2014; 10/23/2014; 10/28/2014	64
T2 - Innovative Erosion & Sediment Control Field Day	11/03/2014	7
Training *		
ALCAD Stormwater Meeting	08/05/2015	19
CMS4S Review Course	04/09/2015	5
CPESC Review Course	06/10/2015	7
HAZWOPER 40-Hour Certification Course	11/17/2014; 01/12/2015; 03/23/2015; 06/15/2015; 08/10/2015	10
HAZWOPER 8-Hour Refresher Course	11/13/2014; 12/17/2014; 01/22/2015; 03/19/2015; 04/22/2015; 05/13/2015; 06/24/2015; 08/26/2015	58
MS4 Mock Audit Kickoff Meeting	08/26/2015	29
MS4 Overview: Southeast Region, Montgomery Area	09/29/2015	34
MS4 Overview: Southeast Region, Troy Area	09/22/2015	26
QCI Certification Training	10/02/2014; 10/21/2014; 12/09/2014; 02/27/2015; 03/12/2015; 04/30/2015; 05/13/2015; 05/19/2015; 06/11/2015; 06/25/2015; 07/29/2015; 08/13/2015; 08/26/2015; 09/17/2015	51
Review for Commercial Applicator Examination	02/10/2015; 05/12/2015	27

* QCI recertification training, vegetation management training course, and support facility SPCC & universal waste training data presented separately.

ALDOT QCI Recertification Training:
Fiscal Year 2015

Date	Location	ALDOT	City/County	Consultant	Certification Total	*Audit Only*	Session Total
05/11/2015	SE Region - Troy Area	17	4	4	**25**		**25**
05/12/2015	SE Region - Montgomery Area	16	5	11	**32**	*3*	**35**
05/13/2015	EC Region - Alexander City	29	10	1	**40**		**40**
05/14/2015	SE Region - Montgomery Area	30	3	8	**41**		**41**
05/15/2015	EC Region - Alexander City	21	2	5	**28**		**28**
05/21/2015	WC Region - Fayette Area	17	1		**18**	*4*	**22**
05/27/2015	SE Region - Troy Area	22	6	2	**30**		**30**
05/28/2015	EC Region - Alexander City	26	11	4	**41**		**41**
06/03/2015	SE Region - Montgomery Area	30	3	8	**41**		**41**
06/04/2015	EC Region - Birmingham Area	12	17	10	**39**	*1*	**40**
06/08/2015	SW Region - Mobile Area	10	23		**33**		**33**
06/09/2015	SW Region - Grove Hill	15	5		**20**	*1*	**21**
06/10/2015	North Region - Tuscumbia Area	17	10		**27**		**27**
06/11/2015	North Region - Guntersville Area	31	8		**39**	*1*	**40**
06/12/2015	WC Region - Tuscaloosa Area	19	12		**31**	*2*	**33**
06/17/2015	EC Region - Birmingham Area	14	14	16	**44**	*3*	**47**
06/29/2015	WC Region - Tuscaloosa Area	22	10		**32**	*1*	**33**
07/06/2015	North Region - Guntersville Area	27	8		**35**	*1*	**36**
07/07/2015	North Region - Tuscumbia Area	21	6		**27**	*2*	**29**
07/08/2015	WC Region - Fayette Area	17	6		**23**	*3*	**26**
07/09/2015	SW Region - Mobile Area	23	19		**42**	*1*	**43**
07/10/2015	SW Region - Grove Hill	22	1	1	**24**		**24**
07/13/2015	SE Region - Montgomery Area	16	4	4	**24**	*1*	**25**
TOTAL		474	188	74	**736**	*24*	**760**

ALDOT Vegetation Management Training Course:
Fiscal Year 2015

Date	Location	ALDOT Attendees	Non-ALDOT Attendees	Attendee Total	ALDOT Facilitating	Non-ALDOT Facilitating	Participant Total
10/21/2014	Tuscaloosa	38	1	**39**	4	2	**45**
10/22/2014	Montgomery	37	3	**40**	4	2	**46**
10/23/2014	Alex City	37	3	**40**	4	2	**46**
11/05/2014	Troy	35	29	**64**	4	2	**70**
11/06/2014	Mobile	25	4	**29**	4	2	**35**
11/07/2014	Grove Hill	22	2	**24**	4	2	**30**
09/30/2015	Guntersville	30	30	**60**	4	2	**66**
TOTAL		**224**	**72**	**296**			**338**

ALDOT MS4 Support Facilities
SPCC & Universal Waste Training:
Fiscal Year 2015

Facility Name	Session Date	Employees Trained
Central Office Complex	10/14/2014	16
Huntsville District Office	05/07/2015	19
Gadsden District Office	05/21/2015	24
Tuscumbia Area Office	11/21/2014	15
Tuscumbia District Office	11/21/2014	32
Birmingham Area Office	04/09/2015	27
Birmingham District Office		
Calera District Office	03/26/2015	21
Anniston District Office	01/08/2015	8
Tuscaloosa Area Office	11/12/2014	24
Tuscaloosa District Office	11/03/2014	22
Speigner District Office	01/06/2015	17
Montgomery Area Office	11/07/2014	11
Montgomery District Office		
Dothan District Office	07/15/2015	22
Mobile Area Office	08/10/2015	7
Mobile District Office	04/16/2015	9
Tunnel Office	08/27/2015	19
TOTAL		**293**

Alabama Department of Transportation
Vegetation Management Training
2014 Program Agenda

8:30 A.M. **Howard Peavey**, ALDOT Agronomist
- Welcome & Introductions
- Miscellaneous Vegetation Management & Herbicide Issues

9:15 A.M. **Herbicide Industry Representative**
- Industry Updates (Brush Control)
  - Jacob Hodnett, Dow AgroSciences
  - Gueth Braddock, DuPont Land Management

9:45 A.M. BREAK

10:05 A.M. **Dr. Harold Walker**, Auburn University
- Research Updates

10:50 A.M. **Jonathan Woodham**, ALDOT Agronomist
- Spill Prevention / Spill Response

11:10 P.M. **Farrell Baggett**, ALDOT TMS
- Blue Print for a Successful Herbicide Program

11:50 A.M. LUNCH (on your own)

12:50 P.M. **Howard Peavey**, ALDOT Agronomist
- Herbicide Resistance

1:20 P.M. **Dr. Harold Walker**, Auburn University
- Herbicide Formulations

1:50 P.M. BREAK

2:10 P.M. **Randy Rankin**, ALDOT
- Herbicide Truck Maintenance and Calibration

2:40 P.M. **Jonathan Woodham**, ALDOT Agronomist
- Herbicide Treatment Reporting Issues

3:00 P.M. **Howard Peavey**, ALDOT Agronomist
- Why Did My Herbicide Application Not Work?

3:30 P.M. ADJOURN

Alabama Department of Transportation
Vegetation Management Training
2015 Program Agenda

8:30 A.M. **Howard Peavey**, ALDOT Agronomist
- Welcome & Introductions
- Miscellaneous Vegetation Management & Herbicide Issues

9:15 A.M. **Herbicide Industry Representative**
- Mixing Do's & Don'ts
  - Jacob Hodnett, Dow AgroSciences
  - Gueth Braddock, Bayer Crop Sciences
  - Jerry McGukin, Bayer Crop Science
  - Dr. Jason Belcher, Bayer Crop Science

9:45 A.M. BREAK

10:05 A.M. **Dale Dickens**, Urban Forestry Coordinator, Alabama Forestry Commission
- Tree Trimming Techniques and Consequences

10:50 A.M. **Jonathan Woodham**, ALDOT Agronomist
- Herbicide Application Reporting

11:10 P.M. **Farrell Baggett**, ALDOT Superintendent: S.W. Region
- The Right Early Spring Application Can Be Budget Friendly

11:50 A.M. LUNCH (on your own)

12:50 P.M. **Howard Peavey**, ALDOT Agronomist
- Herbicide Program Review

1:20 P.M. **Randy Rankin**, ALDOT
- Safety Issues

2:00 P.M. BREAK

2:20 P.M. **Jonathan Woodham**, ALDOT Agronomist
- Herbicide / Mechanical Control Cost Comparisons

2:50 P.M. **Howard Peavey**, ALDOT Agronomist
- Herbicidal Brush Control

3:10 P.M. Final Comments / Adjourn

ALDOT MS4 Program

Overview and Discussion of MS4 Permit Requirements

Location

Troy Area Office
Training Room
Troy, Alabama

Date and Time

22 September 2015
1:30 PM

Topic

Overview and discussion of ALDOT's MS4 Permit requirements in preparation for a program audit by the Alabama Department of Environmental Management (ADEM).

Agenda

1. Southeast Region Roles and Responsibilities	George Conner
2. Overview and Discussion Format	Jim Bearrentine Dewayne Smith
3. Regulatory Overview	Barry Fagan
4. Storm Water Pollution Program Elements	
a. Structural Controls	Jim Bearrentine
b. Public Education and Involvement	Brantley Kirk
c. Illicit Discharge Detection and Elimination	Jim Bearrentine
d. Construction	Barry Fagan
e. Post-Construction	Wade Henry
f. Pollution Prevention/Good Housekeeping	Jim Bearrentine
5. Monitoring and Reporting	Jim Bearrentine
6. MS4 Audit Process	Dewayne Smith
7. Group Discussion/Feedback	

ALDOT Environmental Concerns Log:
Fiscal Year 2015*

Date	Description of Concern	County	Location Description	Report Source	Category of Concern	ALDOT Follow-Up Action(s)
01/12/2015	"improper siltfencing if any . no adem permits or state permits"	"Lee"	"roy granger rock pit,shug jordon bipass,next to krogers" [AL-147]	Environmental Concerns Reporting Tool	Construction Site Discharge Concern	Delegated to proper ALDOT representative. Investigated. Determined that pollutants neither originated on nor entered ALDOT property.
01/16/2015	Suspected erosion and subsequent sedimentation due to possible deficiencies in ground cover and runoff flow management. Flooding suspected as result of hydraulic interference caused by sediment in channel.	Jefferson	Near 1600 AL Highway 150, Bessemer	Adjacent MS4 (City of Bessemer)	Vegetation Management Concern / Construction Site Discharge Concern / Possible Illicit Discharge	First reported and addressed on 06/12/2014 (in FY 2014), but concern renewed during FY 2015. Delegated to and addressed by proper ALDOT representative.
01/28/2015	Unauthorized construction activity on ALDOT property. Suspected inadequacies in soil stabilization and the use of other erosion and sediment control BMPs.	Lee	Near 4520 U.S. Highway 29 South, Auburn	ADEM	Construction Site Discharge Concern / Vegetation Management Concern	Delegated to proper ALDOT representative. Investigated. Determined that work was done by third party over which ALDOT has no authority and potential of long-term adverse environmental impacts was not significant. Responded to ADEM within 30 days.
02/11/2015	"The trash alongside 155 says a lot, NOTHING GOOD, about Alabama. It should be cleaned up."	"Chilton"	"Between US 25 and US 31"	Environmental Concerns Reporting Tool	Transportation Facility Good Housekeeping Concern	Delegated to proper ALDOT representative. Investigated. Observation considered during evaluation of litter pickup practices.
03/09/2015	"Trash is so bad on the roadside and some places along this stretch of highway is being used as a dump. So very sad to see it in this condition !"	[Jefferson]	"Between Adamsville and Maytown"; "Shady Grove Road"	Environmental Concerns Reporting Tool	Environmental, outside of ALDOT jurisdiction	Forwarded to applicable municipalities.
03/25/2015	"There is an exceedingly large oak tree which has a hugely massive limb overhanging both of the eastbound lanes of travel of Highway 72. The tree is on the southside of the roadway, and just off the right-of-way. A large portion of the tree (roughly 1/3 of it) broke away Sunday and took down power lines. The tree appears to be hollow. The next portion of the tree that breaks away will likely fall on Highway 72, totally blocking the eastbound lanes of travel. When that happens, traffic encountering the lane blockage will happen upon it suddenly after cresting a small rise just to the west of the tree. This tree is likely a hazard to traffic and life. Any tree pruning would likely occupy/block travel portions of the roadway."	"Lauderdale"	"U.S. Highway 72"	Environmental Concerns Reporting Tool	Non-Environmental	Delegated to proper ALDOT representative.

ALDOT Environmental Concerns Log:
Fiscal Year 2015

Date	Description of Concern	County	Location Description	Report Source	Category of Concern	ALDOT Follow-Up Action(s)
04/03/2015	"ALDOT recently did some excavation etc. on this part of the interstate behind the home of Harold Harbour at 3717 Charleston Lane in the Charleston Square community. In this same area there is a "large" tree that is in the right of way behind my house at 3721 Charleston Lane in the Charleston Square community that is leaning upon the state's chain link fence that if it falls, it will hit my privacy fence as well as my house. If someone from ALDOT could come out and survey the situation and advise me what actions need to be taken, it would greatly be appreciated."	"Jefferson"	"Interstate 459 N"; "Right of way, 1/2 mile south of Acton Road"	Environmental Concerns Reporting Tool	Non-Environmental	Delegated to proper ALDOT representative.
04/14/2015	"1. Drainage for N and E side of road runs onto personal property and into fish pond. 2. Water runs over on N side of road onto personal property causing awful erosion from road ROW through property and into pond. I have tried fixing this on my property numerous times. I don't understand why I am having to deal with problems caused by drainage design from the highway."	"Mobile"	"4840 Lott Rd. Approx 1000 ft East on Lott Rd from intersection of Lott Rd and Schillingers Rd."	Environmental Concerns Reporting Tool	Transportation Facility Good Housekeeping Concern	Delegated to and addressed by proper ALDOT representative.
04/21/2015	"The canal and ponds that surround the Cypress Village complex are full of garbage and debris. Numerous species of wild life, from birds & fish to alligators live on these waters and the pollution looks very bad. I don't have a solution, not sure where all the garbage comes from, usually worse after heavy rains, so may just be runoff? How can we get this area of concern cleaned up? Not sure who is responsible for it."	"Baldwin"	"23833G Cypress Manor, Orange Beach"	Environmental Concerns Reporting Tool	Environmental, outside of ALDOT jurisdiction	Delegated to proper ALDOT representative. Property in question determined not to be impacted by ALDOT property runoff.
04/29/2015	"Along the highway 78 on the east side we have a lot of large brush that the mowers who have been out can't cut.it needs cleared to prevent mosquitoes and snakes coming into church property. We will keep it mowed once cleared.it's really not that much property but to much for us to clear.thanks"	"Jefferson"	"7077 highway 78 east Dora Al"	Environmental Concerns Reporting Tool	Transportation Facility Good Housekeeping Concern	Delegated to and addressed by proper ALDOT representative.
05/04/2015	Small patch of Cogongrass observed in the median of US-82.	Pickens	US-82 near the AL-MS state line	Citizen Report	Transportation Facility Good Housekeeping Concern	Delegated to and addressed by proper ALDOT representative.
05/22/2015	"The ditches in front of our terminal are over grown and the water will not recede from the back of our property, because of it. Beavers have also built a damn, just north of us and it is causing the water to back up all along Hwy 43. The county says it is the states issue, we really need help and relief. Please contact me."	"Mobile"	"11725 Hwy 43 N Axis, AL"	Environmental Concerns Reporting Tool	Transportation Facility Good Housekeeping Concern	Delegated to and addressed by proper ALDOT representative.
06/04/2015	"Fireworks Stores are being set up on state right of way. Putting the state at risk of law suits and will also cause traffic problems."	"St. Clair"	"10325 US Hwy 231 South Cropwell AL"	Environmental Concerns Reporting Tool	Non-Environmental	Delegated to proper ALDOT representative.

ALDOT Environmental Concerns Log:
Fiscal Year 2015

Date	Description of Concern	County	Location Description	Report Source	Category of Concern	ALDOT Follow-Up Action(s)
07/06/2015	Garbage observed on suspected ALDOT property.	Mobile	Near the intersection of Old Hwy 45 & Barney Carter Rd (near US-45)	Adjacent MS4 (Mobile County)	Transportation Facility Good Housekeeping Concern	Delegated to and addressed by proper ALDOT representative.
08/04/2015	"I am president of the Redmont Park Neighborhood Association and Arlington Avenue as it runs underneath the Red Mountain Expressway is in our neighborhood which is one of the finest residential areas in the state. The public ROW down Arlington is very well maintained except for the ALDOT ROW under the highway. It is overgrown and has now become a garbage dumping location. This is totally unacceptable and must be cleaned up immediately. If not corrected to our neighborhood's satisfaction, we will be forced to take more drastic action."	"Jefferson"	"ALDOT ROW where Hwy 280/31 crosses Arlington Avenue"	Environmental Concerns Reporting Tool	Transportation Facility Good Housekeeping Concern	Delegated to and addressed by proper ALDOT representative.
08/25/2015	"Grass needs cutting; especially median."	"Mobile"	"I-65" ("West Lee Street to exit 13"; "Exit 13-15")	Environmental Concerns Reporting Tool	Transportation Facility Good Housekeeping Concern	Delegated to and addressed by proper ALDOT representative.
08/27/2015	"Our roadsides are not being mowed. It has only been mowed one time this summer. As well as being very unattractive, it is a harbor for unwanted pests and spreads unwanted vegetation into our yards. It makes it impossible to keep the weeds, vines, and other plants from coming into our yards. You can only roundup so much. This problem has seemed to progressively gotten worse each year. It would seem that a regular mowing schedule should be implemented. Thank you for any consideration with this matter."	"Dale"	"SE Dale county between Hwy 167 and Hwy 84"	Environmental Concerns Reporting Tool	Transportation Facility Good Housekeeping Concern	Delegated to and addressed by proper ALDOT representative.
09/18/2015	"There is a huge rotten pine tree on the State right of way that is lodged between two tree branches and if this tree ever falls it will close the highway because it will reach from one side to the other. This tree is very large and will need to be cut into manageable sizes before it can be moved. I have tried to hire a contractor to remove the tree and he refused due to the location of the tree and the danger involved. The highway will need to be closed off temporarily while the tree is dropped. I hope no one ever get hurt if this tree ever falls prematurely because it would absolutely crush a car if it hit one and cause serious injuries. I hope this message will get to the right person as it may save a life. I have tried to get Alabama Power to cut the tree and they stated it would not interfere with their lines therefore they would not touch the tree. Please help us get this tree down and make our roadways safer. Thank You."	"Lee"	"7095 Hwy 29 North Opelika"	Environmental Concerns Reporting Tool	Non-Environmental	Delegated to proper ALDOT representative.

* Information about possible illicit discharges discovered during major outfall screening is provided in Appendix D in "ALDOT Major Outfall Inventory & Screening Summary (through Fiscal Year 2015)."

ALDOT Community Outreach Group Meetings:
Fiscal Year 2015

Date	Group	COG Attendees	Other Attendees*	ALDOT Attendees	Total Attendees	Purpose
11/04/2014	Coliseum Boulevard Plume	4	2	1	7	Status update of project; overview of drone use for observation of treatment systems.
11/13/2014	Birmingham Northern Beltline	2	2	4	8	Project overview and turbidity demonstration.
11/18/2014	Safe 98	7	2	3	12	Update on federal funding and status of plans.
12/11/2014	Coliseum Boulevard Plume	0	25	1	26	Annual update for Montgomery Area Association of Realtors (MAAR).
04/21/2015	Coliseum Boulevard Plume	4	4	3	11	Introduction of new project staff, overview of status of project, update on littering.
06/04/2015	Birmingham Northern Beltline	9	3	4	16	Introduction of new Region staff; project overview and update.
07/21/2015	Birmingham Northern Beltline	5	20	4	29	Project observation with COG members, environmental stakeholder groups, and regulatory agencies.
08/21/2015	Coliseum Boulevard Plume	5	2	2	9	Project status update; discussion about new membership recruitment; update on project clean-up by Clean City Commission

* Can include facilitators, consultants to ALDOT, realtors at MAAR meeting, or selection panel members.

Appendix D:

Supplemental Material for Section II.D

ALDOT Major Outfall Inventory & Screening Summary
(through Fiscal Year 2015)

IDDE Outfall Map Index

ALDOT MS4 Area Maps
(subset depicting completed major outfall inventory)

ALDOT MS4 Major Outfall Inventory Schedule

ALDOT Illicit Discharge Incident Tracking Form

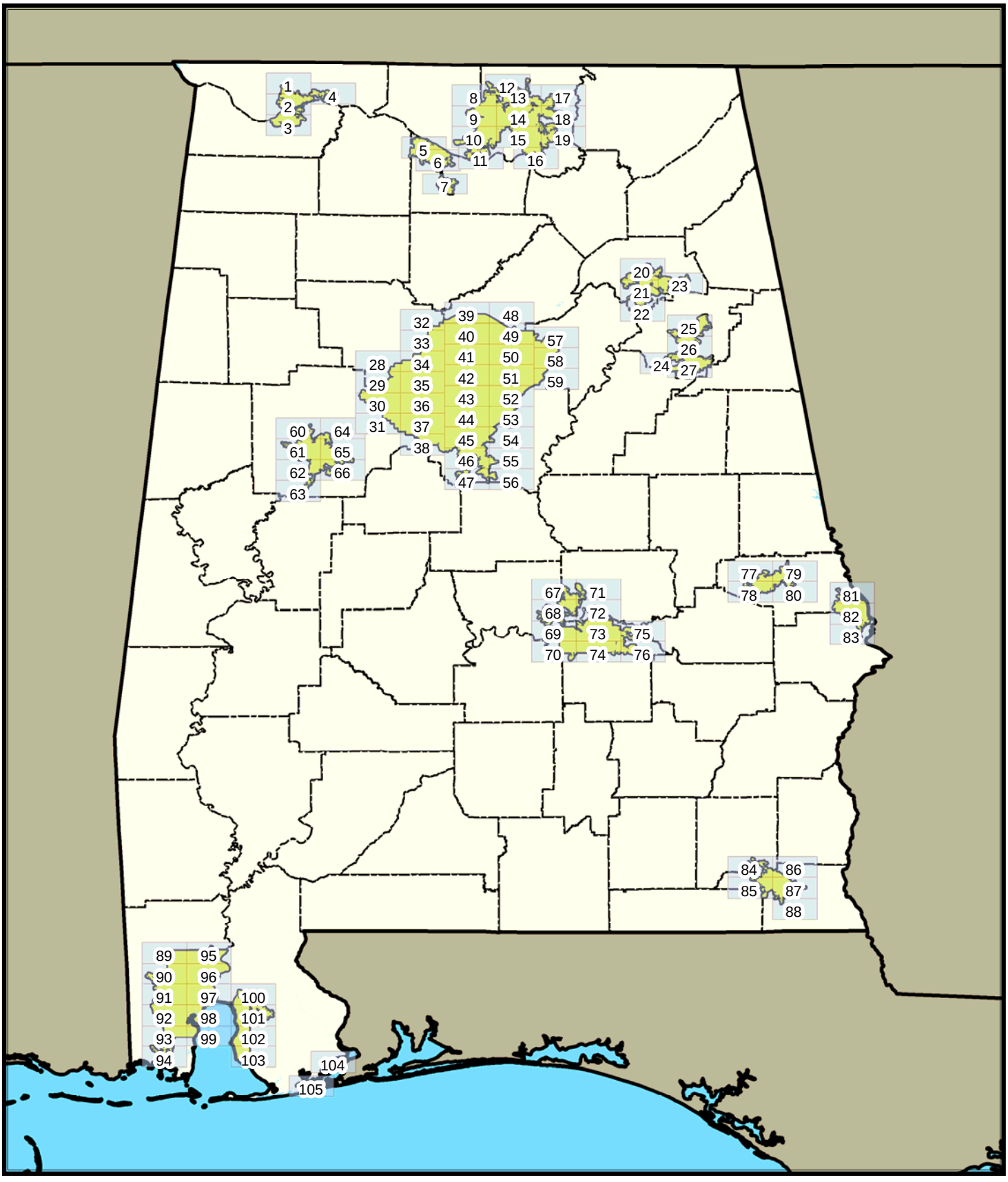
ALDOT Non-Stormwater Discharge Investigation Form

ALDOT Major Outfall Inventory & Screening Summary

(through Fiscal Year 2015)

MS4 Area	Locations Studied for Major Outfall Candidates	Major Outfalls Added to Inventory	Major Outfalls Screened	Possible Illicit Discharges at Major Outfalls	Other Possible Illicit Discharges	Possible Illicit Discharge Follow-Up Outcomes
Dothan*	52	17	17	0	3	Follow-up investigations performed. 3 illicit discharges traced to municipal MS4 and reported to appropriate MS4 authority.
Auburn/Opelika	44	6	6	0	4	Follow-up investigations performed. 1 investigation was inconclusive. 1 investigation determined naturally-occurring flow. No flow observed in 2 other investigations.
Phenix City	24	5	5	0	2	Follow-up investigations performed. 1 illicit discharge traced to municipal MS4 and reported to appropriate MS4 authority. No flow observed in the other investigation.
Montgomery	125	28	28	1	6	Follow-up investigations performed. Unable to determine source for 1 illicit discharge (at major outfall) in which algae detected; investigation continuing. 1 illicit discharge traced to municipal MS4 and reported to appropriate MS4 authority. 1 investigation determined naturally-occurring flow. No flow observed in 4 other investigations.
Tuscaloosa	98	34	34	3	5	Follow-up investigations performed. 7 illicit discharges (including 2 at major outfalls) traced to municipal MS4 and reported to appropriate MS4 authority. 1 investigation (associated with a major outfall) determined naturally-occurring flow.
TOTAL	**343**	**90**	**90**	**4**	**20**	
Percent of Major Outfalls on Inventory Screened			**100%**			

* Screening results for the Dothan MS4 area also reported in the FY 2014 annual report appendix in "ALDOT Environmental Concerns Log: Fiscal Year 2014."



IDDE Outfall Map Index

ALABAMA
DEPARTMENT OF TRANSPORTATION
DESIGN BUREAU - STORMWATER

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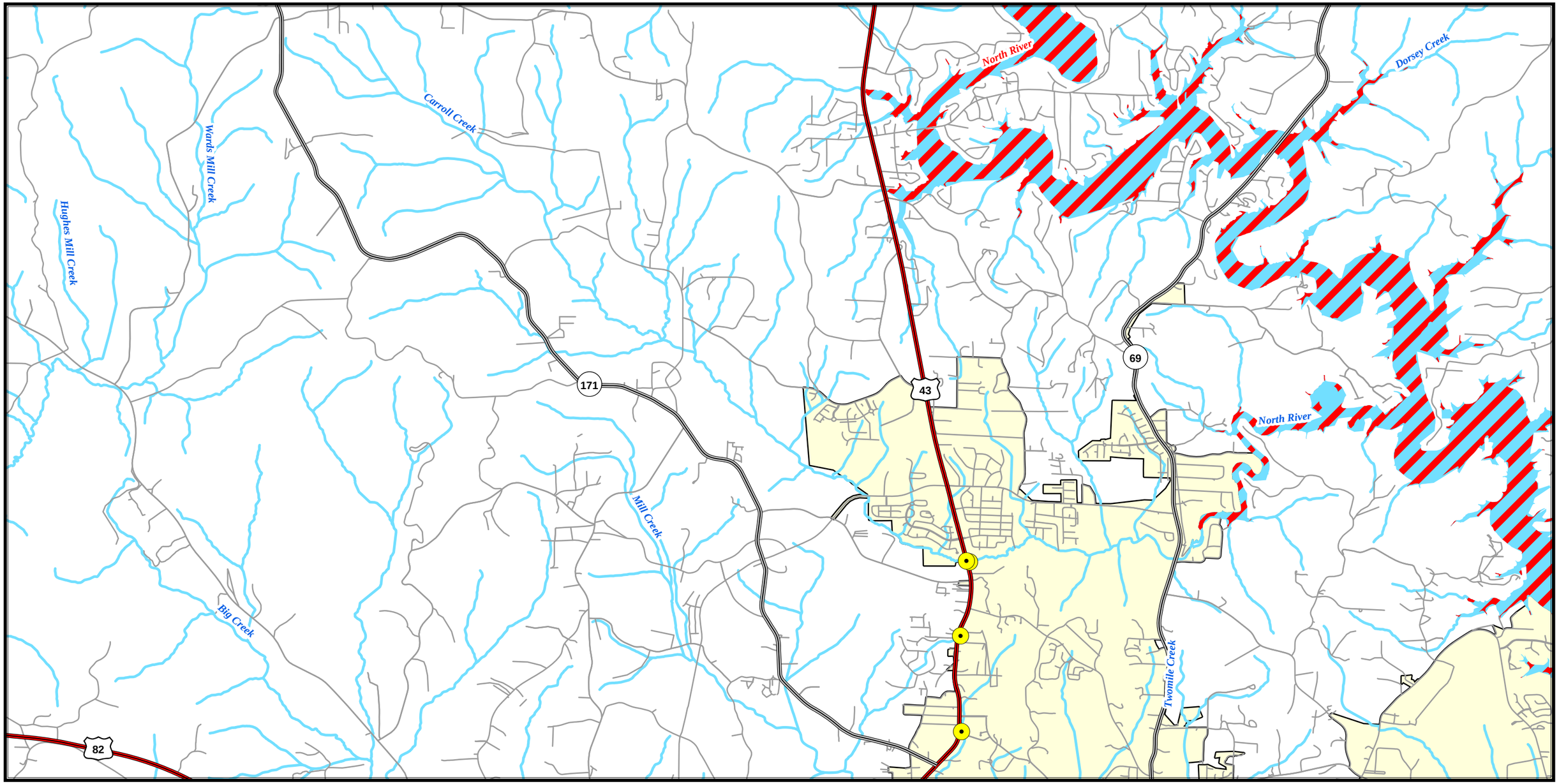

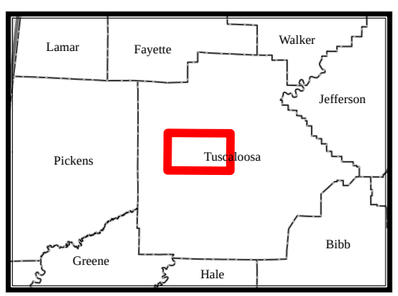

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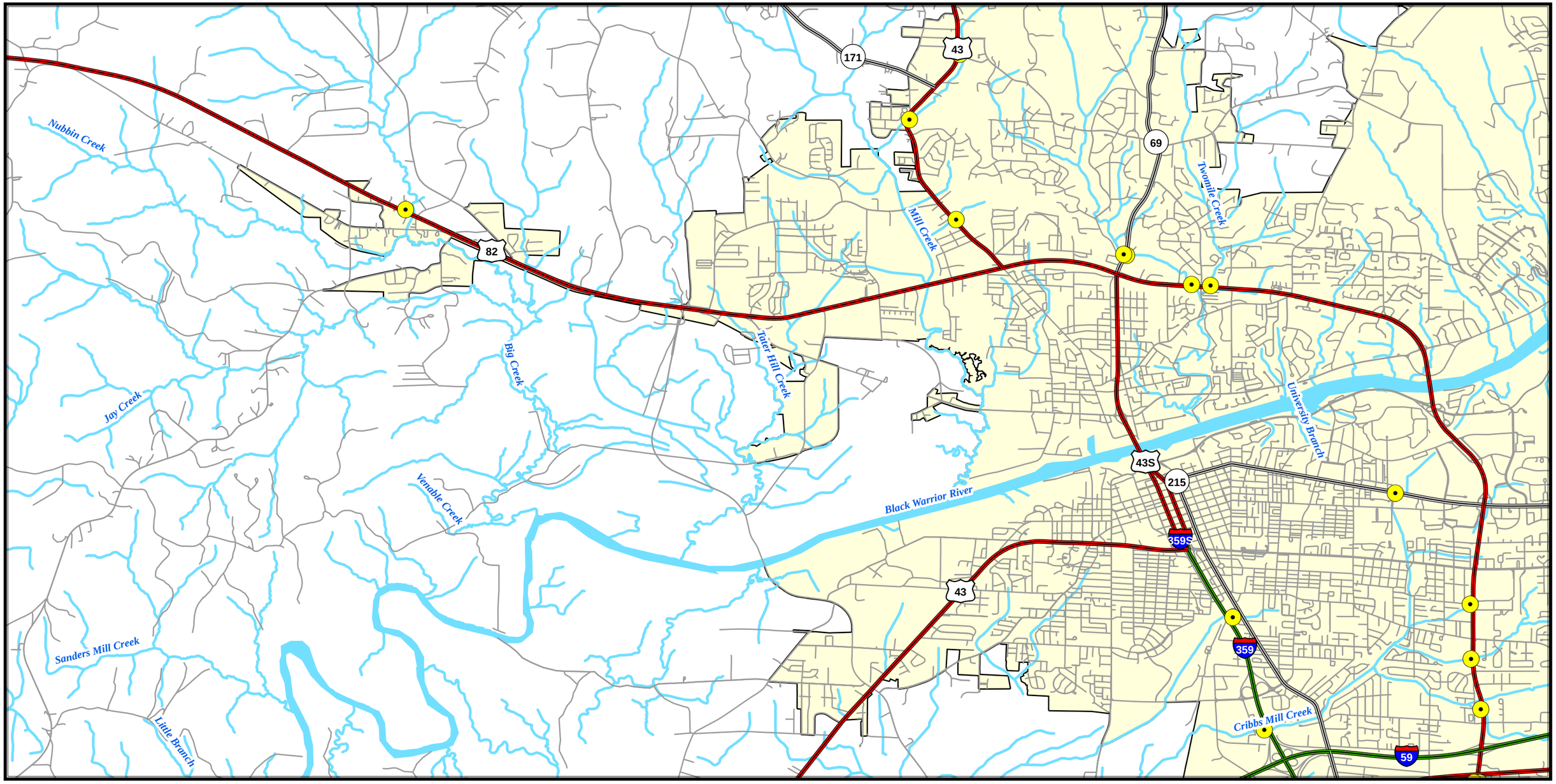
- Other POCs

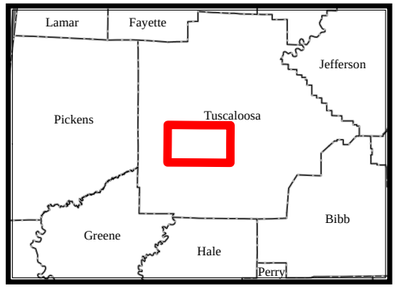
N

Department Of Transportation
Design Bureau - Stormwater

0 1,250 2,500 5,000 7,500 10,000 Feet

1 inch = 5,000 feet





ALDOT MS4 Areas Tuscaloosa Map: 2

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- Major Outfall on Inventory

303(d) / TMDL Listed Waters

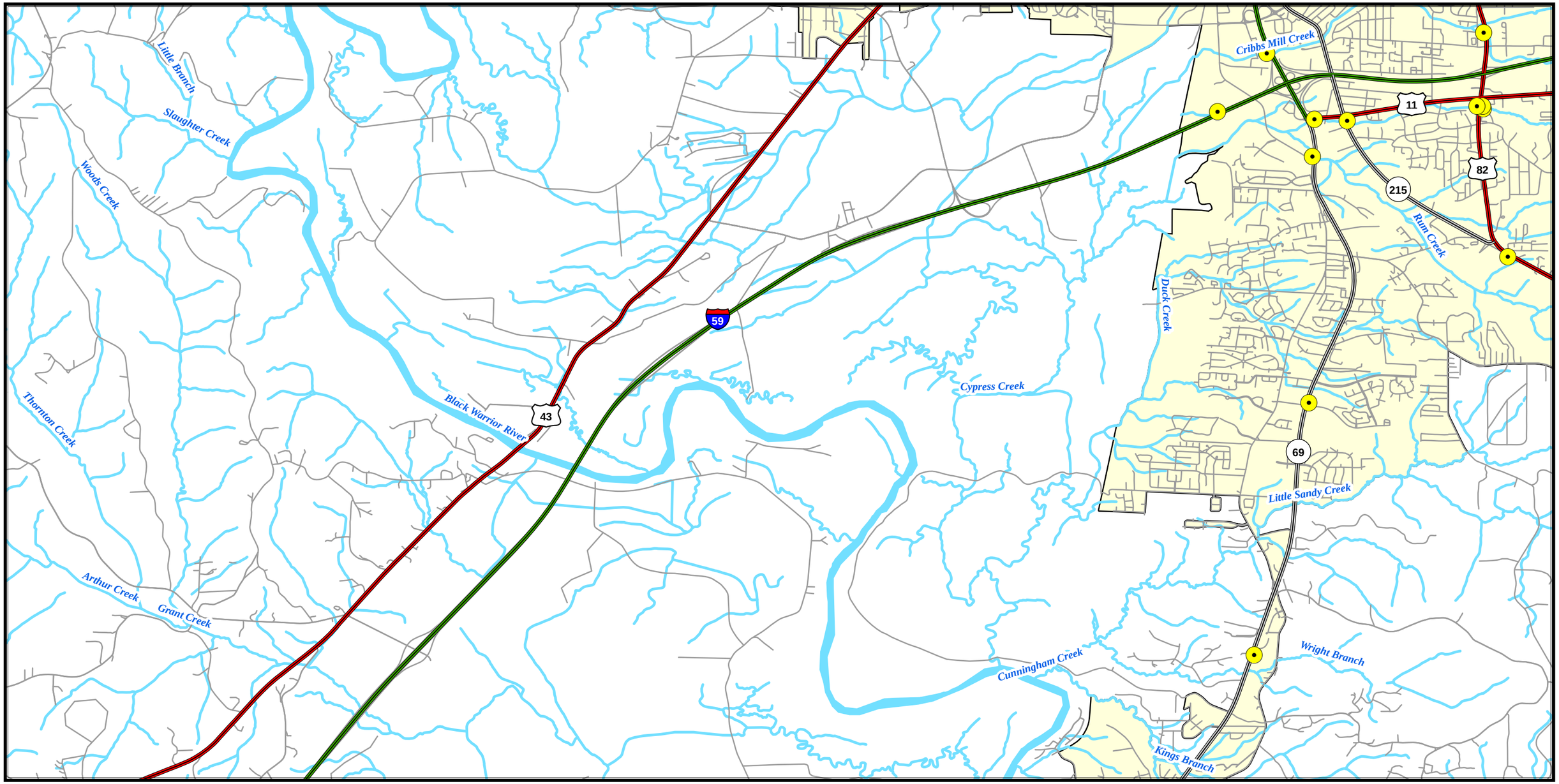
- Sediment POC
- Other POCs

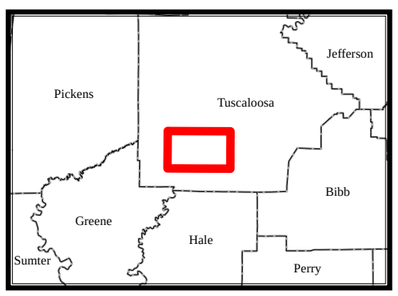
N

ALABAMA DEPARTMENT OF TRANSPORTATION
DESIGN BUREAU - STORMWATER

0 1,250 2,500 5,000 7,500 10,000 Feet

1 inch = 5,000 feet





ALDOT MS4 Areas Tuscaloosa Map: 3

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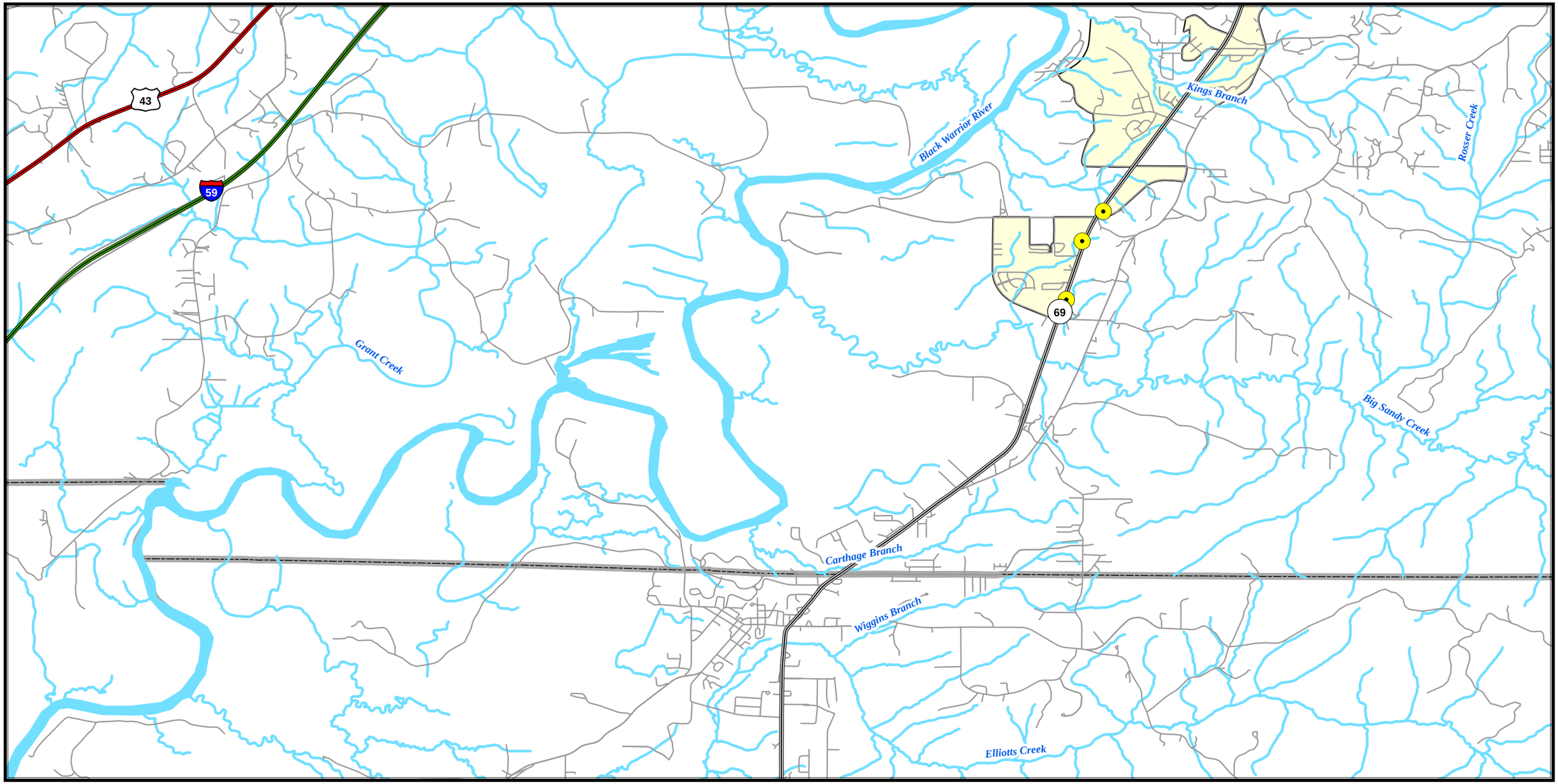
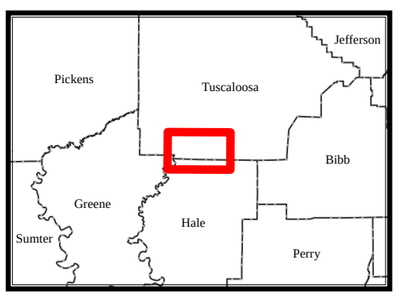
ALABAMA DEPARTMENT OF TRANSPORTATION DESIGN BUREAU - STORMWATER

0 1,250 2,500 5,000 7,500 10,000 Feet

1 inch = 5,000 feet





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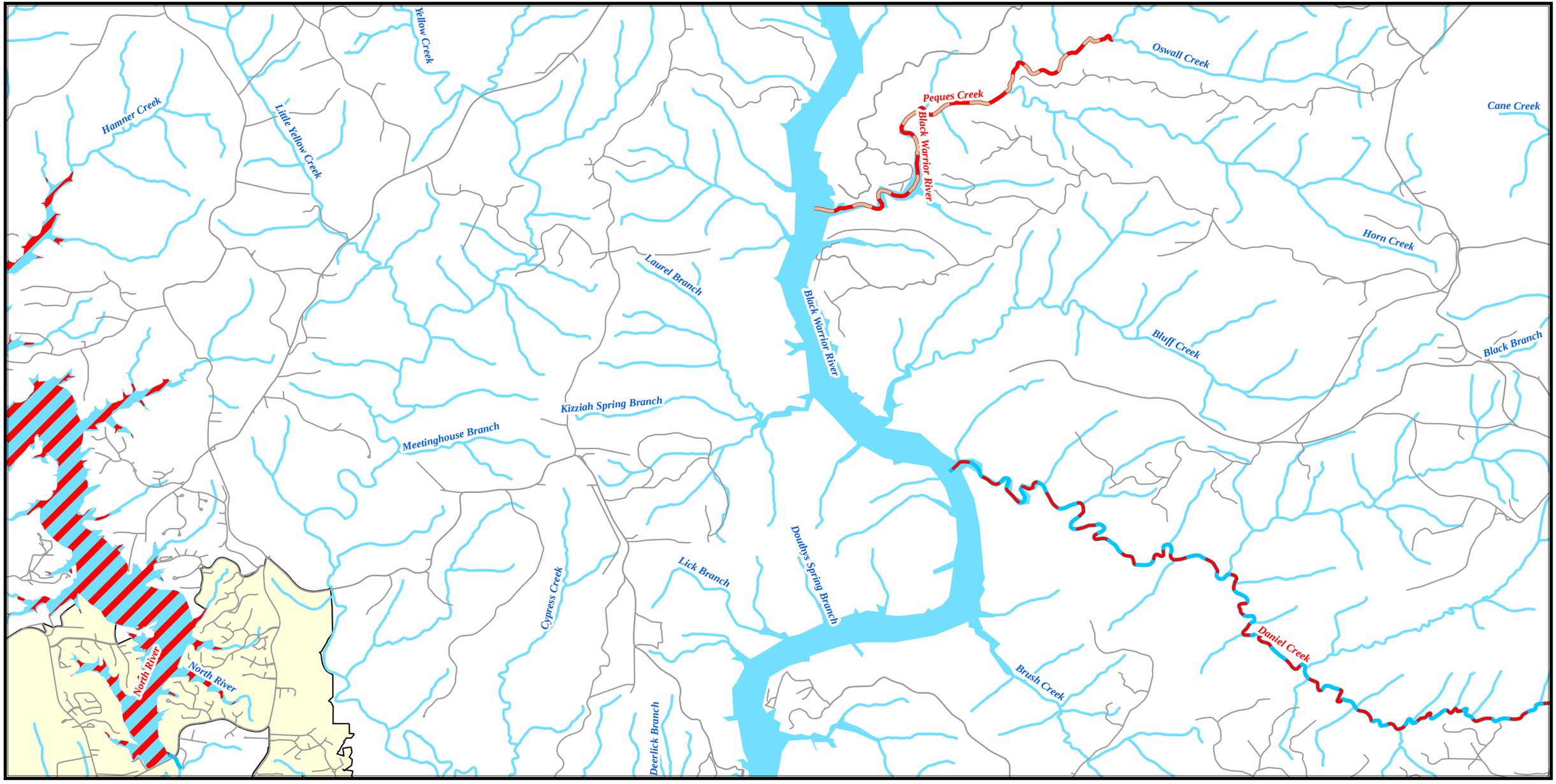
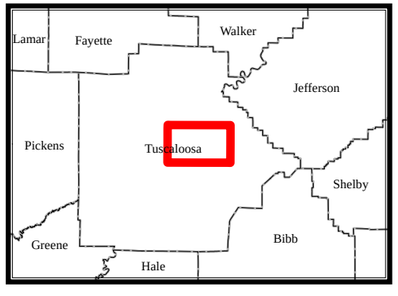
N

ALABAMA DEPARTMENT OF TRANSPORTATION DESIGN BUREAU - STORMWATER

0 1,250 2,500 5,000 7,500 10,000 Feet

1 inch = 5,000 feet





ALDOT MS4 Areas Tuscaloosa Map: 5

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Sediment POC

Other POCs

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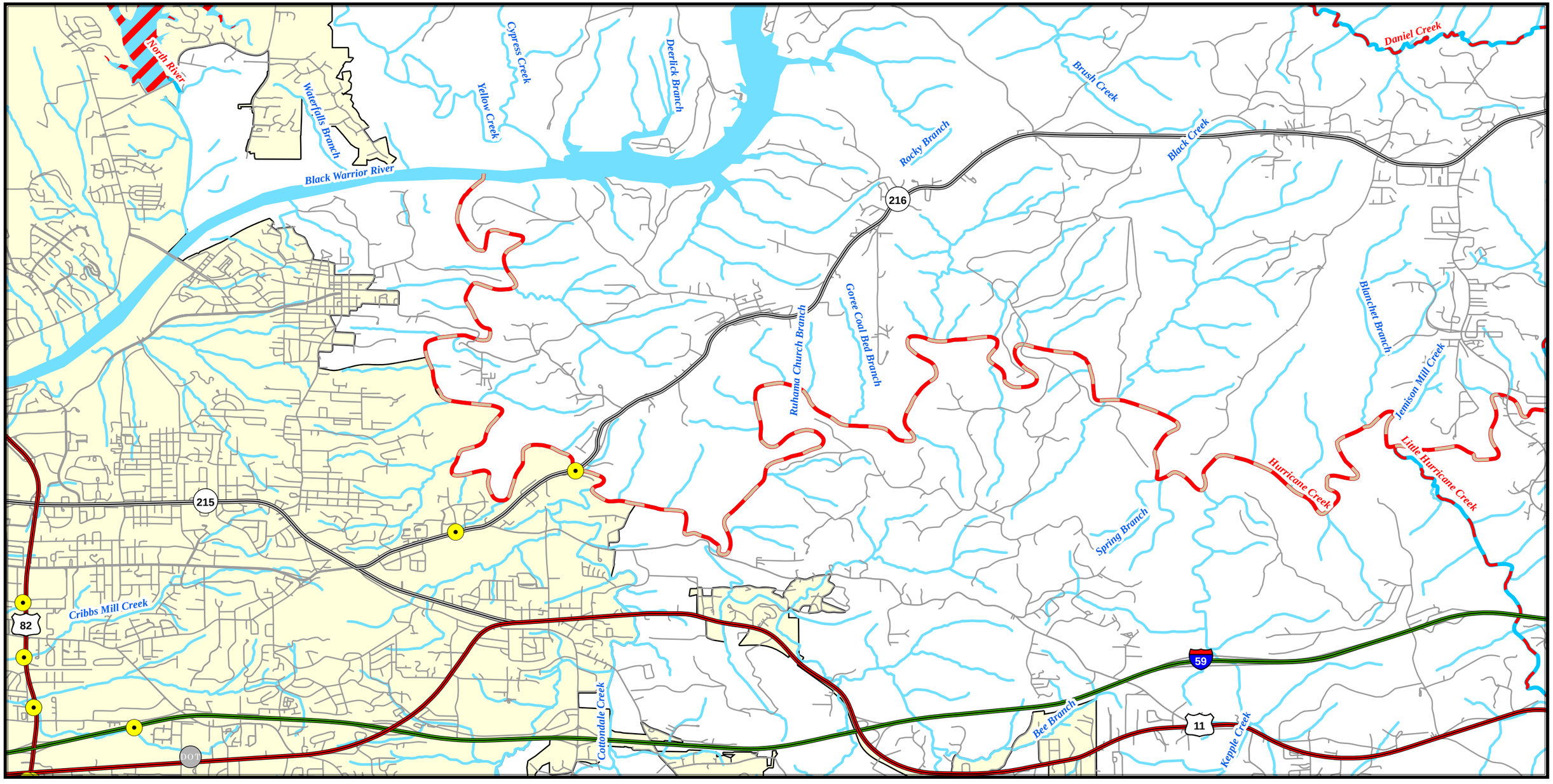
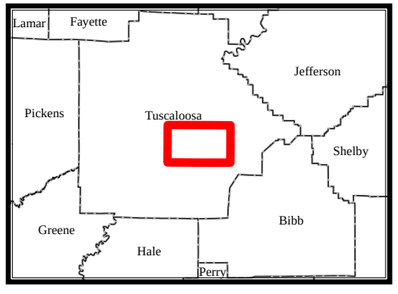
Department Of Transportation
Design Bureau - Stormwater

0 1,250 2,500 5,000 7,500 10,000 Feet

1 inch = 5,000 feet





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MS4 Area

ALDOT Support Facility

Location Needing Study

Major Outfall on Inventory

303(d) / TMDL Listed Waters

Sediment POC

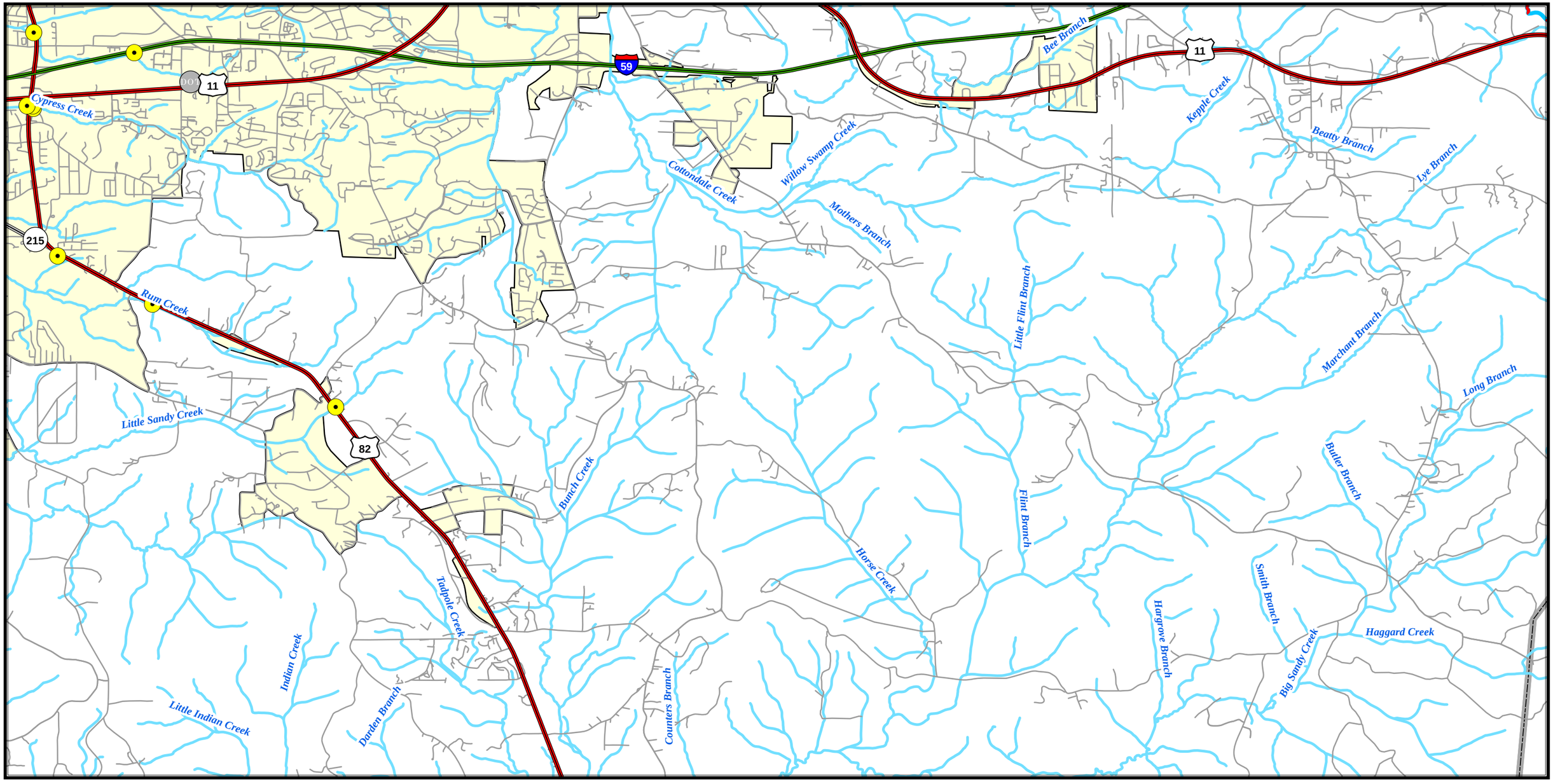
Other POCs

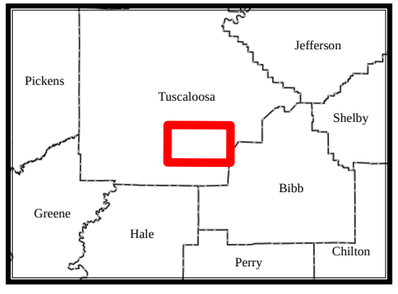
N

Department Of Transportation
Design Bureau - Stormwater

0 1,250 2,500 5,000 7,500 10,000 Feet

1 inch = 5,000 feet





ALDOT MS4 Areas Tuscaloosa Map: 7

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MS4 Area

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Sediment POC

Other POCs

N

Department Of Transportation
Design Bureau - Stormwater

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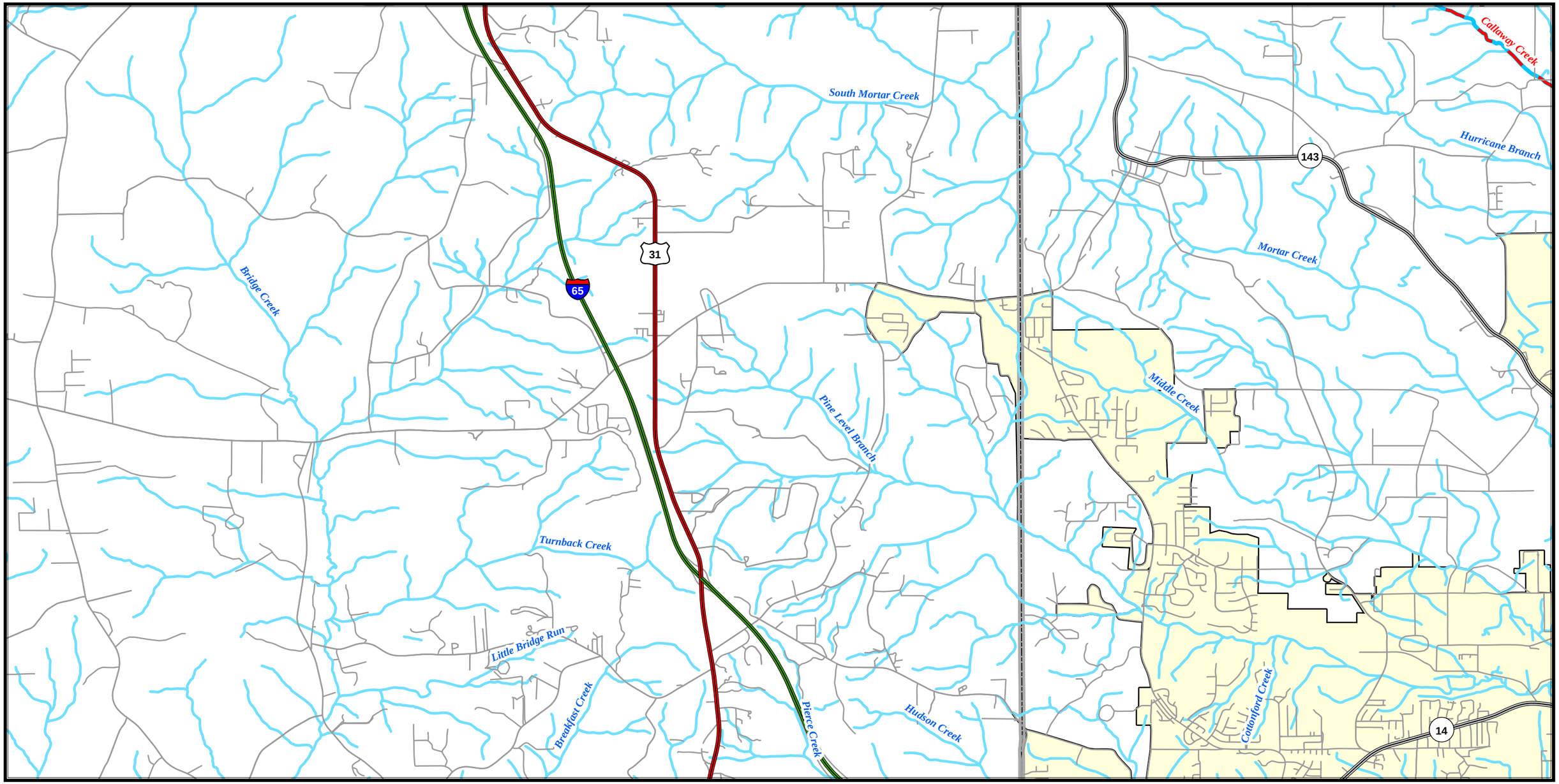
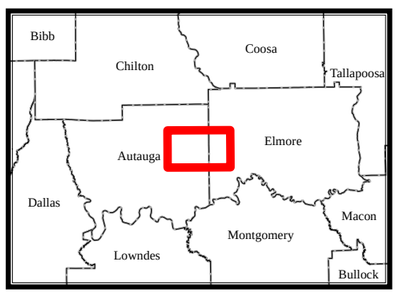
1 inch = 5,000 feet





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- Sediment POC
- Other POCs

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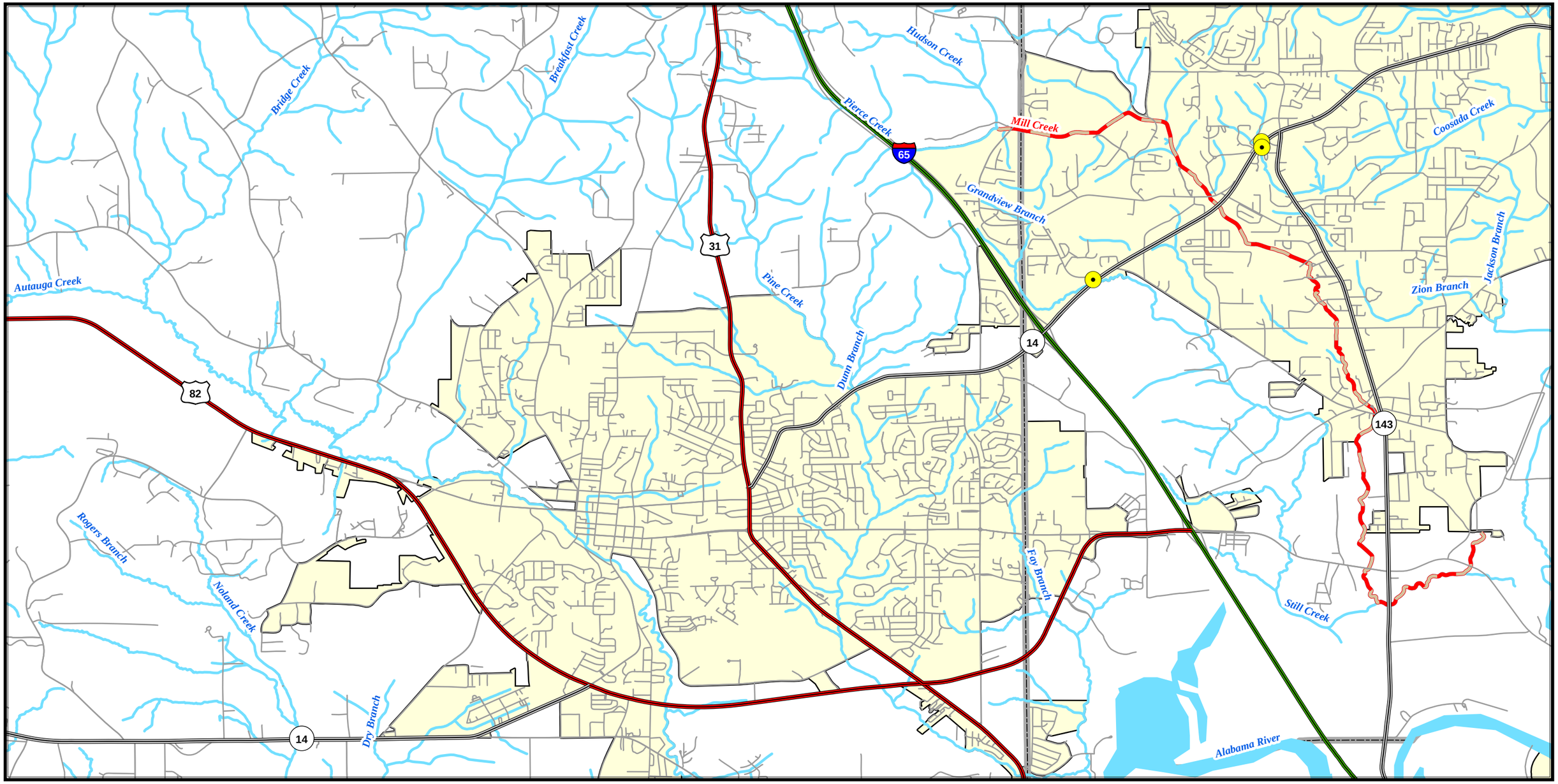
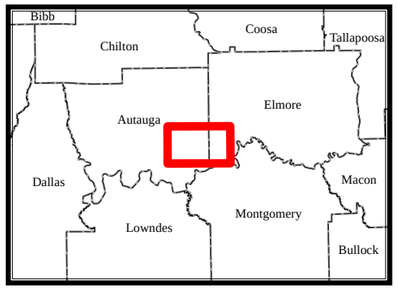
ALABAMA DEPARTMENT OF TRANSPORTATION DESIGN BUREAU - STORMWATER

0 1,250 2,500 5,000 7,500 10,000 Feet

1 inch = 5,000 feet





ALDOT MS4 Areas Montgomery Map: 2

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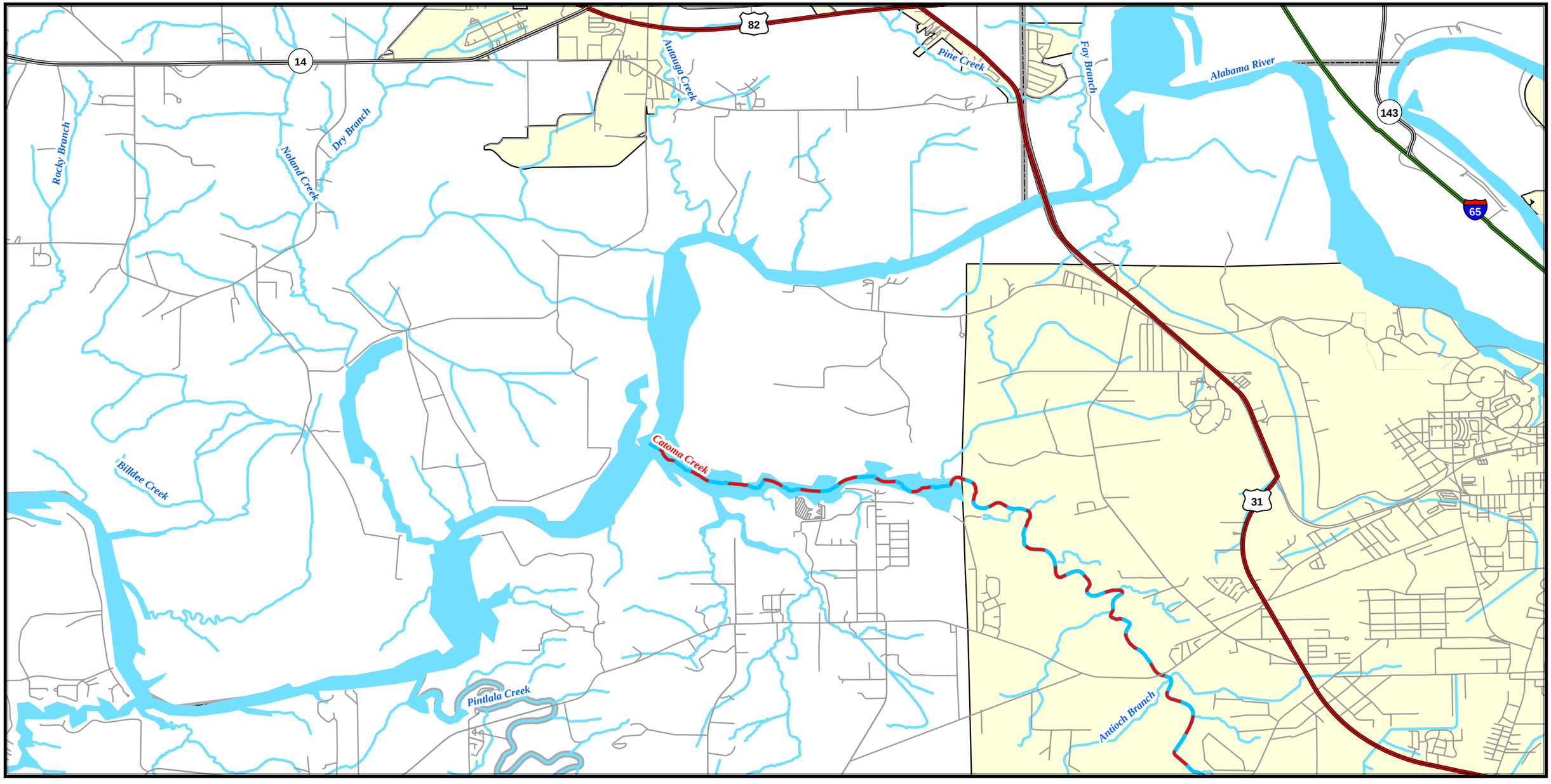
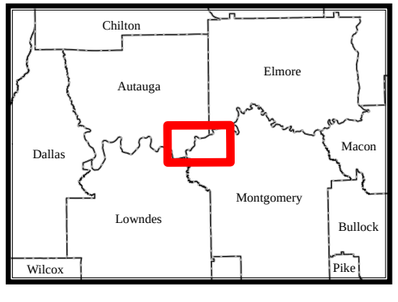
ALABAMA DEPARTMENT OF TRANSPORTATION
DESIGN BUREAU - STORMWATER

0 1,250 2,500 5,000 7,500 10,000 Feet

1 inch = 5,000 feet





ALDOT MS4 Areas Montgomery Map: 3

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0 1,250 2,500 5,000 7,500 10,000 Feet

1 inch = 5,000 feet

Department Of Transportation
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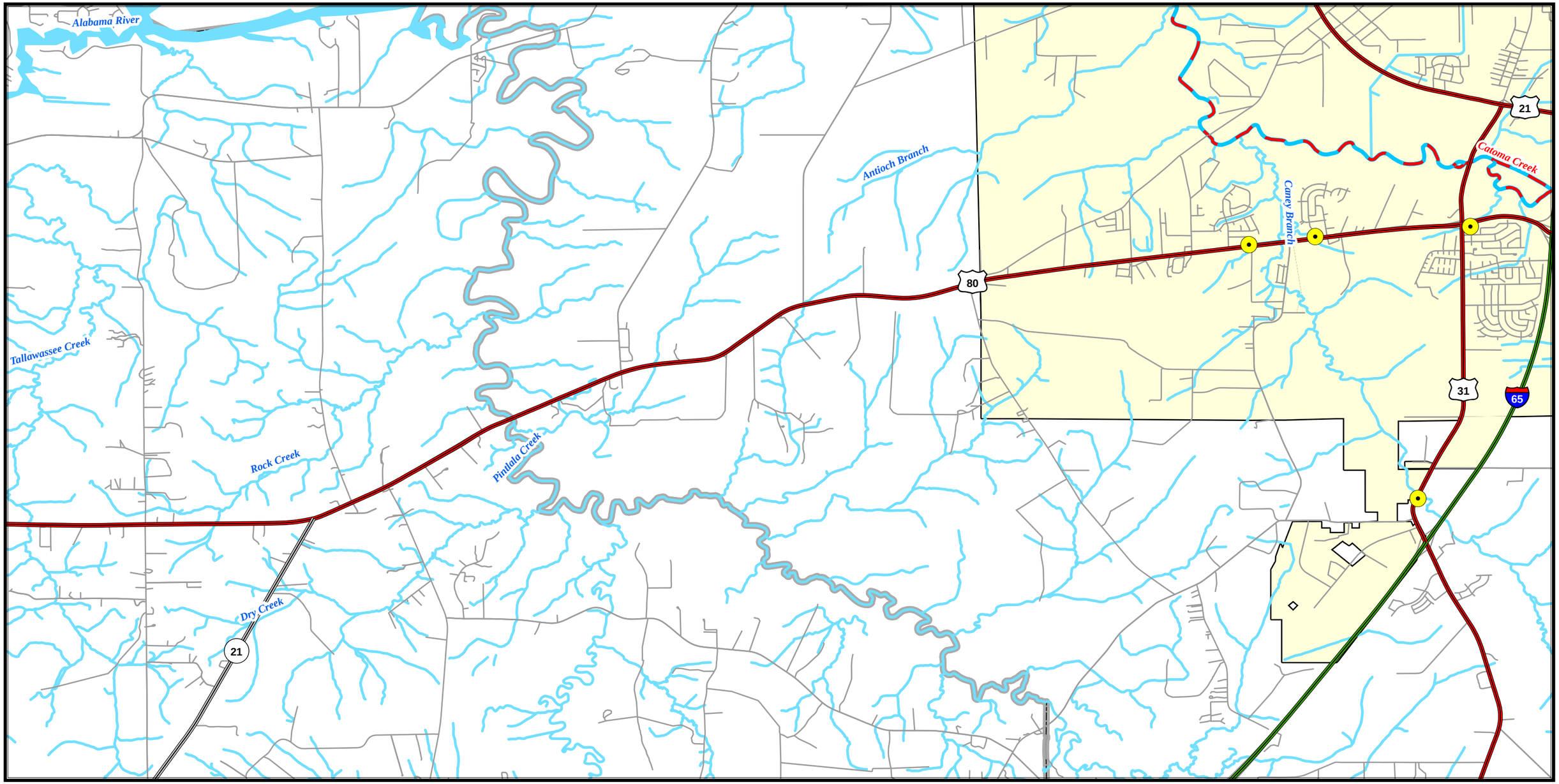

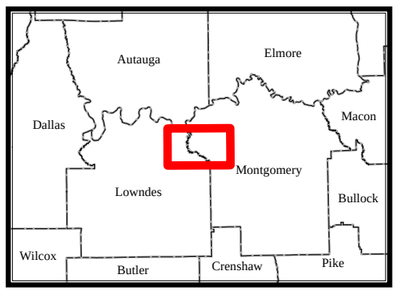

ALDOT MS4 Areas Montgomery Map: 4

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ALABAMA DEPARTMENT OF TRANSPORTATION DESIGN BUREAU - STORMWATER

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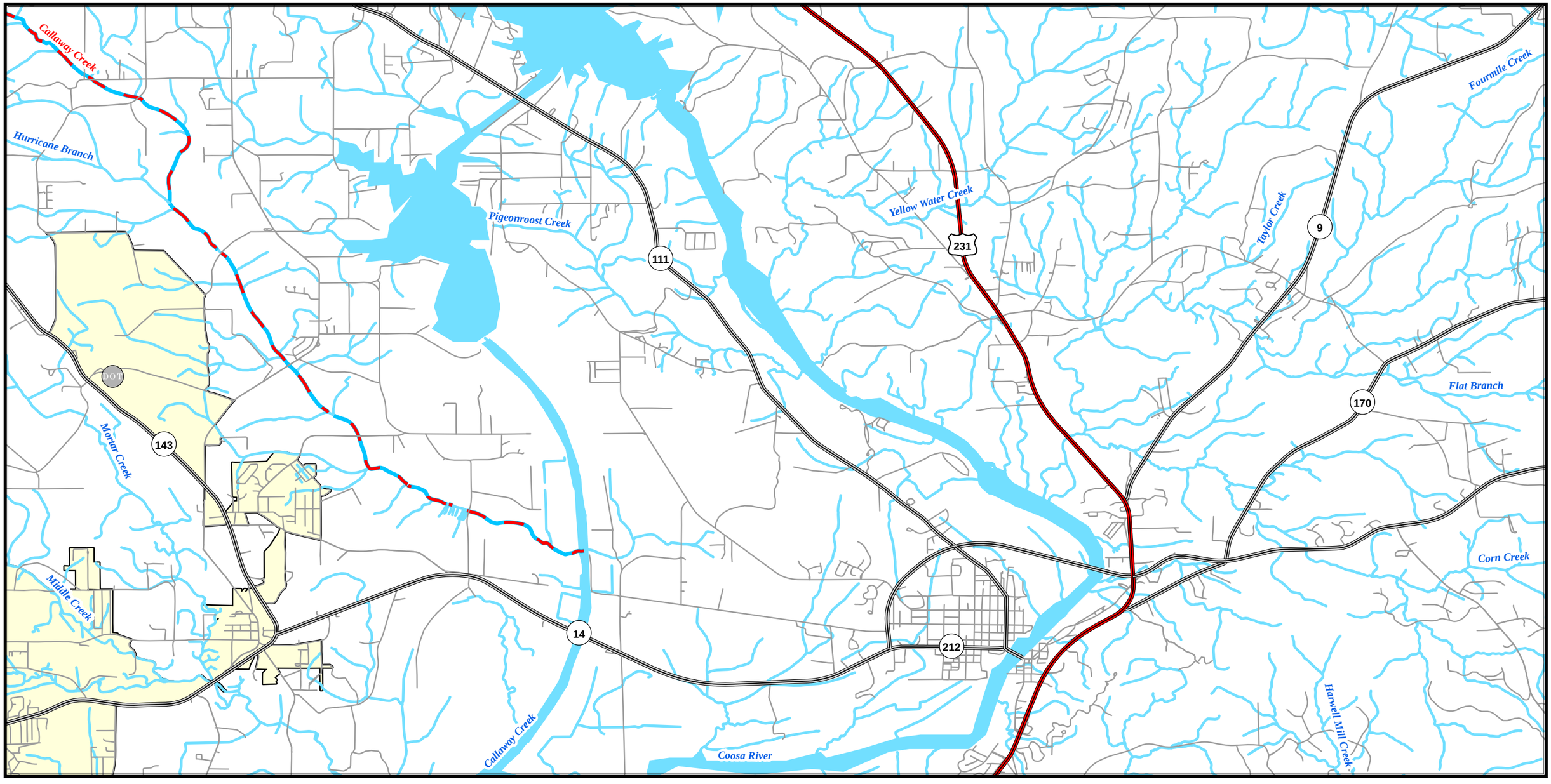

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Department Of Transportation
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0 1,250 2,500 5,000 7,500 10,000 Feet

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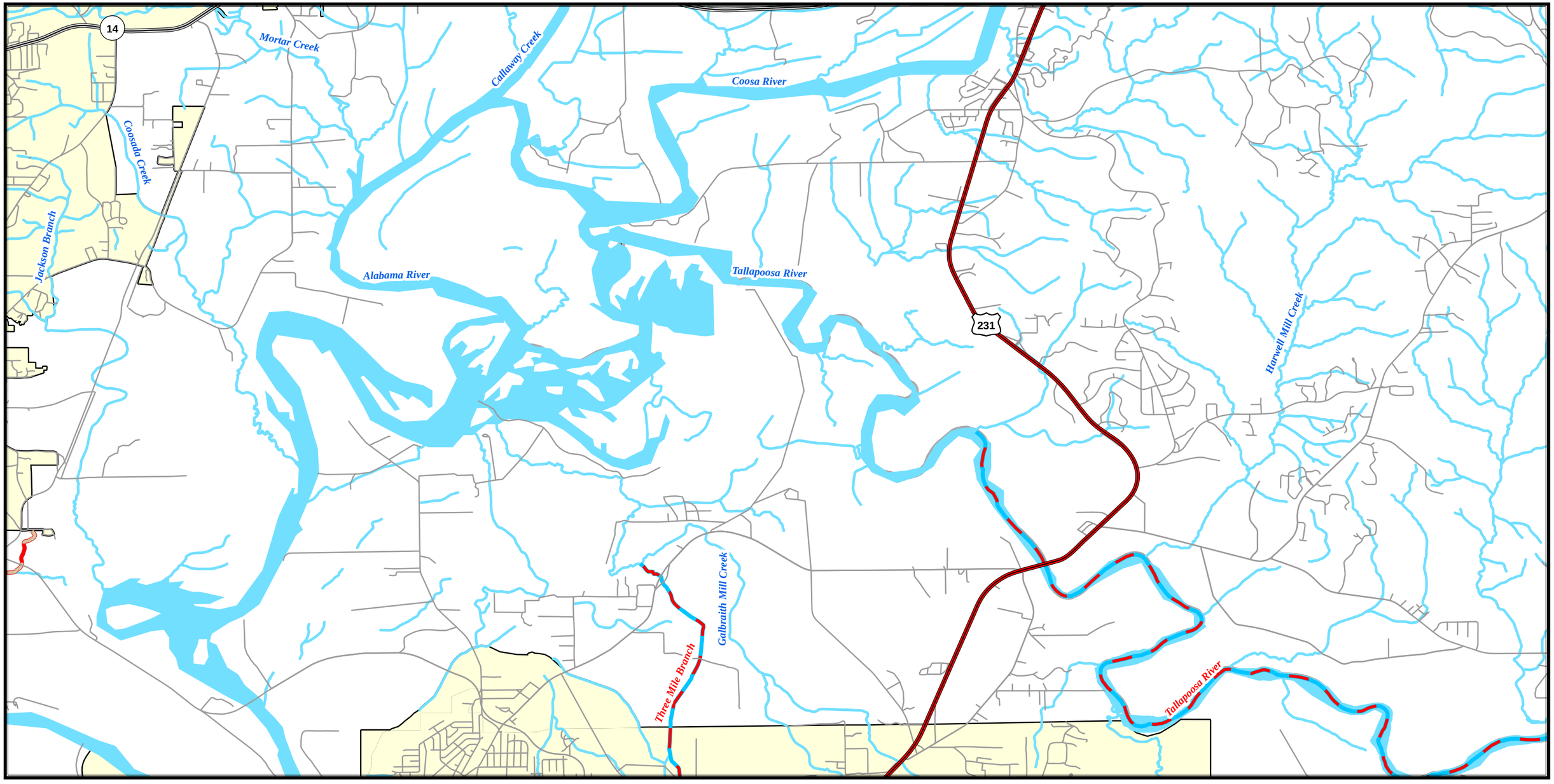

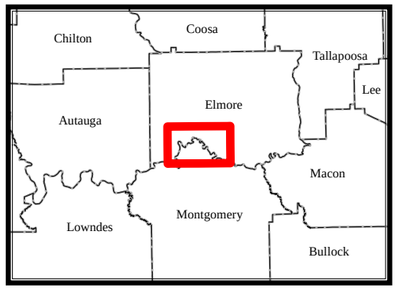

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Department Of Transportation
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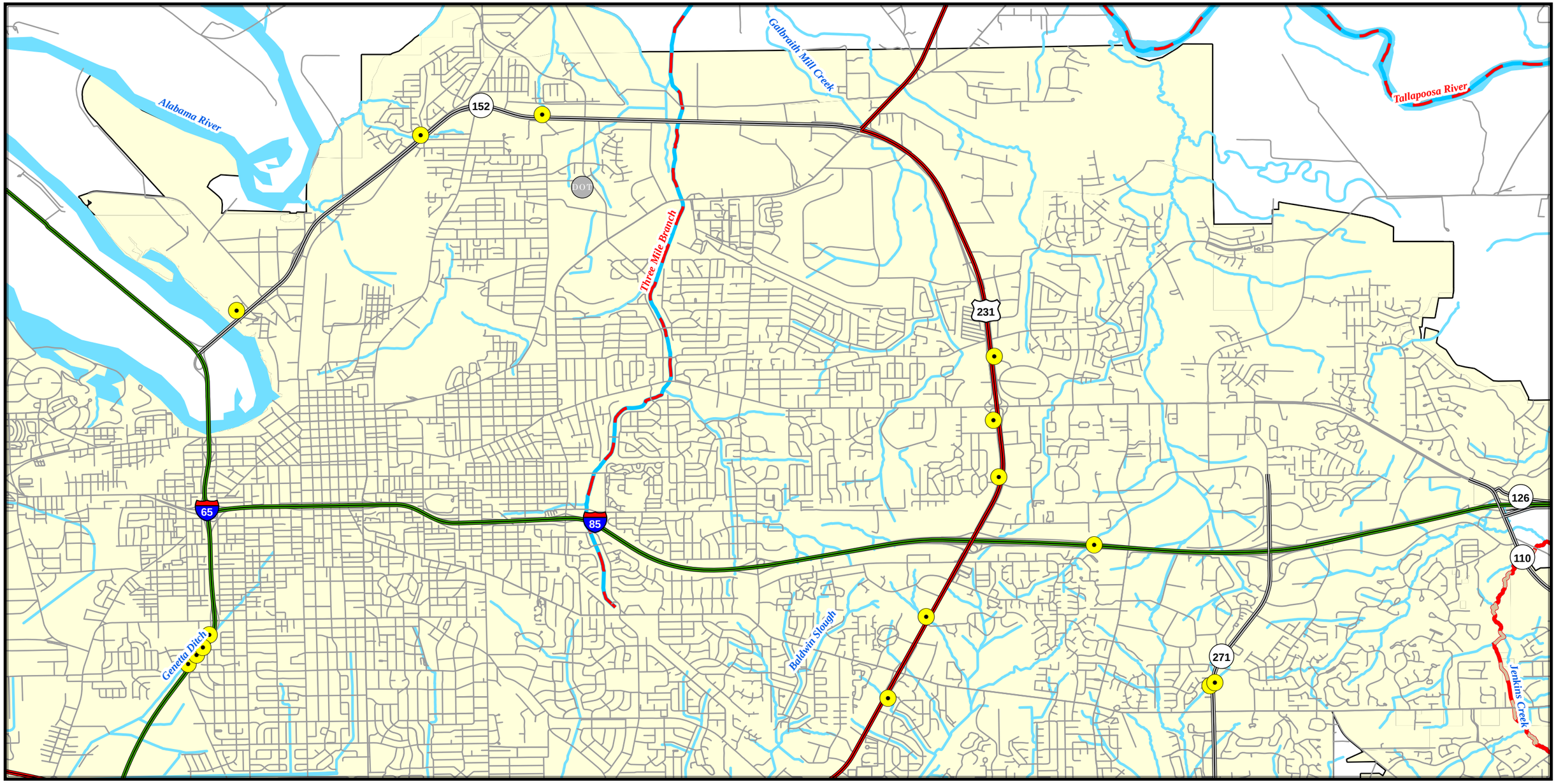
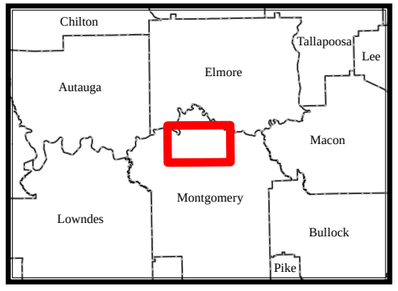
0 1,250 2,500 5,000 7,500 10,000 Feet

1 inch = 5,000 feet





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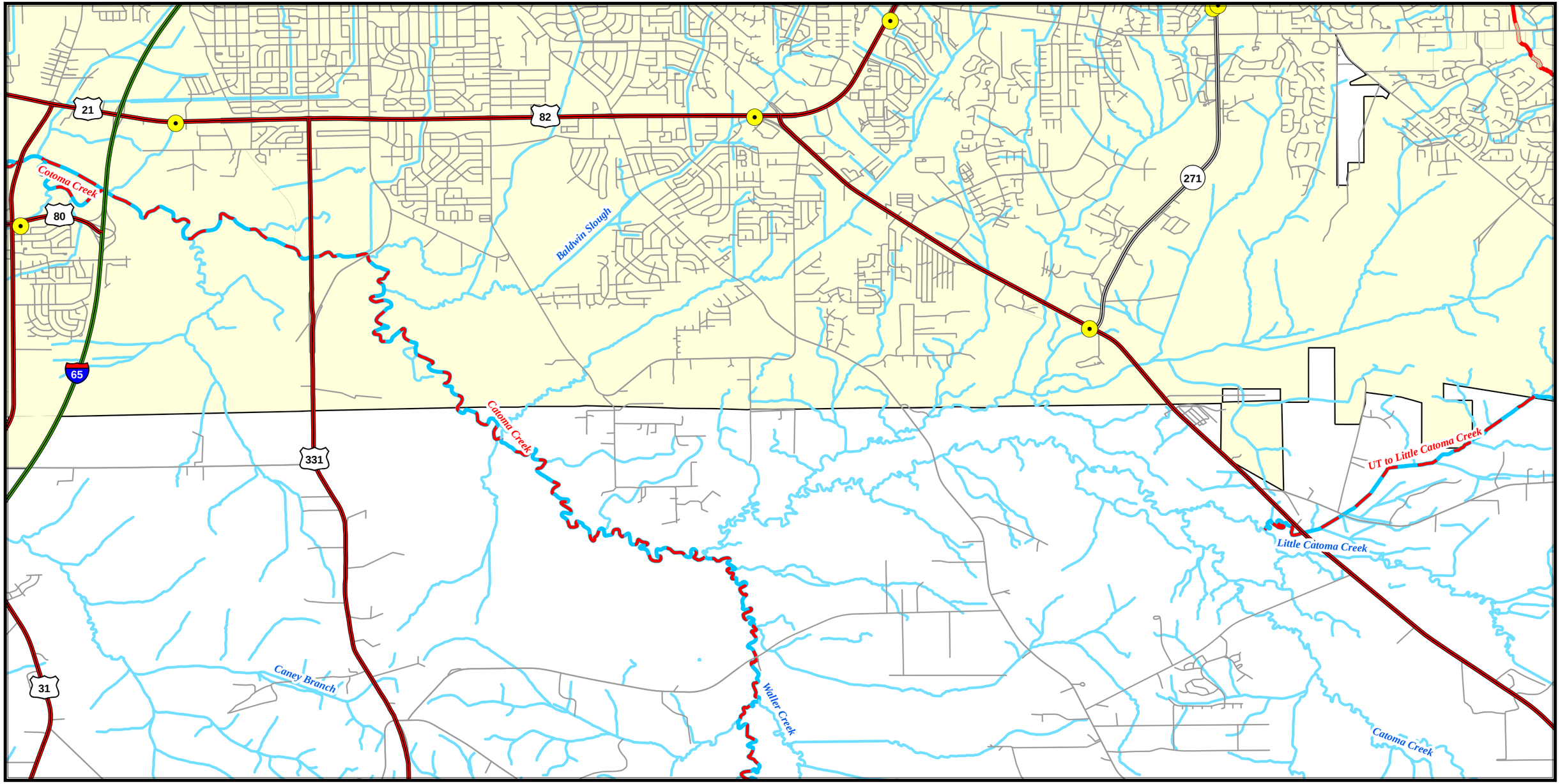
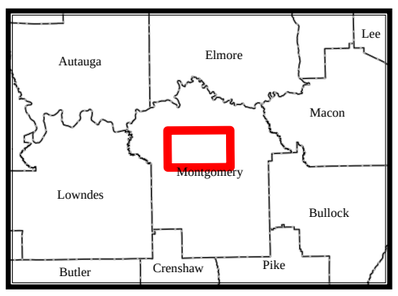
ALABAMA DEPARTMENT OF TRANSPORTATION
DESIGN BUREAU - STORMWATER

0 1,250 2,500 5,000 7,500 10,000 Feet

1 inch = 5,000 feet





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Department Of Transportation
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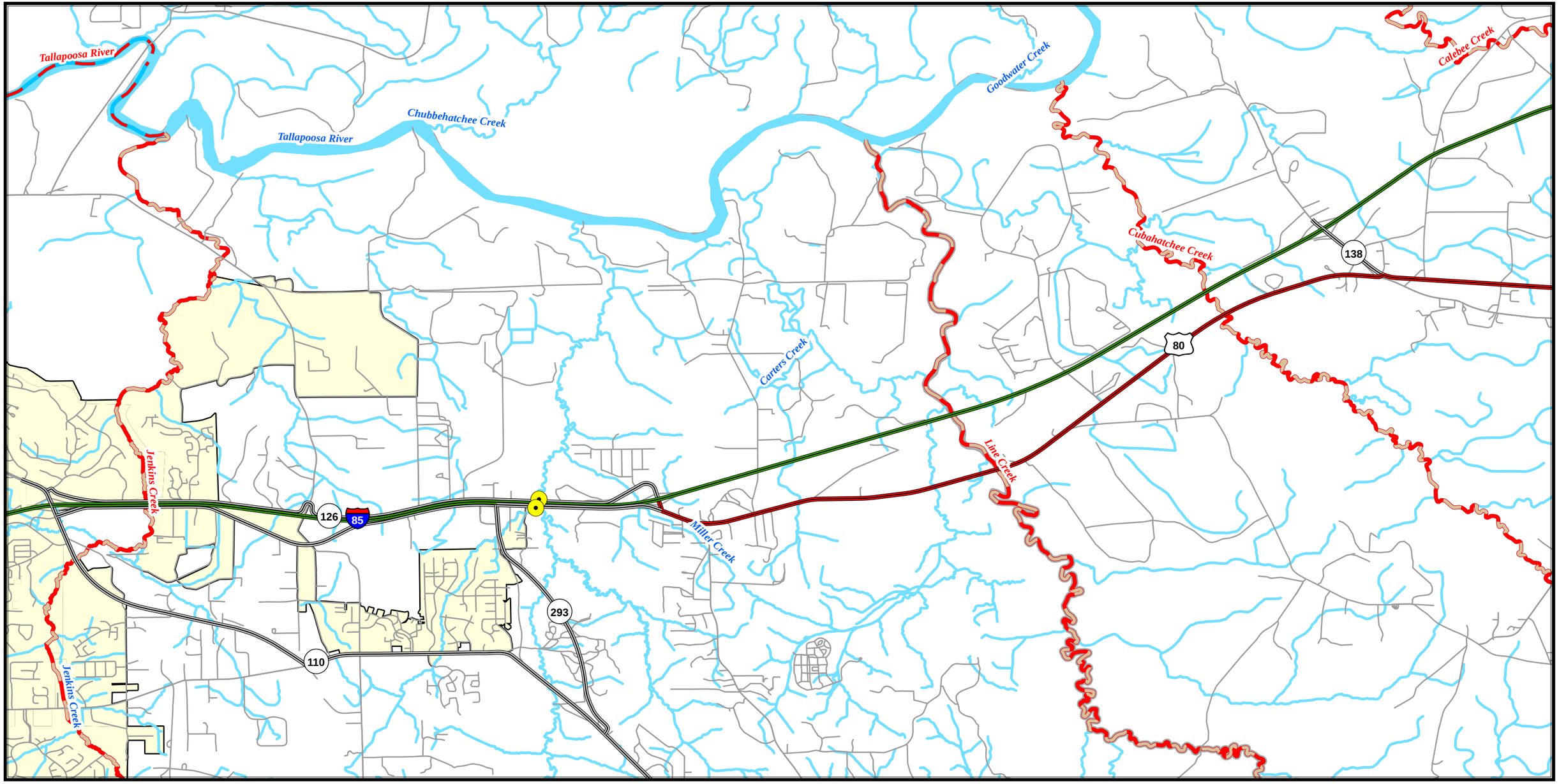
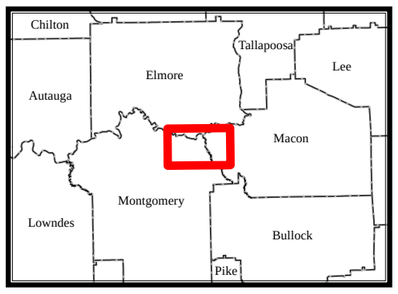
0 1,250 2,500 5,000 7,500 10,000 Feet

1 inch = 5,000 feet





ALDOT MS4 Areas Montgomery Map: 9

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Department Of Transportation
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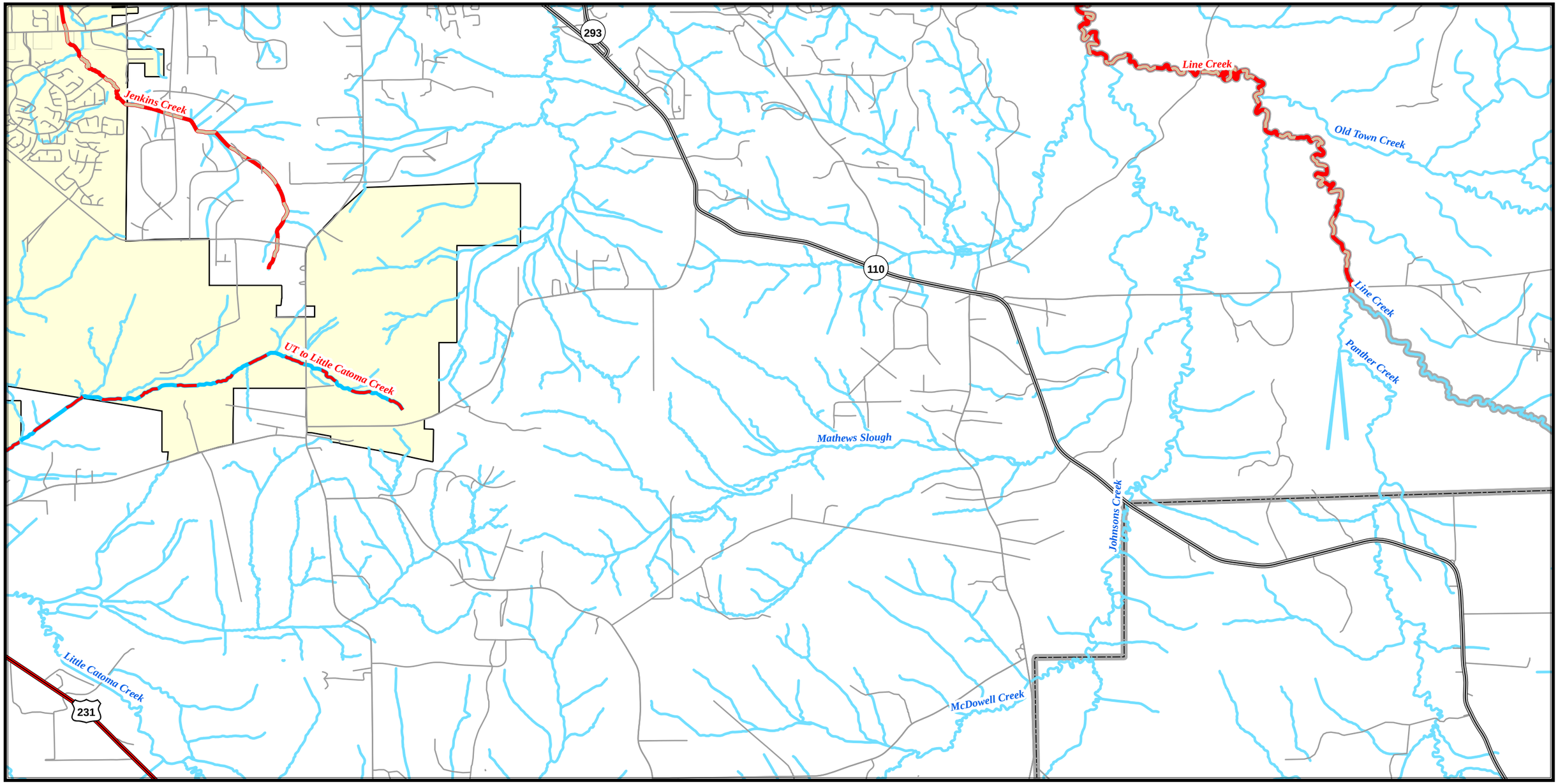
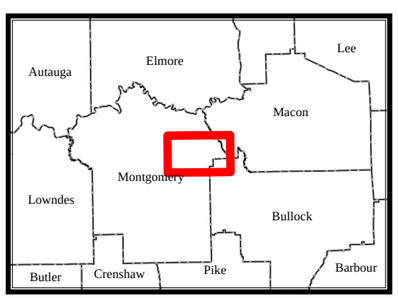
0 1,250 2,500 5,000 7,500 10,000 Feet

1 inch = 5,000 feet





ALDOT MS4 Areas Montgomery Map: 10

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N

0 1,250 2,500 5,000 7,500 10,000 Feet

1 inch = 5,000 feet

Department Of Transportation
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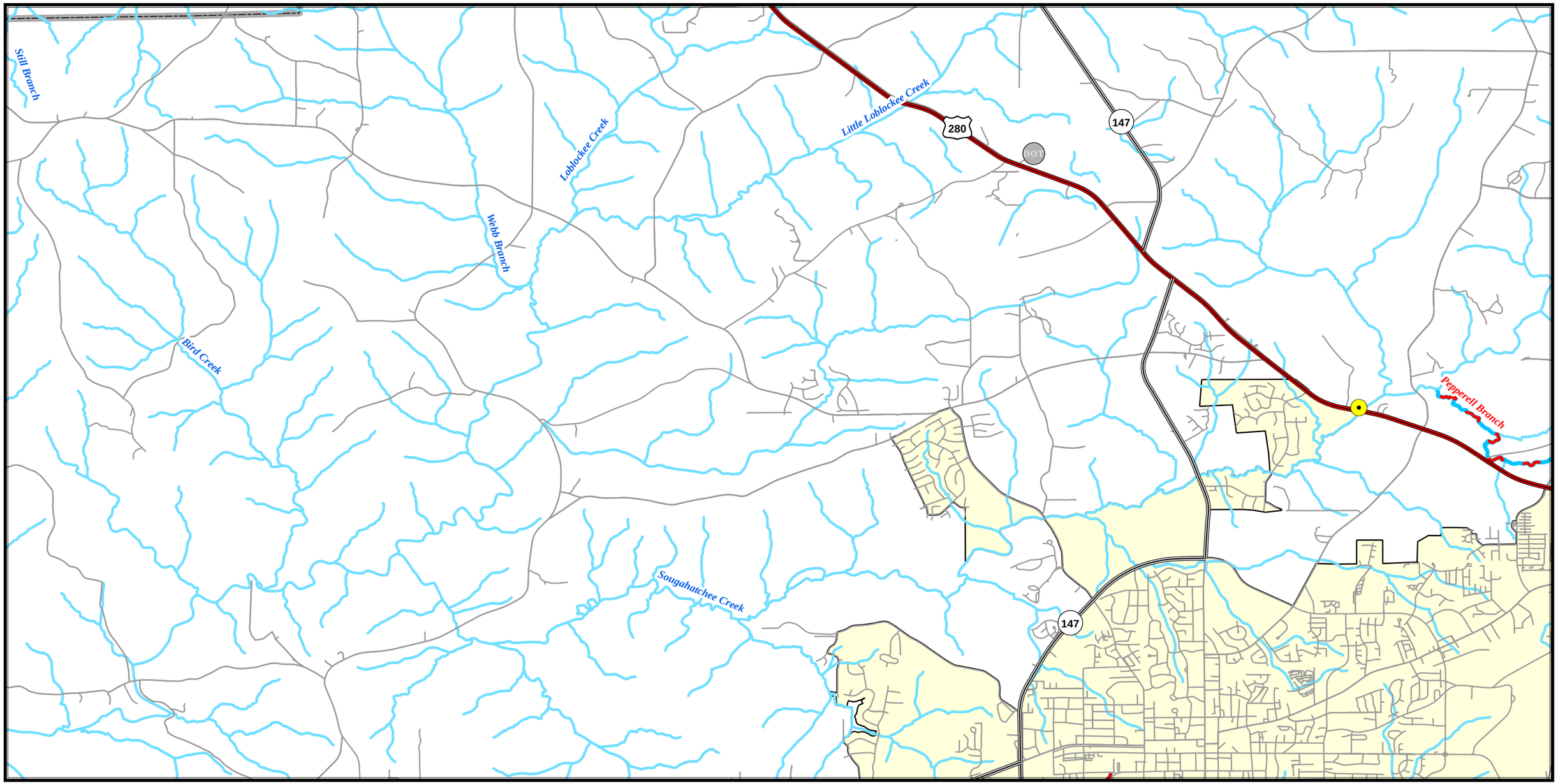

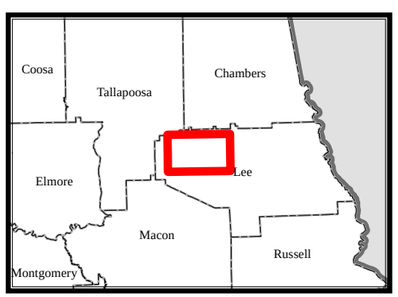

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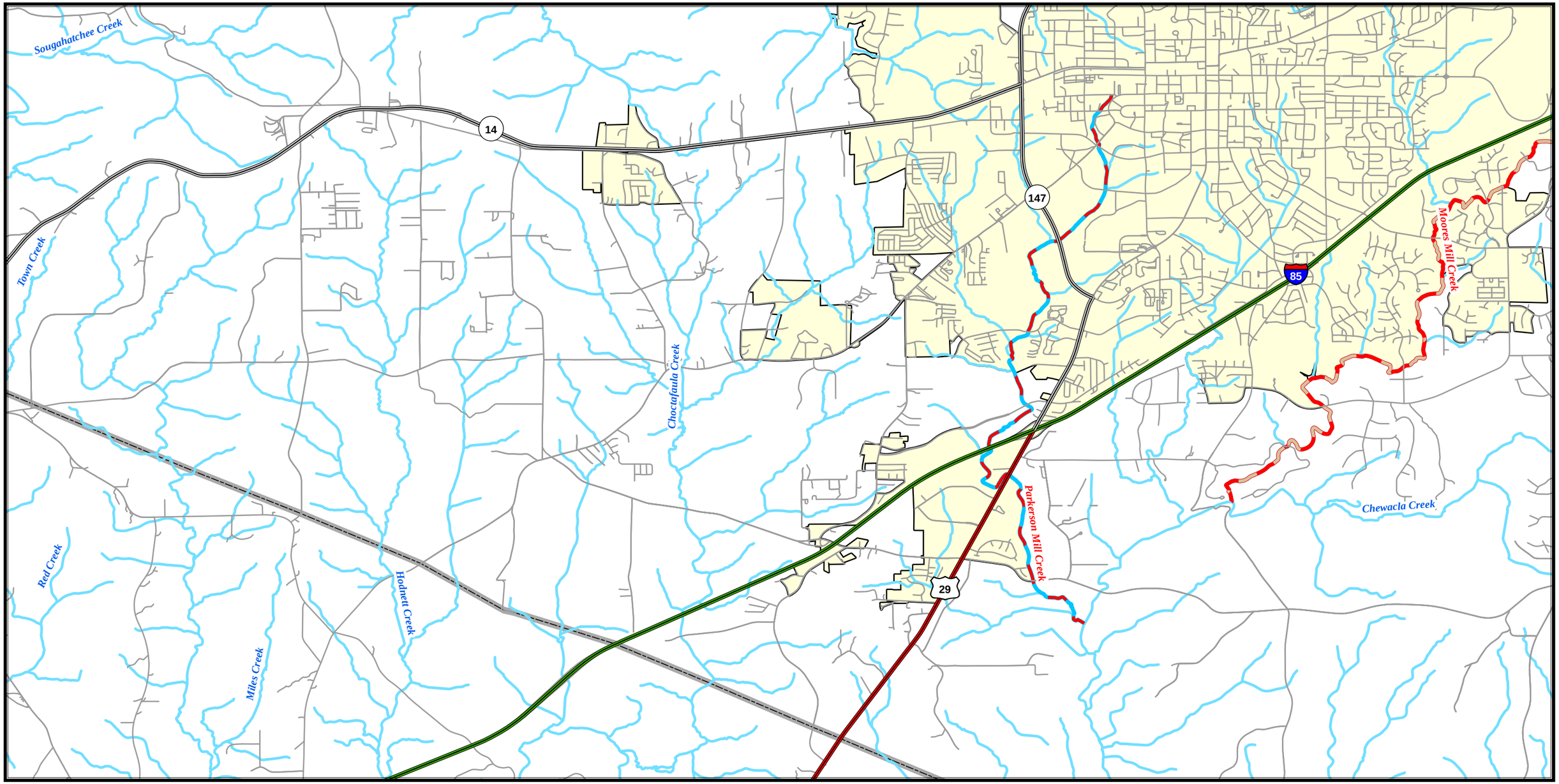
N

0 1,250 2,500 5,000 7,500 10,000 Feet

1 inch = 5,000 feet

Department Of Transportation
Design Bureau - Stormwater



ALDOT MS4 Areas Auburn/Opelika Map: 2

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MS4 Area

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Other POCs

N

Department Of Transportation
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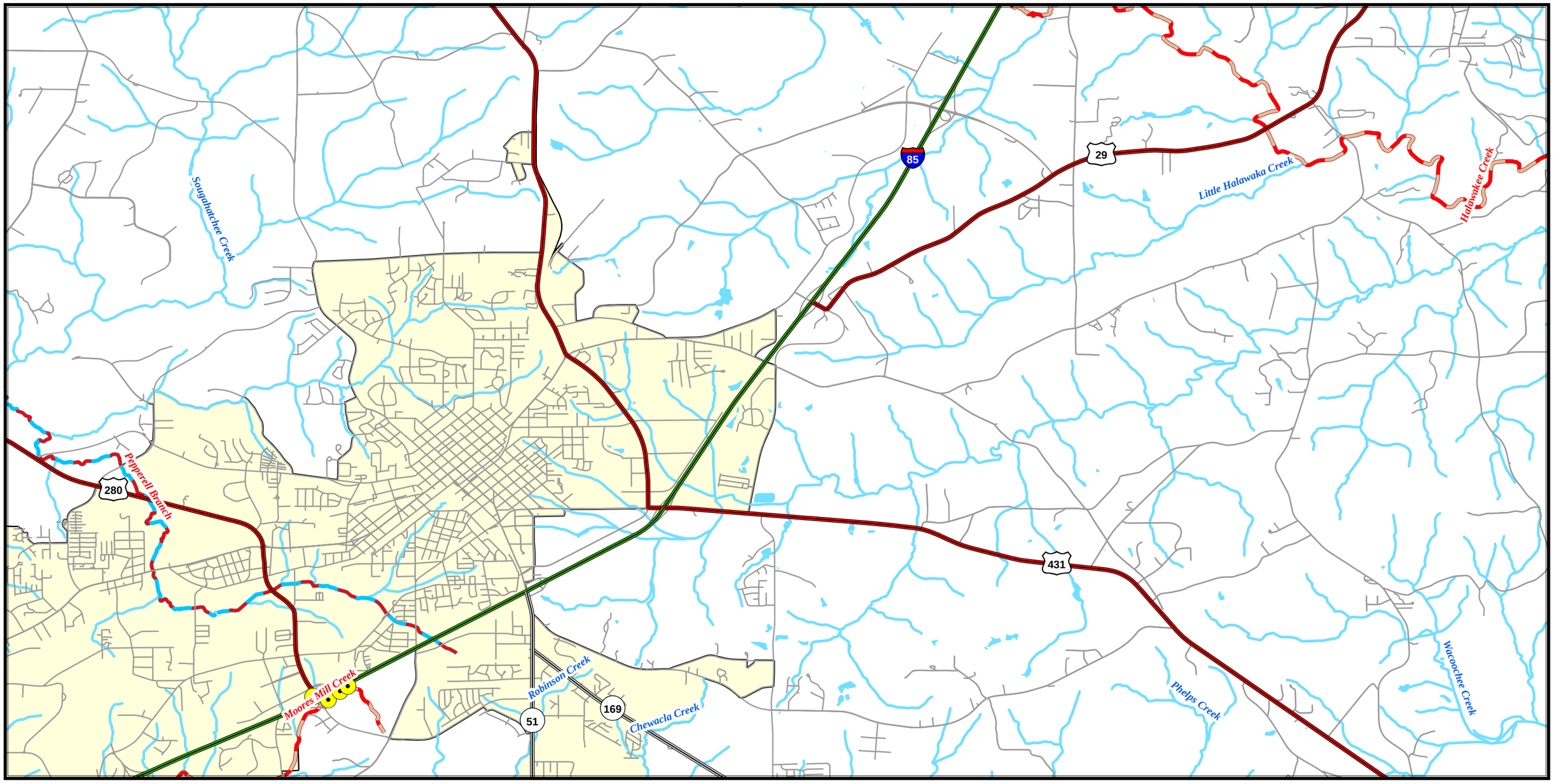

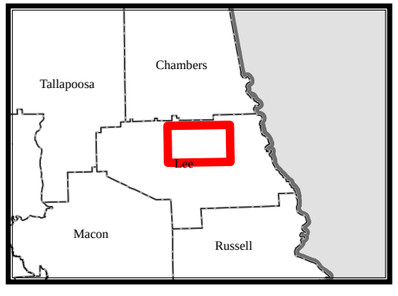

ALDOT MS4 Areas Auburn/Opelika Map: 3

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303(d) / TMDL Listed Waters
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- Other POCs

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Department Of Transportation
Design Bureau - Stormwater

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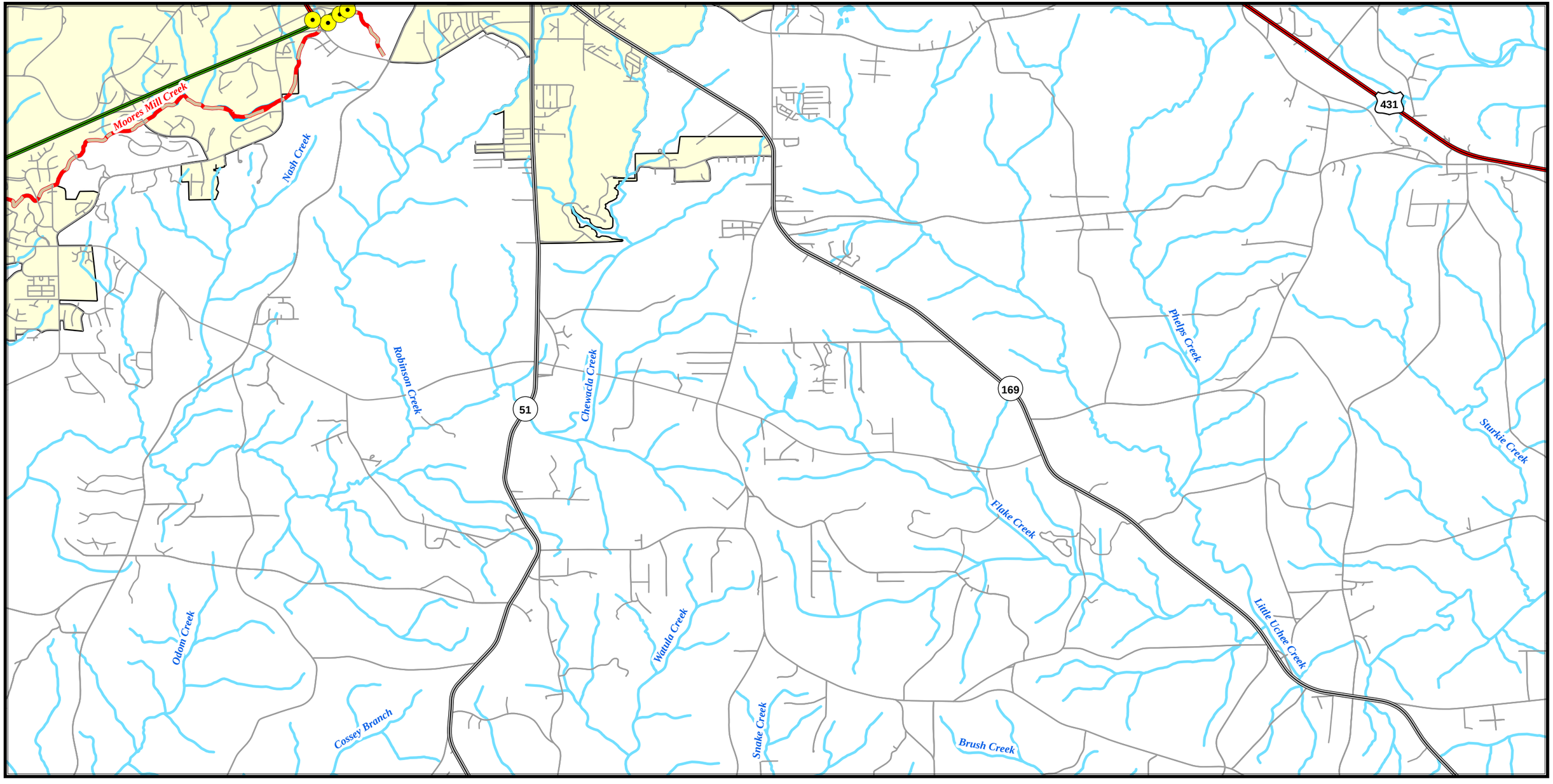
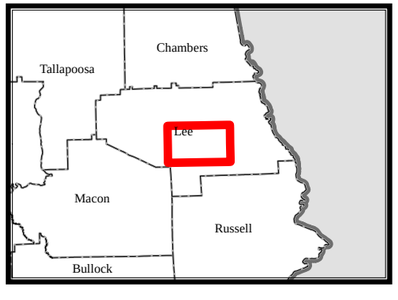




ALDOT MS4 Areas Auburn/Opelika Map: 4

Index #: 80

MS4 Area

ALDOT Support Facility

Location Needing Study

Major Outfall on Inventory

303(d) / TMDL Listed Waters

Sediment POC

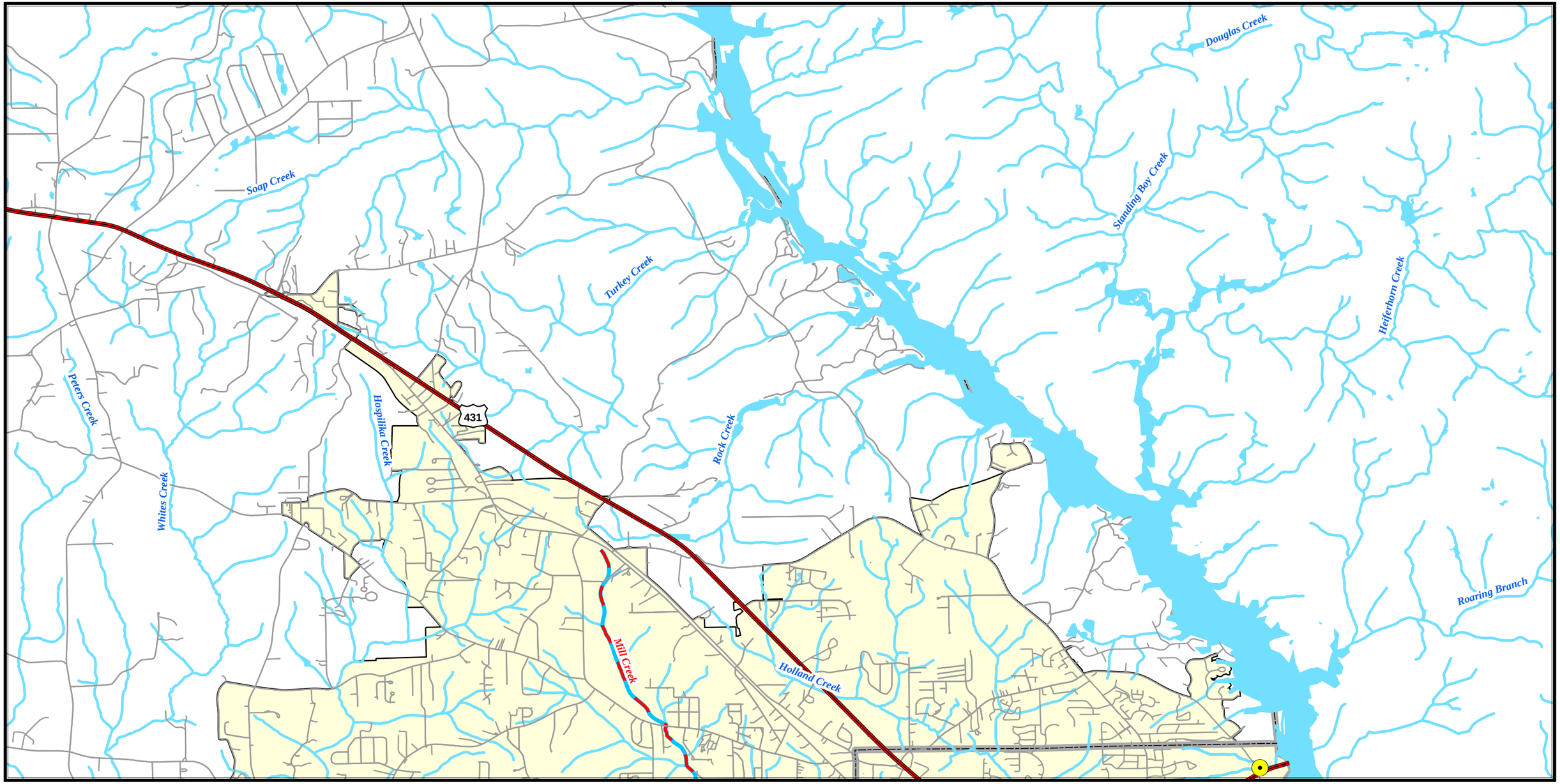
Other POCs

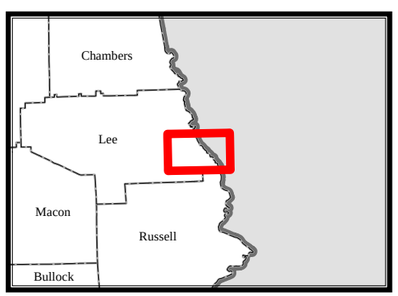
N

Department Of Transportation
Design Bureau - Stormwater

0 1,250 2,500 5,000 7,500 10,000 Feet

1 inch = 5,000 feet





ALDOT MS4 Areas Phenix City Map: 1

Index #: 81

- MS4 Area
- ALDOT Support Facility
- Location Needing Study
- Major Outfall on Inventory

303(d) / TMDL Listed Waters

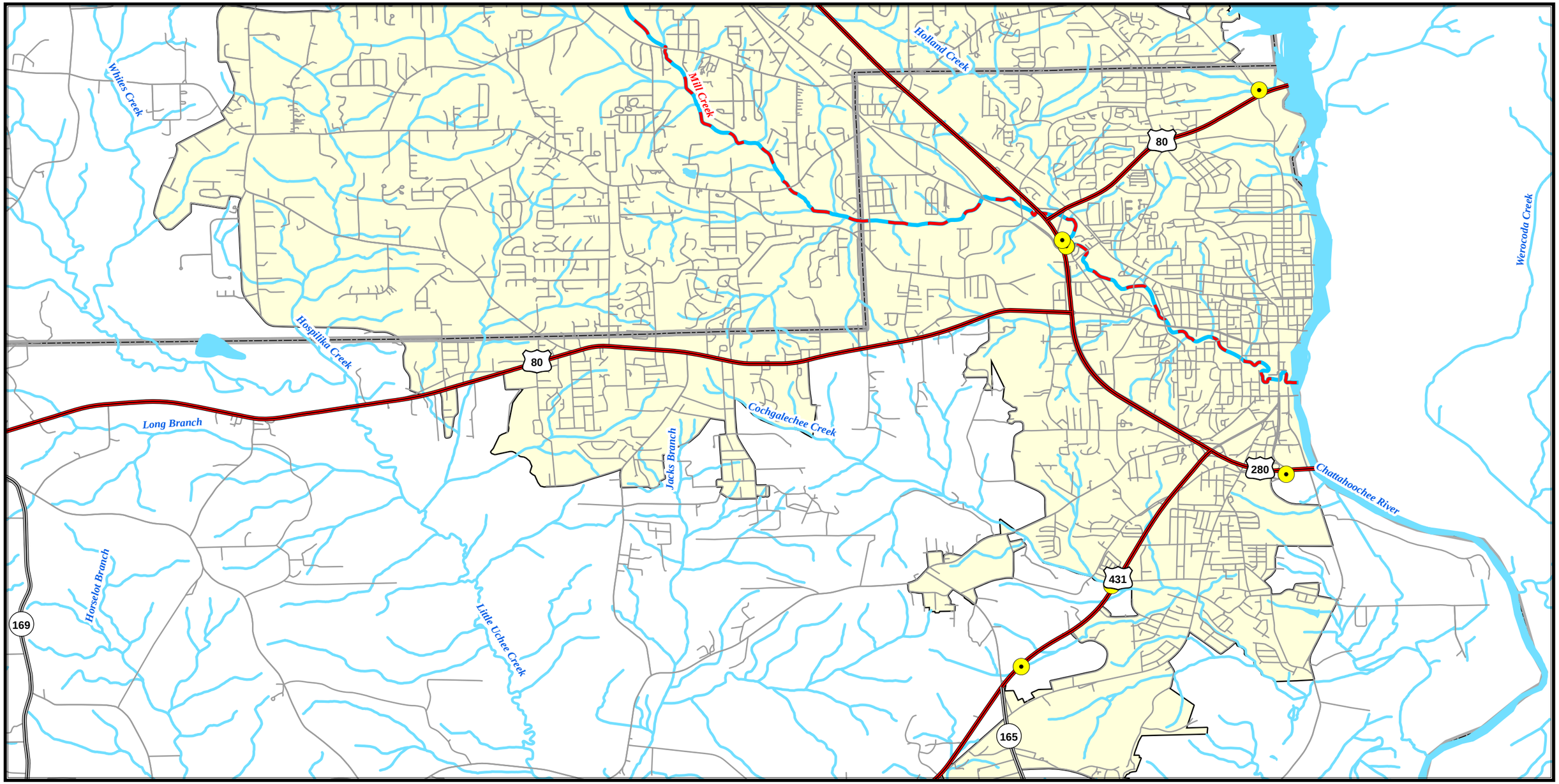
- Sediment POC
- Other POCs

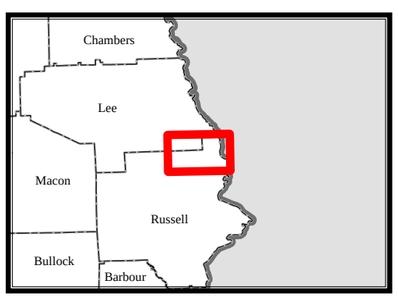
N

Department Of Transportation
Design Bureau - Stormwater

0 1,250 2,500 5,000 7,500 10,000 Feet

1 inch = 5,000 feet





ALDOT MS4 Areas Phenix City Map: 2

Index #: 82

- MS4 Area
- ALDOT Support Facility
- Location Needing Study
- Major Outfall on Inventory

303(d) / TMDL Listed Waters

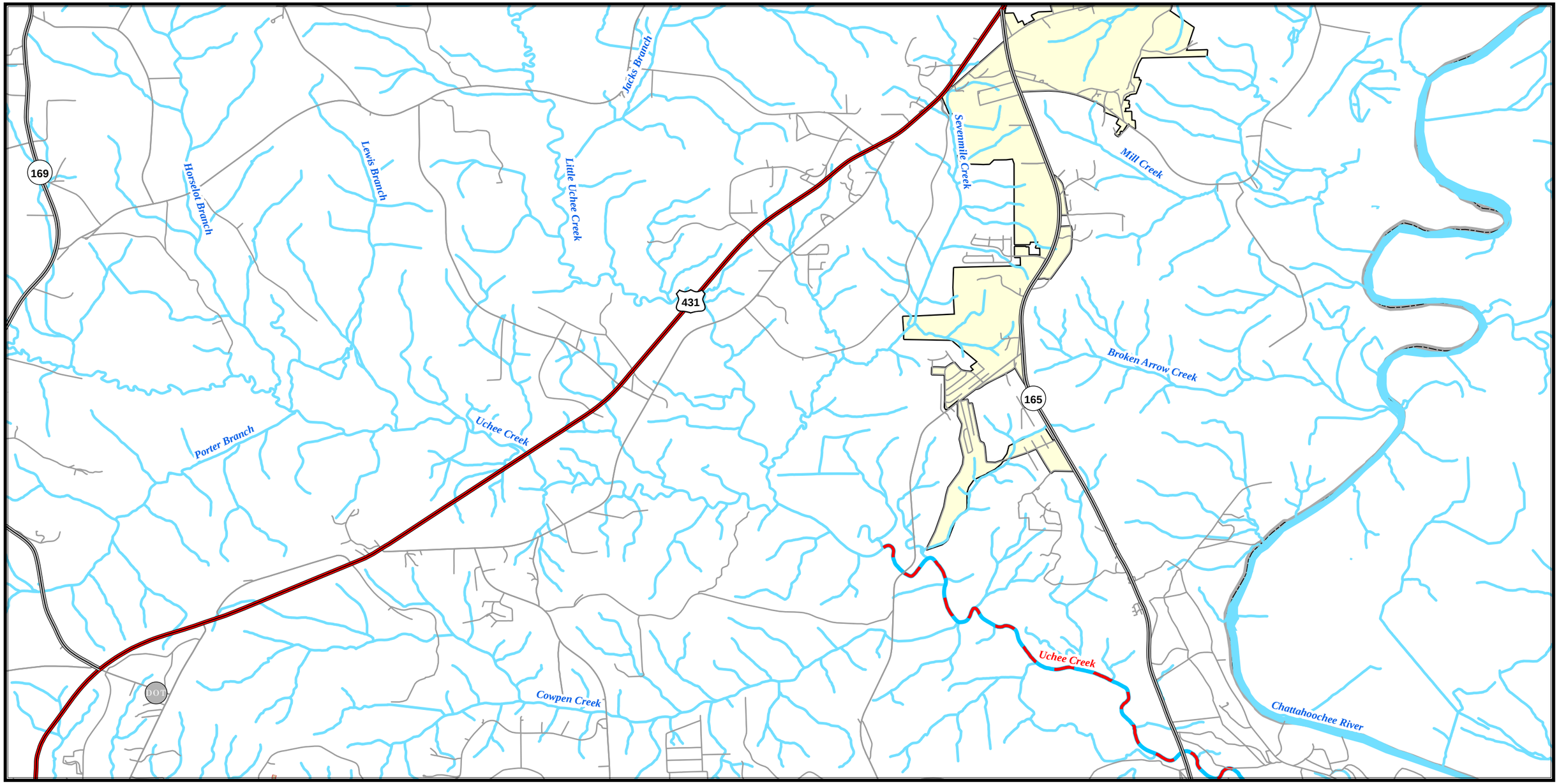
- Sediment POC
- Other POCs

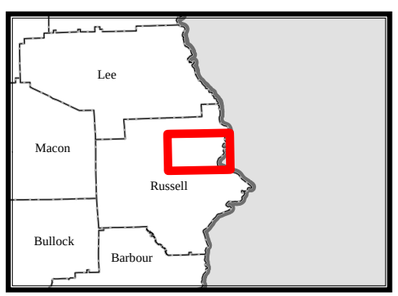
N

Department Of Transportation
Design Bureau - Stormwater

0 1,250 2,500 5,000 7,500 10,000 Feet

1 inch = 5,000 feet





ALDOT MS4 Areas Phenix City Map: 3

Index #: 83

- MS4 Area
- ALDOT Support Facility
- Location Needing Study
- Major Outfall on Inventory

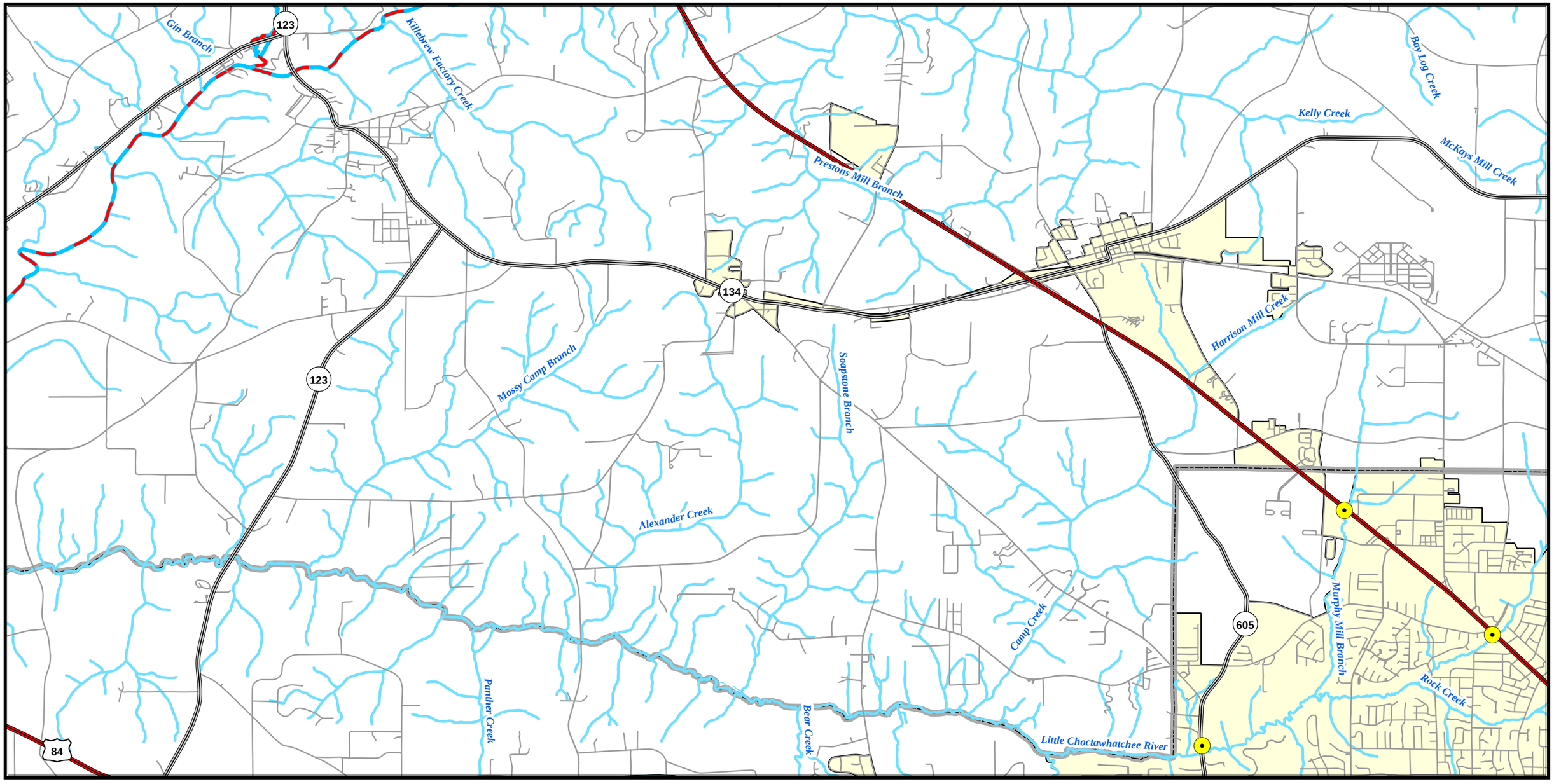
303(d) / TMDL Listed Waters
- Sediment POC
- Other POCs

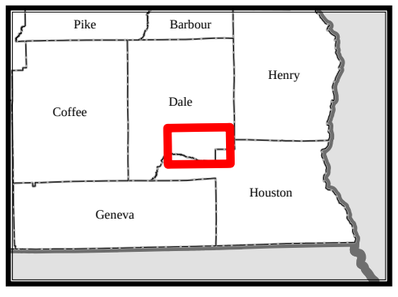
N

Department Of Transportation
Design Bureau - Stormwater

0 1,250 2,500 5,000 7,500 10,000 Feet

1 inch = 5,000 feet





ALDOT MS4 Areas Dothan Map: 1

Index #: 84

MS4 Area

ALDOT Support Facility

Location Needing Study

Major Outfall on Inventory

303(d) / TMDL Listed Waters

Sediment POC

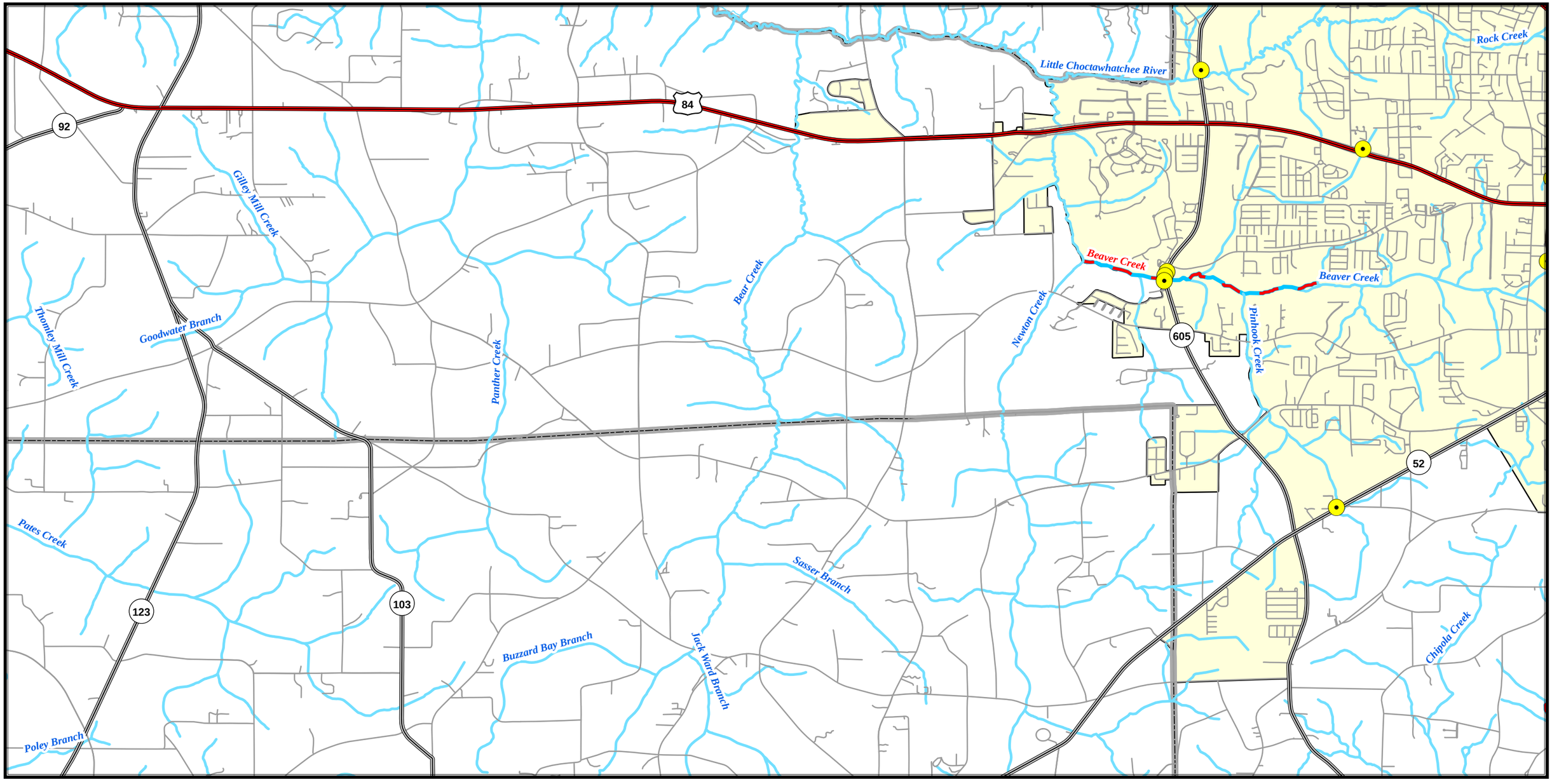
Other POCs

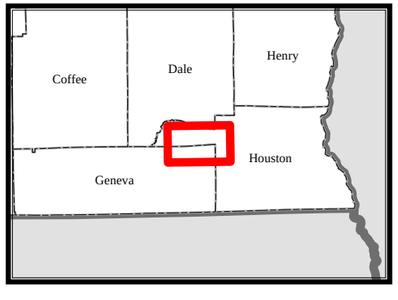
N

ALABAMA DEPARTMENT OF TRANSPORTATION
DESIGN BUREAU - STORMWATER

0 1,250 2,500 5,000 7,500 10,000 Feet

1 inch = 5,000 feet





ALDOT MS4 Areas Dothan Map: 2

Index #: 85

MS4 Area

ALDOT Support Facility

Location Needing Study

Major Outfall on Inventory

303(d) / TMDL Listed Waters

Sediment POC

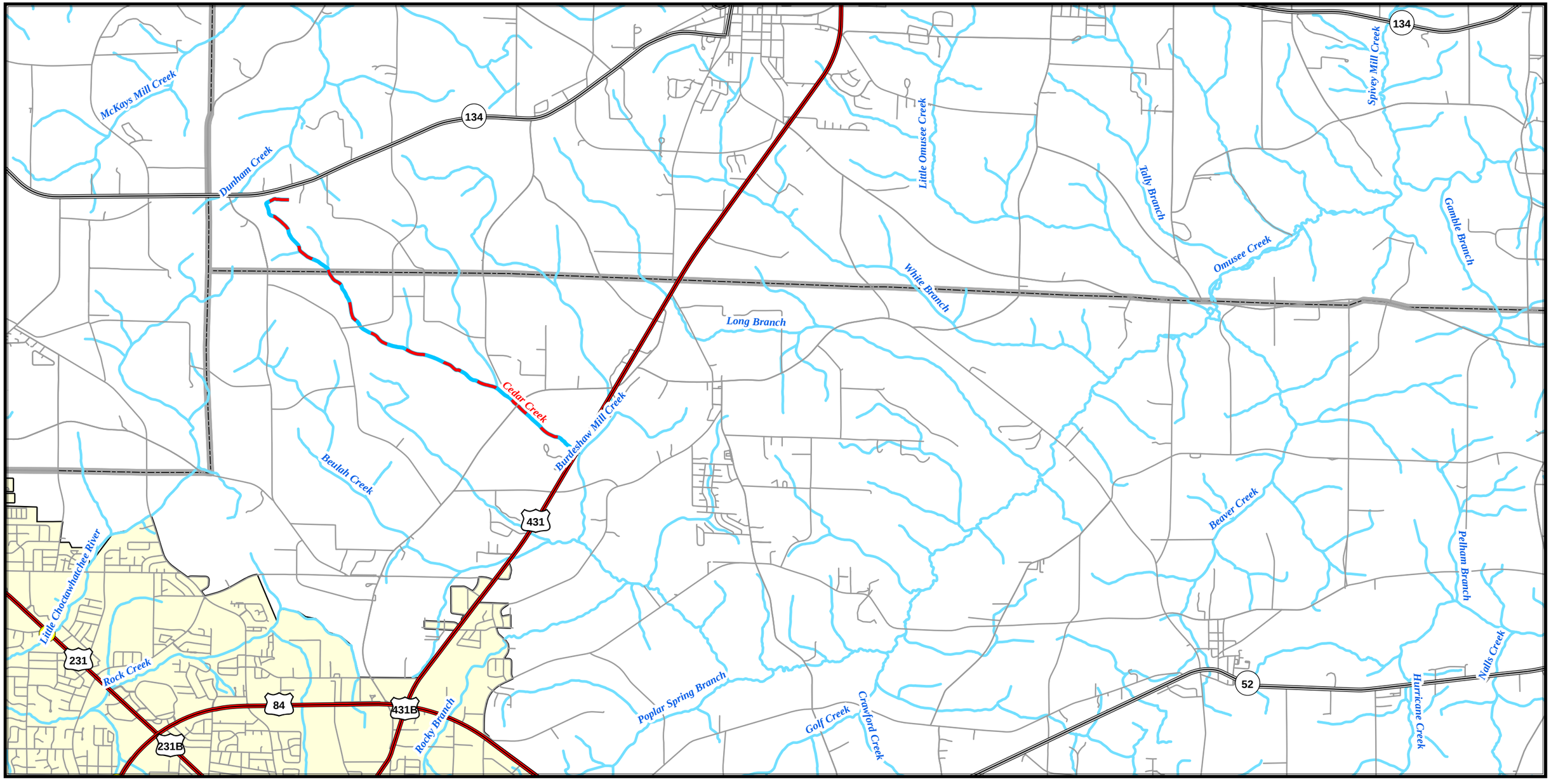
Other POCs

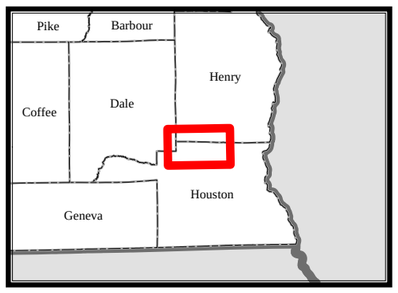
N

ALABAMA DEPARTMENT OF TRANSPORTATION DESIGN BUREAU - STORMWATER

0 1,250 2,500 5,000 7,500 10,000 Feet

1 inch = 5,000 feet





ALDOT MS4 Areas Dothan Map: 3

Index #: 86

MS4 Area

ALDOT Support Facility

Location Needing Study

Major Outfall on Inventory

303(d) / TMDL Listed Waters

Sediment POC

Other POCs

N

ALABAMA DEPARTMENT OF TRANSPORTATION DESIGN BUREAU - STORMWATER

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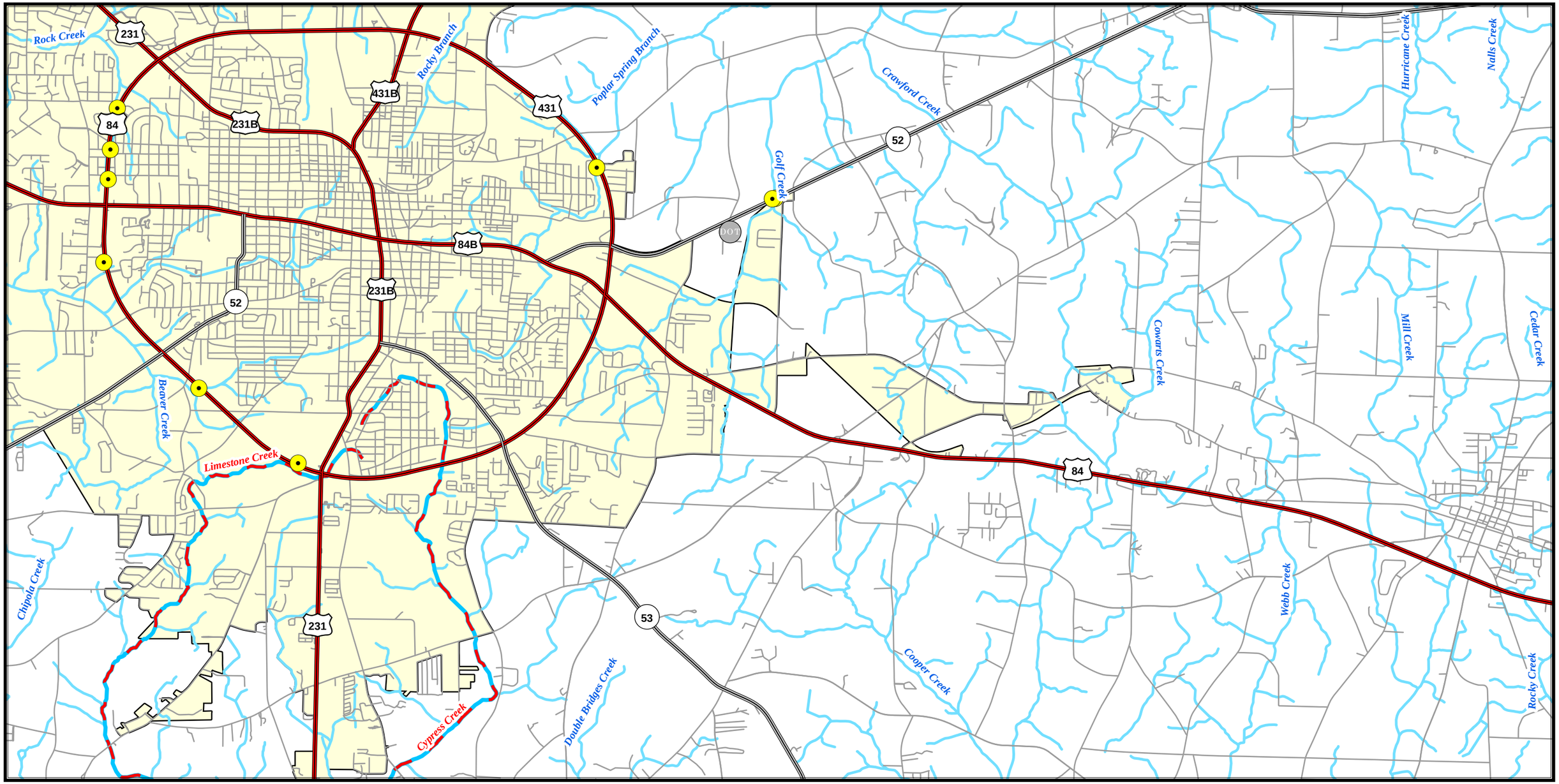
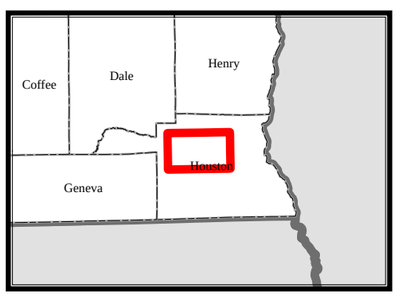
1 inch = 5,000 feet





ALDOT MS4 Areas Dothan Map: 4

Index #: 87

- MS4 Area
- ALDOT Support Facility
- Location Needing Study
- Major Outfall on Inventory

303(d) / TMDL Listed Waters
- Sediment POC
- Other POCs

N

Department Of Transportation
Design Bureau - Stormwater

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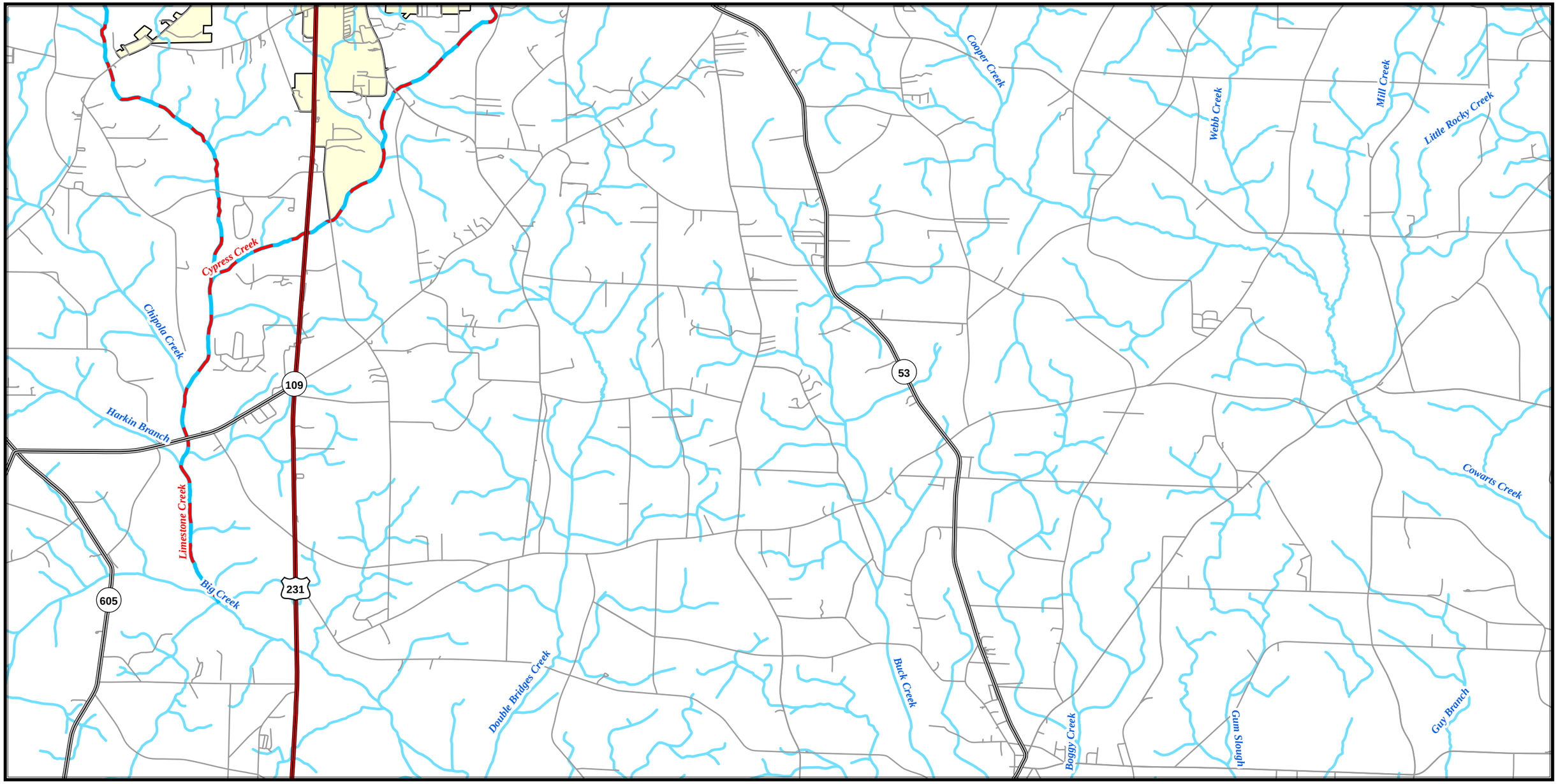
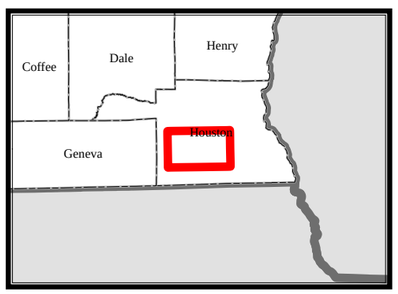
1 inch = 5,000 feet





ALDOT MS4 Areas Dothan Map: 5

Index #: 88

- MS4 Area
- ALDOT Support Facility
- Location Needing Study
- Major Outfall on Inventory

303(d) / TMDL Listed Waters
- Sediment POC
- Other POCs

N

ALABAMA DEPARTMENT OF TRANSPORTATION DESIGN BUREAU - STORMWATER

0 1,250 2,500 5,000 7,500 10,000 Feet

1 inch = 5,000 feet

ALDOT MS4 Major Outfall Inventory Schedule

Last Updated: September 30, 2015

MS4 Area	Locations to Study for Major Outfall Candidates	Commencement	Inventory Status
Dothan*	52	July 2014	Completed
Auburn/Opelika	44	February 2015	Completed
Phenix City	24	February 2015	Completed
Montgomery	125	June 2015	Completed
Tuscaloosa	98	August 2015	Completed
Decatur	42	November 2015**	Not Commenced
Mobile	134	February 2016**	Not Commenced
Baldwin County	83	May 2016**	Not Commenced
Quad Cities	71	August 2016**	Not Commenced
Huntsville	97	November 2016**	Not Commenced
Jefferson/ Shelby County	408	February 2017**	Not Commenced
Anniston	94	August 2017**	Not Commenced
Gadsden	80	November 2017**	Not Commenced

* Pilot study. Validated data considered viable as inventory data for Dothan MS4 area.

** Anticipated.

ILLICIT DISCHARGE INCIDENT TRACKING FORM

General Information	
Call taken by:	Call date:
Call time:	Precipitation in past 72 hrs: inches

Reporter Information	
Incident time:	Incident date:
Caller contact information (*optional*): Name: Phone No.: Address:	

Incident Location			
Latitude: Longitude:			
Stream address or outfall #:			
Closest street address:			
Nearby landmark:			
Primary Location Description	**Secondary Location Description:**		
☐ Stream corridor (*In or adjacent to stream)*	☐ Outfall	☐ In-stream flow	☐ Along banks
☐ Upland area *(Land not adjacent to stream)*	☐ Near storm drain	☐ Near other water source (storm water pond, wetland, etc.):	
Narrative description of location:			

Upland Problem Indicator Description		
☐ Dumping	☐ Oil/solvents/chemicals	☐ Sewage
☐ Wash water, suds, etc.	☐ Other:	

Stream Corridor Problem Indicator Description				
Odor	☐ None	☐ Sewage	☐ Rancid/Sour	☐ Petroleum (gas)
	☐ Sulfide (rotten eggs); natural gas	☐ Other:		
Appearance	☐ "Normal"	☐ Oil sheen	☐ Cloudy	☐ Suds
	☐ Other:			
Floatables	☐ None:	☐ Sewage (toilet paper, etc)	☐ Algae	☐ Dead fish
	☐ Other:			
Narrative description of problem indicators:				

ILLICIT DISCHARGE INCIDENT TRACKING FORM

Suspected Violator
Name: Company: Person or vehicle Description: License Plate No.: Other:

Investigation Notes	
Initial investigation date:	Investigators:
☐ No investigation made	Reason:
☐ Referred to different department/agency:	Department/Agency:
☐ Investigated: No action necessary	
☐ Investigated: Requires action	Description of actions:
Hours between call and investigation:	Hours to close incident:
Date case closed:	
Notes:	

Non-Storm Water Discharge
Investigation Form

Purpose: The purpose of this form is to document the observations made during an investigation of a potential non-storm water discharge into ALDOT's MS4.

Inspection Information

Inspection Type: ☐ Initial ☐ Scheduled ☐ Follow-up ☐ Response to Complaint

Inspector Name: _____ Date: _____

Organization: _____ Time: _____

Phone: _____ E-mail: _____

Signature: _____

Name(s) of others accompanying inspector (if any):

Name: _____ Title: _____

Name: _____ Title: _____

Name: _____ Title: _____

Weather Conditions: ☐ Clear ☐ Cloudy ☐ Rain

Previous Rainfall: _____ inches on _____ Source: _____

Incident Location

Stream: _____ Latitude: ____° ____' ____"

Address: _____ Longitude: ____° ____' ____"

Nearby Landmark: _____

Property Type: ☐ Municipal ☐ Commercial ☐ Industrial ☐ Residential
☐ Other: _____

Primary Location: ☐ Stream ☐ Upland Area

Secondary Location: ☐ Outfall ☐ In-Stream Flow ☐ Near Storm Drain
☐ Along Bank ☐ Other: _____

Comments: _____

Observations

1. Upland Problem Indicators

☐ None ☐ Dumping ☐ Oil / Chemical ☐ Sewage
☐ Wash Water ☐ Suds ☐ Other: _____

Comments: _____

2. Stream Corridor Problem Indicators

Odor ☐ None ☐ Sewage ☐ Oil / Chemical ☐ Sour
☐ Sulfide ☐ Other: _____

Appearance ☐ Normal ☐ Cloudy ☐ Oil / Chemical ☐ Suds
☐ Turbid ☐ Other: _____

Floatables ☐ None ☐ Sewage ☐ Dead Fish ☐ Algae
☐ Other: _____

Comments: _____

3. Field Screening Data

Sample Location: _____

Parameters		Results	Comments
1. Temperature	°C		
2. pH	s.u.		
3. Conductivity	µS/cm		
4. Total Dissolved Solids	mg/L		
5. Potassium	mg/L		
6. Ammonia	mg/L		
7. Chlorine	mg/L		
8. Copper	mg/L		
9. Nitrite	mg/L		
10. Nitrate	mg/L		
11. Phosphate	mg/L		
12. Detergents	mg/L		

Comments: _____

4. Potential Source of Non Storm Water Discharge

☐ Sanitary Sewer ☐ Septic System ☐ Oil / Chemical Spill ☐ Vehicle Washing
☐ Construction Activity ☐ Industrial Activity ☐ Building Maintenance ☐ Drain Pipe
☐ Natural Source ☐ Other: _____

Suspect Violator

Name: _____
Address: _____
City: _____ State: _____ Zip Code: _____
Property Type: ☐ Municipal ☐ Commercial ☐ Industrial ☐ Residential
☐ Other: _____

Follow-up Actions

☐ No follow-up actions are required.
☐ Notify Facility of Non-Storm Water Discharge ☐ Yes ☐ No Date : _____
☐ Conduct Follow-up Investigation ☐ Yes ☐ No Date: _____
☐ Refer to adjacent MS4 ☐ Yes ☐ No Date: _____
☐ Non-Storm Water Discharge Eliminated ☐ Yes ☐ No Date: _____
☐ Notify ADEM ☐ Yes ☐ No Date: _____
☐ Other

Comments: _____

Appendix E:

Supplemental Material for Section II.E

ALDOT MS4 Active Construction Projects (Transportation Facilities):
Fiscal Year 2015

ALDOT MS4 Active Construction Projects (Transportation Facilities):
Fiscal Year 2015

ADEM Permit No.	ALDOT Project No.	ALDOT Permit Sequence No.	MS4 Area	County	Project Description
ALR107503	NHF-8106(008)	204	GADSDEN	ETOWAH	SR-77 FROM STEEL STATION RD TO I-59 RAMP(EAST SIDE)
ALR107574	HPP-0035(511)	1562	MONTGOMERY	MONTGOMERY	MGM OUTER LOOP FR SOUTH OF SR-110 THRU I-85 INT, PHASE V, BSP OUTER LOOP, SERVICE RD, RAMPS @ SR-110 INTERCHANGE & I-85 INTERCHANGE
ALR107574	HPP-0035(510)	1251	MONTGOMERY	MONTGOMERY	MGM OUTER LOOP NORTH OF I-85 INT. PHASE III, GD,DR,B,P,BRG ON RELOCATION SR-126, WIDEN I-85 SOUTHBOUND BRIDGE OVER MILLIES CREEK, & GDR PORTIONS OF RAMPS 1 & 2
ALR108735	APD-0471(501)	1253	JEFFERSON/SHELBY COUNTY	JEFFERSON	COR X, I-65 FR N OF CR-1107 (41ST AVE) TO WALKERS CHAPEL RD/ COR X FR I-65 TO US-31, GDBP/ BR ON I-65, GDR COR X, GDBP/ US-31, LEWISBURG RD, LANDFILL RD, BRG ON LANDFILL RD, I-65 NB BRG OVER US-31, PART RMP BRG NW65X & PART RMP BRG ENX65-NORFOLK SOU
ALR109094	EB-0053(509)	461	HUNTSVILLE	MADISON	SR-53, ADDITIONAL LANES FROM N OF SR-255 (RIDEOUT RD) TO S OF CR-19 (JEFF RD) (PRIORITY #12-2009)
ALR109094	EB-0053(509)	1255	HUNTSVILLE	MADISON	SR-53, ADDITIONAL LANES FROM N OF SR-255 (RIDEOUT RD) TO S OF CR-19 (JEFF RD) (PRIORITY #12-2009)
ALR109107	BRF-0269(503)	699	JEFFERSON/SHELBY COUNTY	JEFFERSON	REPLACE BRIDGE, BIN 001665, SR-269 OVER SHORT CREEK, RR INVOLVEMENT (SUFF=2.0, STATUS=SD) (BIRMINGHAM SOUTHERN RR)
ALR109315	STPOA-0025(518)	1133	GADSDEN	ETOWAH	NEW LOCATION, US 411 FROM FOUR LANES IN GADSDEN TO TURKEYTOWN
ALR109600	STPOAF-8829(600)	1324	QUAD CITIES	COLBERT	SR-133 FROM NORTH OF NORFOLK SOUTHERN RR BRIDGE TO 700 FEET SOUTH OF AVALON AVENUE IN THE CITY OF MUSCLE SHOALS
ALR109616	NHF-0067(501)	511	DECATUR	MORGAN	ADDITIONAL LANES AND BRIDGES OVER CSX RAILROAD ON SR-67 FROM SR-3 (US-31) TO CR-41 (DANVILLE RD) (PRIORITY #23-2011)
ALR10A191	IM-I065(405)	1262	MOBILE	MOBILE	RESURFACING I-65 FROM 0.2 MILES NORTH OF SR-158 TO 1.1 MILES NORTH OF SR-13 (US-43)
ALR10A297	NHF-I085(327)	1209	MONTGOMERY	MONTGOMERY	INTERCHANGE MODIFICATION ON I-85 @ PERRY HILL ROAD (EXIT 4) ADD LOOP RAMP, WIDEN BRIDGES
ALR10A388	NHF-0013(572)	1371	QUAD CITIES	LAUDERDALE	US-43 FR 4 LN @ KILLEN TO SR-64 (ADDITIONAL LANES) BASE & PAVE.
ALR10A425	BRF-7009(600)	630	JEFFERSON/SHELBY COUNTY	JEFFERSON	BRIDGE REPLACEMENT AND RELOCATION ON SR-150 AT SHADES CREEK (BIN # 1502) AND THE CSX RAILROAD FROM MP 6.4 WEST OF SHADES CREEK TO MP 7.0 EAST OF SHADES CREEK (BIN # 1503)
ALR10A806	IM-I459(309)	1407	JEFFERSON/SHELBY COUNTY	JEFFERSON	PVT REHAB, MILL, PATCH, RESURFACE, PATB, BINDER, WEARING LAYER, UNDERDRAIN, SHOULDER TREATMENT AND GUARDRAIL ON I-459 FROM JUST NORTH OF SR-150 TO THE SOUTH END OF SR-3 (US-31) OVERPASS (PRIORITY #5)
ALR10A827	HFL-ACNHF-0038(530)	1402	JEFFERSON/SHELBY COUNTY	JEFFERSON	SR-38 (US-280) INTERSECTIONS IMPROVEMENTS FROM HOLLYWOOD BOULEVARD TO CR-1514 (DOUG BAKER BOULEVARD)
ALR10A940	CMAQ-9802(914)	1400	JEFFERSON/SHELBY COUNTY	SHELBY	PARK & RIDE LOT AT THE SHELBY COUNTY AIRPORT ON SHELBY WEST PARKWAY APPROXIMATELY 0.75 MILES NORTH OF CR-87
ALR10AAF5	IM-I459(308)	1444	JEFFERSON/SHELBY COUNTY	JEFFERSON	I-459 PAVEMENT REHABILITATION FROM CR-143 (GRANTS MILL RD) TO SR-7 (US-11) PLANING, RESURFACING, GUARDRAIL, AND TRAFFIC COUNTING UNITS
ALR10AAW3	ST-059-119-009-()	1421	JEFFERSON/SHELBY COUNTY	SHELBY	TURN LANES AND INTERSECTION IMPROVEMENTS AT SR-119 (MONTEVALLO ROAD) AND CR-80 (MISSION HILLS ROAD)
ALR10AAY4	IM-NHF-I059(326)	1379	TUSCALOOSA	TUSCALOOSA	ADD LANES AND BRIDGE REPLACEMENT TO I-59 FROM .75 MILE SOUTH OF CR-85 (BUTTERMILK ROAD) TO .30 MILE SOUTH OF CR-32

ADEM Permit No.	ALDOT Project No.	ALDOT Permit Sequence No.	MS4 Area	County	Project Description
ALR10AAY4	IM-I059(372)	1480	TUSCALOOSA	TUSCALOOSA	I-59/20 SLIDE REPAIRS (2 SLIDES) AT M.P. 78.3. (STORM WATER PERMIT COVERED UNDER PS1379)
ALR10AAY4	IM-I059(373)	1481	TUSCALOOSA	TUSCALOOSA	I-59/20 SLIDE REPAIRS (2 SLIDES) AT M.P. 79.7 AND M.P. 80.9. (STORM WATER PERMIT COVERED UNDER PS1379)
ALR10AAY4	IMF-NHF-I059(377)	1541	TUSCALOOSA	TUSCALOOSA	I-59 (I-20) ADDITIONAL LANES AND BRIDGE REPLACEMENT FROM SOUTH OF SR-7 (US-11) TO SOUTH OF CR-32. GRADE, DRAIN, BASE, PAVE, AND BRIDGE OVER NS RR NORTHBOUND LANE DOT # 725-432D AND SOUTHBOUND LANE RR DOT # 942-611R
ALR10AAY4	NHF-I059(376)	1542	TUSCALOOSA	TUSCALOOSA	I-59 (I-20) ADD'L LANES FROM SOUTH OF CR-85 (BUTTERMILK ROAD) TO SOUTH OF SR-7 (US-11).
ALR10AB06	IMD-IM-I565(307)	1034	HUNTSVILLE	MADISON	I-565 NEW INTERCHANGE AT CR-3 (COUNTY LINE ROAD), ADD RAMPS TO EXISTING UNDERPASS
ALR10AB07	ST-037-000-010-()	895	JEFFERSON/SHELBY COUNTY	JEFFERSON	ADD LANES ON SR-150 FROM EAST OF CR-97 (SHADES CREST RD) TO EAST OF I-459 AND I-459 NBR FROM 500 FT SOUTH OF MP 11 TO APPROX. 1/2 MILE NORTH OF MP 11
ALR10AC40	NHF-0901(500)	1408	ANNISTON	CALHOUN	SR-901(ANNISTON EAST BYPASS) FROM 1500' SOUTH OF LAKE YAHOU TO SR-1 (US-431)
ALR10AC66	APD-1602(551)	1175	JEFFERSON/SHELBY COUNTY	JEFFERSON	SR-959 (BIRMINGHAM NORTHERN BELTLINE) FROM SR-79 TO SR-75. GRADE AND DRAIN
ALR10AD39	STPAA-0180(505)	1458	BALDWIN COUNTY	BALDWIN	RESURFACING SR-180 FROM 0.28 MILE WEST OF FOLEY BEACH EXPRESS TO EAST OF SR-161
ALR10AD89	ACAA59064F-STPMBF-7503(600)	1420	MOBILE	MOBILE	5-LANE SCHILLINGER RD FROM HOWELLS FERRY RD TO SR-42 (US-98)
ALR10AE54	IM-IMD-I010(328)	1445	MOBILE	MOBILE	RESURFACING I-10 FROM HALLS MILL TO WEST END OF GEORGE C WALLACE TUNNEL
ALR10AF14	NH-HSIP-0001(580)	1469	HUNTSVILLE	MADISON	WIDENING AND RESURFACING SR 1 (US 431) FROM SOUTH OF VICTORIAN LANE IN OWENS CROSS ROADS TO JUST SOUTH OF THE INTERSECTION WITH OLD BIG COVE ROAD
ALR10AF71	NH-0038(531)	1411	JEFFERSON/SHELBY COUNTY	SHELBY	INTERSECTION IMPROVEMENTS ON SR-38 (US-280) AT SR-119 AND ADDITIONAL LANES ON SR-119 FROM CORPORATE DRIVE TO BROOK HIGHLAND PARKWAY.
ALR10AF81	NH-0016(515)	1475	MOBILE	MOBILE	RESURFACING ON SR-16 (US-90) FROM HALLS MILL CREEK BRIDGE TO JOINT AT PINEHILL DRIVE
ALR10AF99	ST-037-003-009-()	1419	JEFFERSON/SHELBY COUNTY	JEFFERSON	WIDENING FOR ADDITIONAL LANES AND INTERSECTION IMPROVEMENTS FROM SHELBY/JEFFERSON COUNTY LINE TO I-459
ALR10AH00	IM-I059(365)	1457	JEFFERSON/SHELBY COUNTY	JEFFERSON	I-59 CONCRETE PAVEMENT REHABILITATION FROM US-31(E. B. STEPHENS EXP) TO I-20 (PRIORITY #1)
ALR10AH64	STPAA-HSIP-0110(505)	1503	MONTGOMERY	MONTGOMERY	RESURFACE AND WIDENING OF SR 110 FROM CHANTILLY PKWY TO THE BULLOCK COUNTY LINE
ALR10AH70	STPOA-HSIP-0007(537)	1471	GADSDEN	ETOWAH	RESURFACE AND SAFETY WIDENING SR-7 (US-11) FROM INTERSECTION WITH SR-1 (US-431) IN ATTALLA TO DEKALB COUNTY LINE. FY 2014 PHASE 1 RSF PROGRAM.
ALR10AI77	NH-HSIP-0002(562)	1505	HUNTSVILLE	MADISON	RESURFACING AND 2' SAFETY WIDENING SR-2 (US-72) EASTBOUND ONLY FROM EAST OF SHIELDS ROAD TO WEST OF BROCK ROAD
ALR10AJ04	NH-HSIP-0163(502)	1508	MOBILE	MOBILE	RESURFACING AND 2'SAFETY WIDENING ON SR-163 FROM SR-193 TO SOUTH ABUTMENT OF DOG RIVER BRIDGE
ALR10AJ32	NHF-0020(517)	1523	DECATUR	MORGAN	SR-20 (US-72A) INTERSECTION IMPROVEMENT@ SR-3 (US-31) PAVEMENT REPLACEMENT RESURFACING & STRIPING FROM EAST SIDE OF RR BRIDGE MP 68.605 TO SR-3 MP 71.32

ADEM Permit No.	ALDOT Project No.	ALDOT Permit Sequence No.	MS4 Area	County	Project Description
ALR10AJ79	NH-0006(551)	1517	TUSCALOOSA	TUSCALOOSA	EXTENDING AND ADDING NEW TURN LANES SR-6 (US-82) (MCFARLAND BLVD) WITH CITY OF TUSCALOOSA
ALR10AK61	IMF-I359(302)	1504	TUSCALOOSA	TUSCALOOSA	I-359 RESURFACING AND DRAINAGE IMPROVEMENTS FROM I-20/59 TO 15TH STREET OVERPASS
ALR10AL01	STPAA-HSIP-0004(539)	1524	JEFFERSON/SHELBY COUNTY	JEFFERSON	WIDENING, PLANING, RESURFACING, LOOP DETECTORS, PERMANENT TRAFFIC STRIPE, GUARDRAIL END ANCHORS AND BRIDGE RAIL RETROFIT ALONG SR-4 (US-78) FROM 19TH STREET IN IRONDALE TO 0.147 MILES WEST OF I-20
ALR10AL25	IMF-HSIPF-I059(354)	1513	GADSDEN	ETOWAH	RESURFACING, CROSS SLOPE CORRECTION, BRIDGE RAISING, GUARDRAIL REPLACEMENT AND GUIDERAIL INSTALLATION ON I-59 FROM THE ST CLAIR/ETOWAH COUNTY LINE TO 0.2 MILES SOUTH OF SR 77
ALR10AM41	BR-7940(601)	1518	TUSCALOOSA	TUSCALOOSA	REPLACE BRIDGE SR-215 63-8.5 OVER ABS RAILROAD AND 19TH STREET, BIN # 002800
ALR10AN08	NHF-0002(564)	1502	HUNTSVILLE	MADISON	SR-2 (US-72, CORRIDOR V) ADDITIONAL LANE (WESTBOUND ONLY) AND INTERSECTION IMPROVEMENTS FROM MAYSVILLE ROAD TO SHIELDS ROAD.
ALR10AN09	99-303-371-003-401-()	1531	JEFFERSON/SHELBY COUNTY	JEFFERSON	WIDENING, PLANING, RESURFACING, LOOP DETECTORS, PERMANENT TRAFFIC STRIPE, GUARDRAIL END ANCHORS AND BRIDGE RAIL RETROFIT ALONG SR-3 (US-31) FROM 0.150 MILE NORTH OF I-65 TO 0.050 MILE NORTH OF SHADES CREST ROAD (CR-99)
ALR10AQ03	NHF-BRF-0210(506)	1560	DOTHAN	HOUSTON	BRIDGE OVER BRIDGE CULVERT ON SR-210 (ROSS CLARK CIRCLE), FROM FORTNER STREET TO BAUMAN DRIVE BIN'S #020952, #020951
ALR10AT04	ST-051-009-005-()	1597	MONTGOMERY	MONTGOMERY	SERVICE ROAD IMPROVEMENTS ALONG SR-6 (US-231) AND THE EAST BYPASS (US-82) AT TRENHOLM STATE TECHNICAL COLLEGE
ALR10AU20	STPAA-STPBH-7376(600)	1581	JEFFERSON/SHELBY COUNTY	JEFFERSON	VEHICLE/PEDESTRIAN BRIDGE ON SHUTTLESWORTH DR FROM 29TH AVE N TO 32ND AVE N
ALR10AU64	NH-HSIP-0006(556)	1611	MONTGOMERY	MONTGOMERY	RESURFACE AND 2FT SAFETY WIDENING SR-6 (US-82) FROM THE JCT OF SR-8 (US-80) TO PAVEMENT JOINT JUST SOUTH OF SR 271 AND WESTBOUND ONLY FROM MP 165.8 TO MP 166.441
ALR10AU70	ST-002-180-008-()	1595	BALDWIN COUNTY	BALDWIN	INTERSECTION IMPROVEMENTS AT SR-180 AND MAIN STREET AND WIDENING FROM MONEY BAYOU DRIVE TO WILLIAM SILVERS PARKWAY
ALR10AV56	APDF-0471(533)	1607	JEFFERSON/SHELBY COUNTY	JEFFERSON	FINAL BASE AND PAVE ON I-22 (CORRIDOR X) FROM CR-77 (COALBURG ROAD) TO I-65 AND TO INCLUDE THE PARTIAL SIGNING AND STRIPING FROM WEST OF THE SR-4 (US-78) INTERCHANGE TO I-65
ALR10AV58	STPBHF-I020(349)	1609	JEFFERSON/SHELBY COUNTY	JEFFERSON	BRIDGE REPLACEMENT AND APPROACHES ON 31ST STREET NORTH OVER I-59/20 (BIN 10493) AND 12TH AVENUE NORTH OVER I59-/20 (BIN 10494)
ALR10AW61	ST-037-038-008-()	1615	JEFFERSON/SHELBY COUNTY	JEFFERSON	SR-38 (US-280) AUXILIARY LANES FROM I-459 TO CAHABA RIVER ROAD
ALR10AW83	STPBHF-I065(457)	1610	JEFFERSON/SHELBY COUNTY	JEFFERSON	CBD BRIDGE WIDENINGS AND APPROACHES ON I-65 OVER 2ND AVE N (BIN 14391), 3RD AVE N (BIN 14393), AND 4TH AVE N (BIN 14392).
ALR10AX27	NH-0038(535)	1604	JEFFERSON/SHELBY COUNTY	JEFFERSON	SR-38 (US-280) MISCELLANEOUS IMPROVEMENTS FROM HOLLYWOOD BLVD TO CR-1514 (DOUG BAKER BLVD) INCLUDING MEDIAN PROTECTION FROM CHEROKEE RD TO OVERTON RD
ALR10AX52	NH-HSIP-0052(509)	1600	DOTHAN	HOUSTON	RESURFACING AND 2' SAFETY WIDENING ON SR-52 FROM SR-12 (US-84) IN DOTHAN TO EAST OF CR-55
ALR10AY32	IM-IMD-I065(435)	1621	JEFFERSON/SHELBY COUNTY	SHELBY	REPLACE EXISTING CONCRETE FLUMES AND REPAIR SINKHOLES ON BACKSLOPE BENCHES ON I-65 NORTH OF SR-119 EXIT 246 TO SOUTH OF VALLEYDALE ROAD EXIT 247

Appendix F:

Supplemental Material for Section II.F

ALDOT Guideline for Operation 3-73:
Post-Development Stormwater Runoff Management

Determining Runoff for Small Storm Events

Post-Development Stormwater Risk Assessment

ALDOT Form HYD-100

ALDOT Form HYD-101

ALABAMA

DEPARTMENT OF TRANSPORTATION

GUIDELINES FOR OPERATION

SUBJECT: POST-DEVELOPMENT STORMWATER RUNOFF MANAGEMENT

The following guidelines should be followed during drainage design on all ALDOT projects requiring new development and re-development let to contract after April 1, 2015.

Designers must provide features and practices that cause post-development hydrology to mimic pre-development hydrology of the site to the maximum extent practicable, working within the constraints of the project, at all locations of discharge. The basis for design to meet this requirement shall be small, frequent rain events up to and including the 95th percentile rain event for the site.

While working toward this design goal, initial consideration should be the use of decentralized practices and features near the source of the runoff. Design elements that utilize natural materials and processes will be considered whenever possible.

- Small, frequent rain events are those storm events with rainfall depths up to and including the 95th percentile event for a specific county.

- Pre-development and Post-development hydrology include both peak discharge and runoff volume.

- Pre-development hydrology is the existing hydrological condition of the site just prior to construction of the planned development or re-development.

- New Development describes the creation of a new transportation facility or a new support facility that causes a ground disturbance of greater than one acre.

- Re-Development with respect to transportation facilities describes non-maintenance work performed to or on an existing transportation facility that provides for an increased number of thru lanes of travel, and causes a ground disturbance of greater than one acre. Work on an existing road that does not result in an additional thru lane does not constitute re-development.

- Re-Development with respect to support facilities describes non-maintenance work performed to or on an existing support facility that causes a ground disturbance of more than one acre.

The Chief Engineer may approve exceptions to this policy so long as downstream property will not be significantly impacted, and the bed and bank structure of receiving stream channels will not be significantly degraded by the increased stormwater discharge. Justification for an exception will be described and quantified in a written request to the Chief Engineer, including a description of the analysis and conclusions regarding downstream impacts.

RECOMMENDED FOR APPROVAL: _____
STATE DESIGN ENGINEER

APPROVAL: _____
CHIEF ENGINEER

APPROVAL: _____ 11/24/14
TRANSPORTATION DIRECTOR DATE

DETERMINING RUNOFF FOR SMALL STORM EVENTS

1. Introduction

The following calculation guidance should be used during drainage design on all ALDOT projects requiring new development and re-development, as defined in the Guideline for Operation (GFO 3-73) (ALDOT 2014).

As stated in the GFO 3-73, designers should attempt to provide features and practices that cause post-development hydrology to mimic pre-development hydrology of the site to the maximum extent practicable for all small, frequent rain events, working within the constraints of the project, at all locations of discharge. While working toward this goal, consideration should first be given to the use of decentralized practices and features near the source of the runoff. Design elements that utilize natural materials and processes will be considered whenever possible (ALDOT 2014).

The purpose of this document is to provide calculation guidance for drainage design using small frequently occurring storms. The 95th percentile rainfall event will be used for calculating runoff volume and peak discharge. Runoff volume (in inches) is calculated using the 95th percentile rainfall event and a volumetric runoff coefficient. Peak discharge is calculated using the rainfall, basin area, modified curve number, and time of concentration. The modified curve number is determined using the rainfall and runoff volume. Peak discharge can be calculated by hand or through the use of various computer programs. Sample calculations for determining runoff and peak discharge have been included.

2. Design Storm

2.1. Design Storm

Small, frequently occurring storms account for a large proportion of the annual precipitation volume, and runoff from those storm events also significantly alter the discharge frequency, rate and temperature of the runoff (USEPA 2009). As indicated in the GFO 3-73, ALDOT will consider storm events with rainfall depths up to and including the 95th percentile rainfall event, as defined by USEPA (2009), for a specific location as being such small storm events. In turn, for stormwater runoff calculation, the design storm to be used in the analysis will be the 95th percentile rainfall event.

2.2. 95th Percentile Rainfall Depths in Alabama

Estimation of the 95th percentile rainfall depths for all locations throughout the State was performed by the ALDOT Design Bureau according to the approach detailed in the MS4 Stormwater Management Program Plan. Figure 1 is the isohyetal map for the 95th percentile rainfall depths in Alabama generated using that approach.

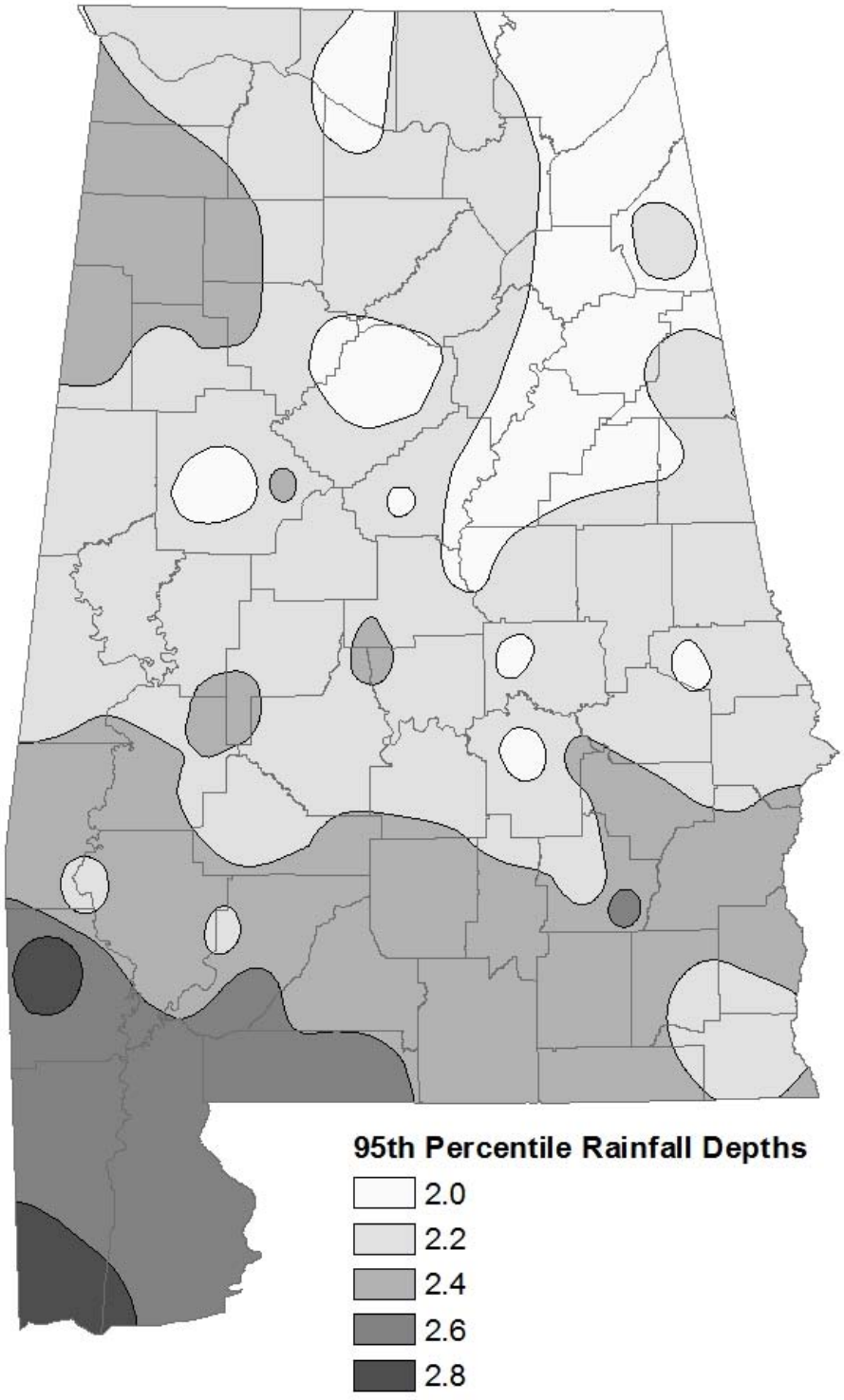


Figure 1 Isohyetal map for the 95th percentile rainfall depths in Alabama

3. Stormwater Runoff Volume and Peak Discharge Calculation

3.1. NRCS Curve Number Method

The curve number (CN) method is a commonly used tool for estimating runoff from rainfall excess. The method was developed by the USDA Natural Resources Conservation Service (NRCS, formerly SCS) and described in detail in Chapter 10 of the National Engineering Handbook, Part 630 - Hydrology (NEH 630) (USDA 2004). In this method, runoff is calculated based on precipitation, initial abstraction, and watershed storage. The curve number runoff equation is:

$$Q = \frac{(P - I_a)^2}{(P - I_a) + S} \qquad P > I_a \qquad (1)$$

$$Q = 0 \qquad P \leq I_a \qquad (2)$$

where, Q is runoff (in.), P is design storm (in.), I_a is initial abstraction (in.), and S is potential maximum retention (in.). Initial abstraction (I_a) consists mainly of interception, infiltration, and depression storage. I_a can be highly variable but NRCS (USDA 2004) found that it can be approximated in many cases by using the following formula:

$$I_a = 0.2\,S \qquad (3)$$

Therefore, the runoff equation becomes:

$$Q = \frac{(P - 0.2\,S)^2}{(P + 0.8\,S)} \qquad P > I_a \qquad (4)$$

where, S is a function of CN:

$$S = \frac{1000}{CN} - 10 \qquad (5)$$

Therefore, runoff can be calculated using only the curve number and rainfall. Curve numbers are determined by land cover type, hydrologic condition, antecedent moisture condition (AMC), and hydrologic soil group (HSG). Curve numbers for various land covers based on an average AMC for annual floods and I_a = 0.2 S can be found in NEH 630 (USDA 2004). For watersheds having multiple land cover types and HSGs, CN is weighted to get watershed CN, and the runoff is estimated using that weighted CN.

Despite its widespread use, the weighted CN method may not be appropriate for estimating runoff from smaller storm events because it can imply a significant initial loss that may not take place, as noted by Pitt (1999). Since all estimated 95th percentile storm events in Alabama are less than 3.0 inches (ranges from 2.0 to 2.8 inches), the design storm will be treated as a small storm. Therefore, the weighted CN will not be used to perform runoff volume and peak discharge calculations for the design storm. Instead, the CN will be modified using the methodology discussed in the following section.

3.2. Small Storm Hydrology Method

The Small Storm Hydrology Method (Pitt 1987) was developed to estimate the runoff volume from urban and suburban land uses for relatively small storm events. In this method, runoff is calculated using volumetric runoff coefficients. Pitt (2013) lists the runoff coefficients that are based on extensive field research conducted in the Midwestern U.S., the Southeastern U.S., and Ontario, Canada, over a wide range of land uses and storm events. Runoff coefficients for individual source areas generally vary with the rainfall amount. Larger storms have higher coefficients. The runoff coefficients for various source areas (Table 1) are derived using the original table from Pitt (2013).

Runoff is simply calculated by multiplying the rainfall amount by the appropriate runoff coefficient. Because the runoff relationship is linear for a given storm, a composite runoff coefficient (weighted average) can be computed for an area consisting of multiple land uses. Therefore, runoff is given by:

$$Q = P * R_{vc} \tag{6}$$

where, Q is runoff (in.), P is the 95th percentile rainfall (in.), and R_{vc} is the composite runoff coefficient.

The following equation is used to determine the stormwater runoff volume (V) in cubic feet:

$$V = \frac{P}{12} * R_{vc} * A * 43560 \tag{7}$$

where, V is runoff volume (ft^3) and A is drainage area (acres). Using the rainfall amount and runoff, a corresponding modified CN can be computed utilizing the following equation:

$$CN = \frac{1000}{10 + 5P + 10Q - 10\sqrt{Q^2 + 1.25\,Q\,P}} \tag{8}$$

Once the modified CN is computed, the time of concentration (t_c) can be computed based on methods identified in Chapter 15 of NEH 630 (USDA 2010) and peak discharge (Q_p) for the design storm can be computed. Procedures and sample calculations for stormwater runoff volume and peak discharge estimation are provided in the next subsection.

Table 1. Source areas and corresponding R_v values for different rainfall amounts

Source Areas	Rainfall (inches)				
	2.0	2.2	2.4	2.6	2.8
Roof Areas					
Flat, Connected	0.90	0.91	0.91	0.92	0.93
Pitched, Connected	0.99	0.99	0.99	0.99	0.99
Flat or Pitched, Unconnected, A Soil	0.07	0.09	0.10	0.12	0.13
Flat or Pitched, Unconnected, B Soil	0.16	0.18	0.19	0.21	0.22
Flat or Pitched, Unconnected, C or D Soil	0.26	0.28	0.29	0.31	0.32
Parking and Storage Areas					
Paved, Connected	0.99	0.99	0.99	0.99	0.99
Unpaved, Connected	0.89	0.90	0.91	0.92	0.92
Paved or Unpaved, Unconnected, A Soil	0.07	0.09	0.10	0.12	0.13
Paved or Unpaved, Unconnected, B Soil	0.16	0.18	0.19	0.21	0.22
Paved or Unpaved, Unconnected, C or D Soil	0.26	0.28	0.29	0.31	0.32
Driveways or Sidewalks					
Connected	0.99	0.99	0.99	0.99	0.99
Unconnected, A Soil	0.07	0.09	0.10	0.12	0.13
Unconnected, B Soil	0.16	0.18	0.19	0.21	0.22
Unconnected, C or D Soil	0.26	0.28	0.29	0.31	0.32
Streets or Alley Areas					
Smooth textured	0.88	0.89	0.90	0.91	0.91
Intermediate or Rough Textured	0.84	0.85	0.86	0.87	0.88
Highway Areas					
Paved Lane and Shoulder	0.88	0.89	0.90	0.91	0.91
Undeveloped or Pervious Areas					
Undeveloped or Pervious Areas, A Soil	0.07	0.09	0.10	0.12	0.13
Undeveloped or Pervious Areas, B Soil	0.16	0.18	0.19	0.21	0.22
Undeveloped or Pervious Areas, C or D Soil	0.26	0.28	0.29	0.31	0.32
Residential Areas*					
Low Density, < 2 units / acre	0.26	0.28	0.29	0.31	0.32
Medium Density, between 2 and 6 units / acre	0.55	0.58	0.60	0.61	0.62
High Density, > 6 units / acre	0.99	0.99	0.99	0.99	0.99
Other Areas					
Commercial / Industrial	0.99	0.99	0.99	0.99	0.99
High Traffic Urban Paved Areas	0.98	0.98	0.98	0.99	0.99
High Traffic Urban Pervious Areas	0.55	0.58	0.60	0.61	0.62
Excavation or Embankment Construction	0.26	0.28	0.29	0.31	0.32

Connected - flows directly into the drainage system, or occurs as concentrated shallow flow that runs over a pervious area and then into a drainage system.

Unconnected - drains over a pervious area as sheet flow, provided the impervious area is less than one-half the pervious area and the flow path through the pervious area is at least twice the impervious surface flow path. For unconnected flow use the R_v values associated with the appropriate soil type for pervious areas.

*Residential areas include buildings, driveways, yard and streets.

3.3. Calculation Procedures

Stormwater runoff volume and peak discharge can be estimated using the following procedure:

1. Determine the 95th percentile rainfall depth for the project location using the isohyetal map (Figure 1).
2. Delineate watershed boundaries and divide watershed into source areas based on its land use and soil type characteristics.
3. Assign runoff coefficients to source areas using Table 1 and compute the composite runoff coefficient (R_{vc}) by calculating a weighted average.
4. Compute runoff volume using Equations (6) and (7).
5. Compute modified CN using Equation (8).
6. Compute travel times and time of concentration using Velocity Method as described in Chapter 15 of NEH 630 (USDA 2010)
7. Calculate I_a/P using Equations (3) and (5).
8. Compute unit peak discharge (q_u) using Figure A.2 or A.3.
9. Calculate peak discharge using Graphical Peak Discharge Method as described in TR-55 (USDA 1986)

Land use and soil data can be obtained from various online sources. A few example websites are provided below:

Land Use Data:
National Land Cover Database 2011 (NLCD 2011) (http://www.mrlc.gov/nlcd2011.php): NLCD 2011 is the most recent national land cover product created by the Multi-Resolution Land Characteristics (MRLC) Consortium that has been applied consistently across the United States at a spatial resolution of 30 meters. Due to the coarser resolution of land use data for the purpose of this study, it is recommended that designers use recent aerial imagery to delineate land use for given location manually and/or using GIS tools.

Aerial Imagery:
Aerial imagery is available online in ArcGIS or it can be downloaded from different sources:
USGS EarthExplorer (http://earthexplorer.usgs.gov): Aerial imagery of different types (high resolution orthoimagery, NAIP JPG2000, etc.) are available to download depending on selected location.
USGS National Map Viewer (http://viewer.nationalmap.gov/viewer): 1-meter orthoimagery and other data can be downloaded from USGS National Map Viewer.

Soil Data:
The Soil Survey Geographic Database (SSURGO), operated by the USDA-NRCS, provides soil data and information produced by the National Cooperative Soil Survey. The information can be displayed in tables or as maps and is available for most areas in Alabama and other states. SSURGO map data can be viewed in the Web Soil Survey

(http://websoilsurvey.nrcs.usda.gov) or downloaded in ESRI Shapefile format. The coordinate systems are Geographic. Attribute data can be downloaded in text format that can be imported into a Microsoft Access database.

3.4. Sample Calculation (Example 1)

Using steps outlined in Section 3.3, the calculation of pre-development and post-development runoff volumes and peak discharges for the 95th percentile rainfall event in a watershed near Birmingham, Alabama is carried out below:

Pre-development Conditions

1. Determine the 95th percentile rainfall depth for the project location using the isohyetal map (Figure 1).

95th percentile rainfall (P) = 2.0 in.

2. Delineate watershed boundaries and divide watershed into source areas based on its land use and soil type characteristics.

Manual delineation or automatic delineation using GIS tools can delineate watershed boundaries for a given outlet and can divide a watershed into grouped areas based on its land use and soil type characteristics.

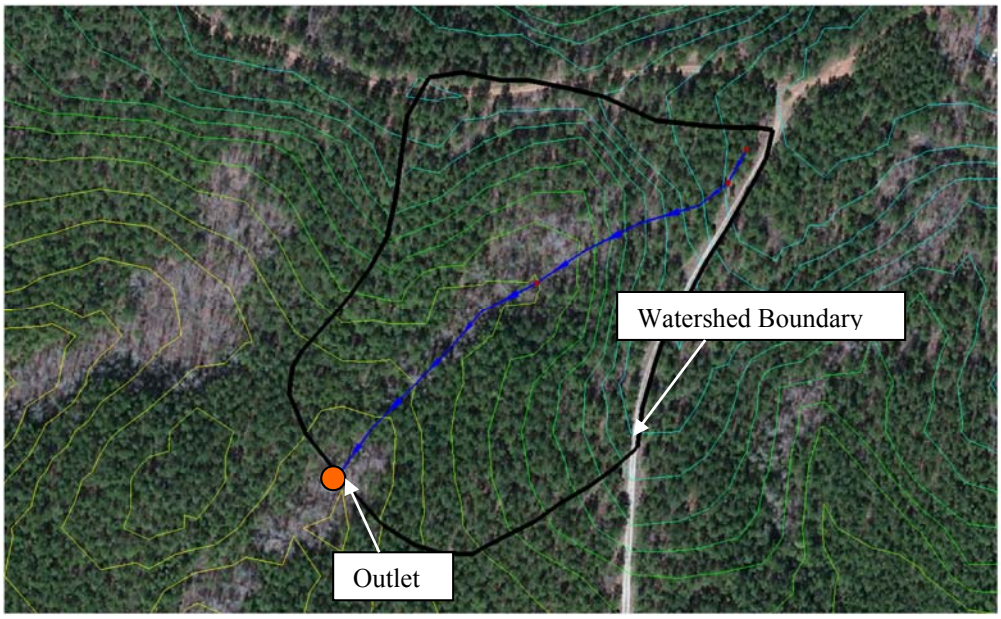


Figure 2. Aerial photograph indicating an outlet and drainage boundary

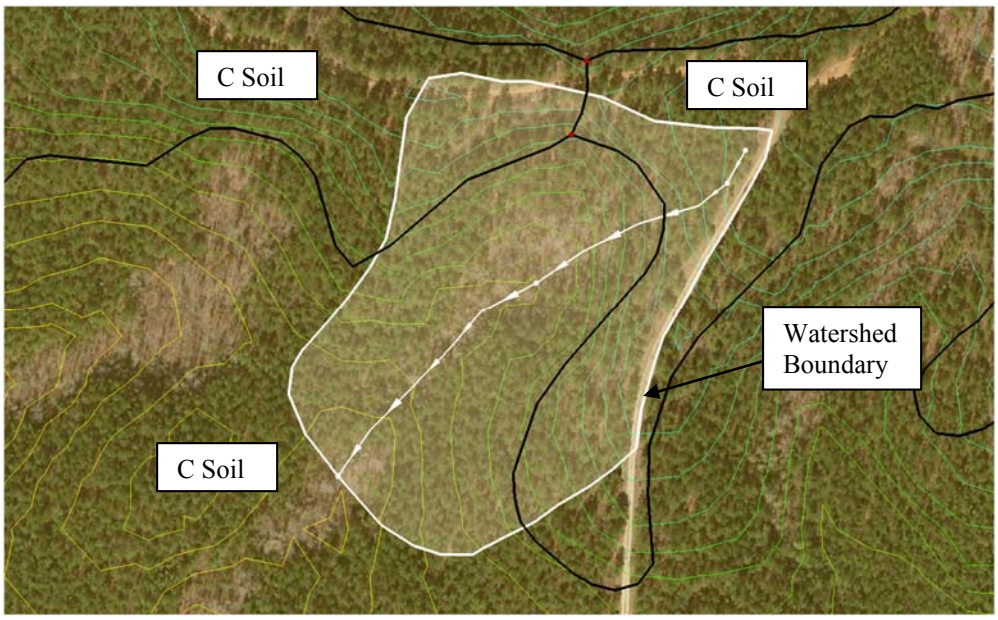


Figure 3. Aerial photograph indicating drainage boundary and soil types

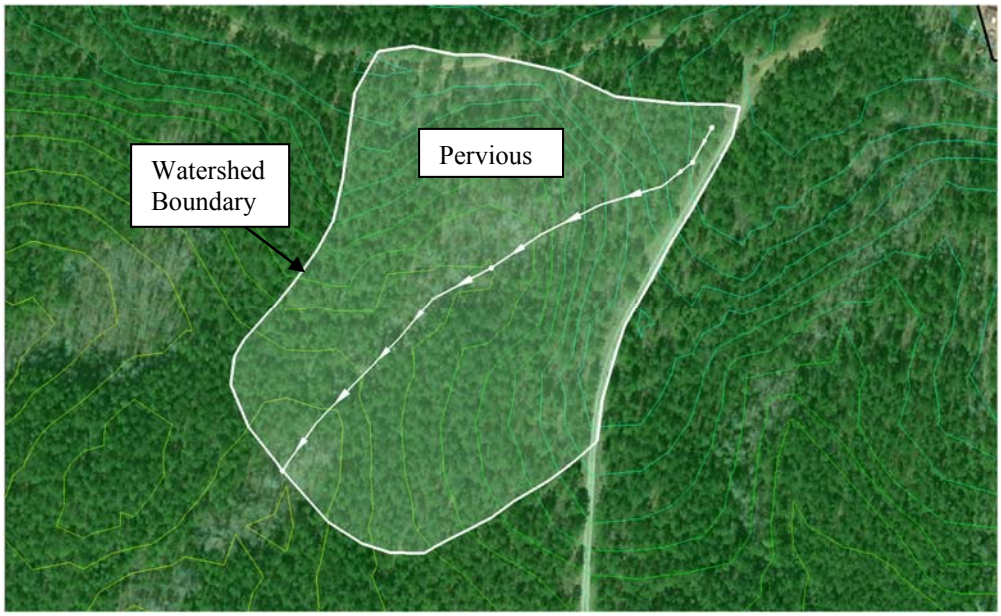


Figure 4. Aerial photograph indicating drainage boundary and pre-development source areas

Table 2. Land use and soil type distribution of sample watershed in Birmingham, Alabama

	Land Use	**Soil Type**	**Area in acres**
1	Woods- Good	Type C	5.9

3. Assign runoff coefficient to source areas using Table 1 and compute the composite runoff coefficient (R_{vc}) by calculating a weighted average.

Table 3. Source areas and corresponding R_v

Source areas	**Area (acres)**	**R_v (2 in)**	**Area * R_v**
Woods (Pervious areas – clayey soils, HSG - C)	5.9	0.26	1.534
∑ A =	5.9	∑ (A*R_v)=	1.534

Composite runoff coefficient

$$R_{vc} = \frac{\sum A * R_v}{\sum A} = \frac{1.534}{5.9} = \mathbf{0.26}$$

4. Compute runoff volume using Equations (6) and (7).

$Q = P * R_{vc} = 2 * 0.26 = \mathbf{0.52\ in}.$

$$V = \frac{P}{12} * R_{vc} * A * 43560 = \frac{2}{12} * 0.26 * 5.9 * 43560 = \mathbf{11137\ ft^3}$$

5. Compute modified CN using Equation (8)

$$CN = \frac{1000}{10 + 5P + 10Q - 10\sqrt{Q^2 + 1.25\ Q\ P}}$$

$$CN = \frac{1000}{10 + 5 * 2 + 10 * 0.52 - 10\sqrt{0.52^2 + 1.25 * 0.52 * 2}} = \mathbf{79}$$

6. Compute travel time and time of concentration (t_c) using Velocity Method

<u>Segment 1 – Sheet Flow</u>

Travel time for sheet flow

$$T_t = \frac{0.007(nL)^{0.8}}{(P_2)^{0.5} S^{0.4}} = \frac{0.007(0.4 * 50)^{0.8}}{(4.1)^{0.5}(0.029)^{0.4}} = 0.157\ hr = 9.4\ min$$

where, overland roughness coefficient (n) = 0.4 (Light Woods) (Appendix Table A.1),
flow length (L) = 50 ft,
2-year 24-hour rainfall (P_2) = 4.1 in., and
slope (S) = 0.029 ft/ft

Segment 2 – Shallow Concentrated Flow

From Figure A.1 (in Appendix) based on ground cover (Forest) and slope (0.204), average flow velocity (v)

$v = 2.516(S)^{0.5} = 2.516 * 0.204^{0.5} = 1.14\ ft/s$

Travel time for shallow concentrated flow

$$T_t = \frac{L}{60\ v} = \frac{300}{60 * 1.14} = 4.4\ min$$

Segment 3 – Open Channel Flow

For trapezoidal channel of width = 4 feet, flow depth = 0.4 feet (Grassed waterways, shallow concentrated flow, Figure A.1), and side slope (H:V)=3:1,

Area, $A = \frac{1}{2} * 0.4 * (6.4 + 4) = 2.08\ ft^2$

Wetted Perimeter, $P = 1.265 * 2 + 4 = 6.53\ ft$

Hydraulic Radius, $R = {}^{A}/_{P} = {}^{2.08}/_{6.53} = 0.319$

For open channel flow, velocity is estimated using Manning's equation:

$$v = \frac{1.49(R)^{\frac{2}{3}}(S)^{\frac{1}{2}}}{n} = \frac{1.49(0.319)^{\frac{2}{3}}(0.051)^{\frac{1}{2}}}{0.06} = 2.62\ \frac{ft}{s}$$

where, channel roughness (n) = 0.06 and
slope (S) = 0.051 ft/ft

Travel time for open channel flow

$$T_t = \frac{L}{60\ v} = \frac{380}{60 * 2.62} = 2.4\ min$$

Time of Concentration

Table 4. Time of concentration calculation

Segment	Type of Flow	Length (ft)	Slope (ft/ft)	T_t (min)
1	Sheet	50	0.029	9.4
2	Shallow concentrated	300	0.204	4.4
3	Open channel	380	0.051	2.4

$t_c = 9.4 + 4.4 + 2.4 = 16.2\ min = \mathbf{0.27\ hr}$

7. Calculate I_a/P using Equations (3) and (5).

$$I_a = 0.2\,S = 0.2 * \left({}^{1000}/_{CN} - 10\right) = 0.2 * \left({}^{1000}/_{79} - 10\right) = 0.532$$

$$\frac{I_a}{P} = \frac{0.532}{2} = \mathbf{0.27}$$

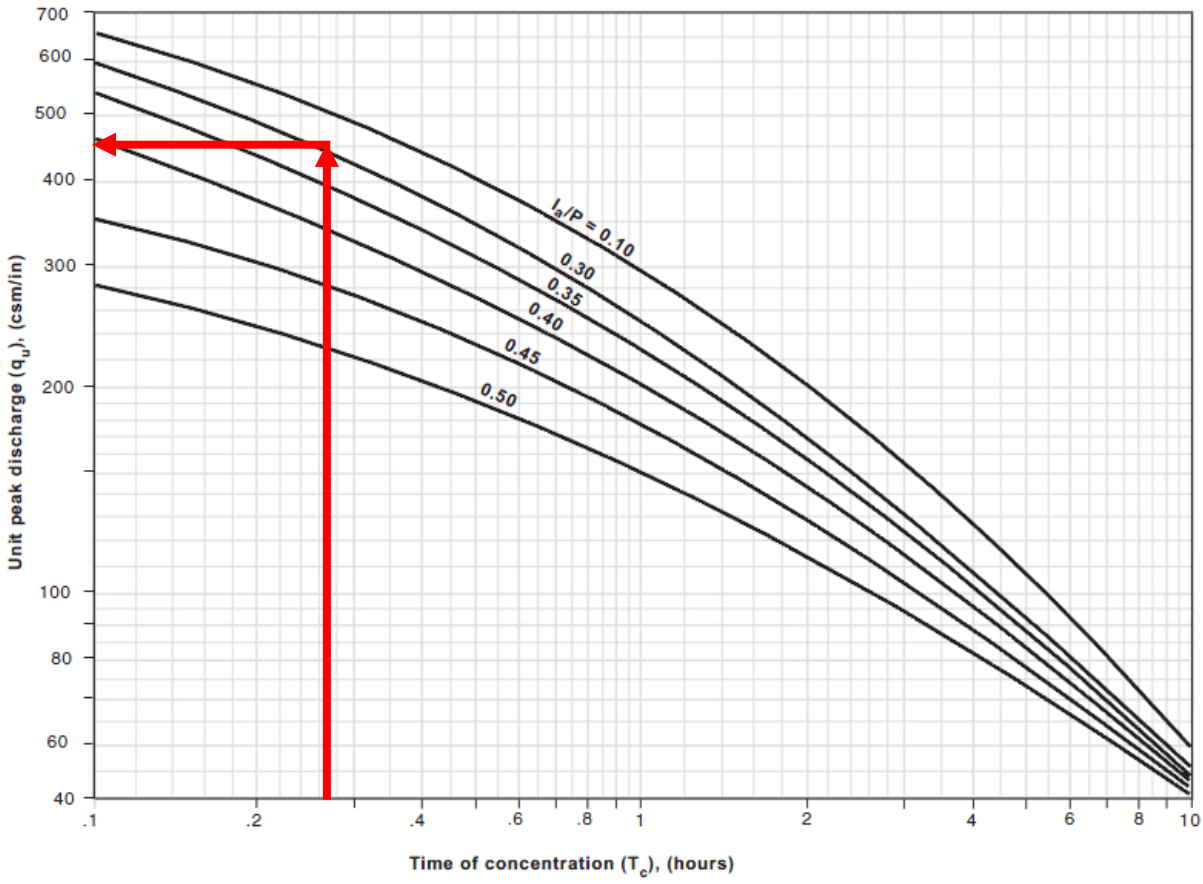
8. Compute unit peak discharge (q_u) using Figure A.2 or A.3.

q_u = 450 csm/in (From Appendix Figure A.3 for t_c = 0.27 hr and I_a/P = 0.27)

9. Calculate peak discharge (Q_p) using Graphical Peak Discharge Method for pre-development conditions

$$Q_p = q_u\,A\,Q\,F_p = 450 * 0.0092 * 0.52 * 1 = \mathbf{2.2\ cfs}$$

where, drainage area (A) = 0.0092 mi^2,
runoff volume (Q) = 0.52 in., and
F_p = 1 (From Appendix Table A.2, no pond and swamp areas)



Estimating unit peak discharge for type III rainfall distribution using Figure A.3

Post-development Conditions

1. Determine the 95th percentile rainfall depth for the project location using the isohyetal map (Figure 1).

95th percentile rainfall (P) = 2.0 in.

2. Delineate watershed boundaries and divide watershed into source areas based on its land use and soil type characteristics.

Manual delineation or automatic delineation using GIS tools can delineate watershed boundaries for a given outlet and can divide a watershed into grouped areas based on its land use and soil type characteristics.

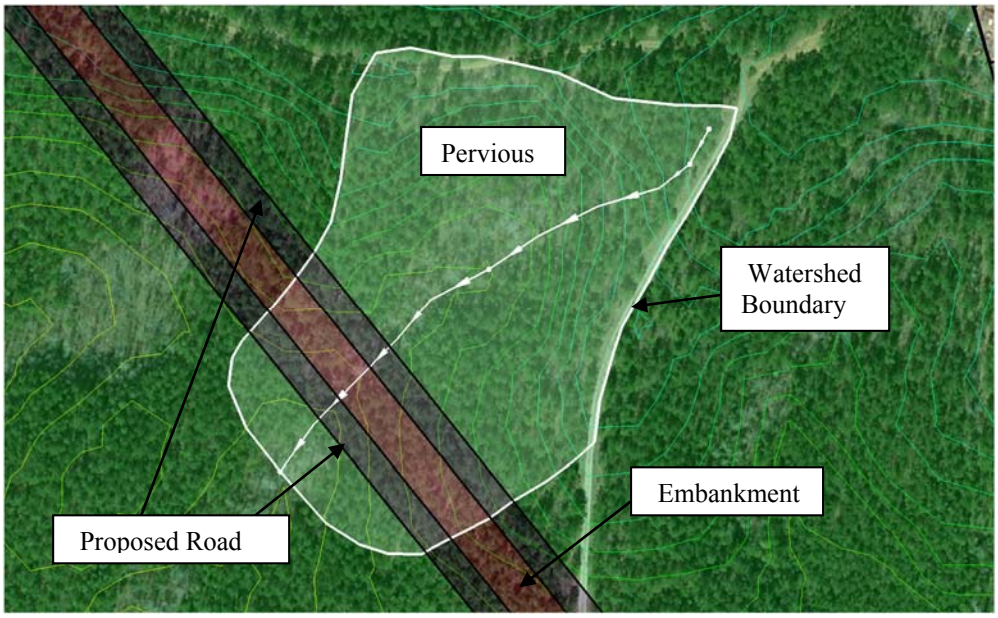


Figure 5. Aerial photograph indicating drainage boundary and post-development source areas

Table 5. Land use and soil type distribution of sample watershed in Birmingham, Alabama

	Land Use	**Soil Type**	**Area in acres**	
			Pre	**Post**
1	Woods- Good	Type C	5.9	4.8
2	Compacted Embankment	Type C		0.5
3	Road/Highway	Type C	-	0.6

3. Assign runoff coefficient to source areas using Table 1 and compute the composite runoff coefficient (R_{vc}) by calculating a weighted average.

Table 6. Source areas and corresponding R_v

Source areas	**Area (acres)**	**R_v (2 in)**	**Area * R_v**
Woods (Pervious areas – clayey soils, HSG - C)	4.8	0.26	1.248
Compacted Embankment (Pervious, HSG - D)	0.5	0.26	0.130
Road (Paved freeway & shoulder, smooth)	0.6	0.88	0.528
∑ A =	5.9	∑ (A*R_v)=	1.906

Composite runoff coefficient

$$R_{vc} = \frac{\sum(A * R_v)}{\sum A} = \frac{1.906}{5.9} = \mathbf{0.32}$$

4. Compute runoff volume using Equations (6) and (7).

$Q = P * R_{vc} = 2 * 0.32 = \mathbf{0.64\ in}.$

$$V = \frac{P}{12} * R_{vc} * A * 43560 = \frac{2}{12} * 0.33 * 5.9 * 43560 = \mathbf{13707\ ft^3}$$

5. Compute modified CN using Equation (8).

$$CN = \frac{1000}{10 + 5P + 10Q - 10\sqrt{Q^2 + 1.25\ Q\ P}}$$

$$CN = \frac{1000}{10 + 5 * 2 + 10 * 0.64 - 10\sqrt{0.64^2 + 1.25 * 0.64 * 2}} = \mathbf{82}$$

6. Compute travel time and time of concentration (t_c) using Velocity Method

Segment 1 – Sheet Flow

Travel time for sheet flow

$$T_t = \frac{0.007(nL)^{0.8}}{(P_2)^{0.5} S^{0.4}} = \frac{0.007(0.4 * 50)^{0.8}}{(4.1)^{0.5}(0.029)^{0.4}} = 0.157\ hr = 9.4\ min$$

where, overland roughness coefficient (n) = 0.4 (Light Woods) (Appendix Table A.1),
flow length (L) = 50 ft,
2-year 24-hour rainfall (P_2) = 4.1 in., and
slope (S) = 0.029

Segment 2 – Shallow Concentrated Flow

From Appendix Figure A.1 based on ground cover (Forest) and slope (0.204), average flow velocity (v)

$v = 2.516(S)^{0.5} = 2.516 * 0.204^{0.5} = 1.14\ ft/s$
Travel time for shallow concentrated flow

$$T_t = \frac{L}{60\ v} = \frac{300}{60 * 1.14} = 4.4\ min$$

Segment 3 – Open Channel Flow

For trapezoidal channel of width = 4 feet, flow depth = 0.4 feet (Grassed waterways, shallow concentrated flow, Figure A.1), and side slope(H:V)=3:1,
Area, $A = \frac{1}{2} * 0.4 * (6.4 + 4) = 2.08\ ft^2$

Wetted Perimeter, $P = 1.265 * 2 + 4 = 6.53\ ft$

Hydraulic Radius, $R = {}^{A}/_{P} = {}^{2.08}/_{6.53} = 0.319$

For open channel flow, velocity is estimated using Manning's equation:

$$v = \frac{1.49(R)^{\frac{2}{3}}(S)^{\frac{1}{2}}}{n} = \frac{1.49(0.319)^{\frac{2}{3}}(0.051)^{\frac{1}{2}}}{0.06} = 2.62\ \frac{ft}{s}$$

where, channel roughness (n) = 0.06 and
slope (S) = 0.051 ft/ft

Travel time for open channel flow

$$T_t = \frac{L}{60\ v} = \frac{380}{60 * 2.62} = 2.4\ min$$

Time of concentration

Table 7. Time of concentration calculation

Segment	Type of Flow	Length (ft)	Slope (ft/ft)	T_t (min)
1	Sheet	50	0.029	9.4
2	Shallow concentrated	300	0.204	4.4
3	Open channel	380	0.051	2.4

$t_c = 9.4 + 4.4 + 2.4 = 16.2\ min = \mathbf{0.27\ hr}$

7. Calculate I_a/P using Equations (3) and (5).

$I_a = 0.2\ S = 0.2 * \left({}^{1000}/_{CN} - 10\right) = 0.2 * \left({}^{1000}/_{82} - 10\right) = 0.439$

$$\frac{I_a}{P} = \frac{0.439}{2} = \mathbf{0.22}$$

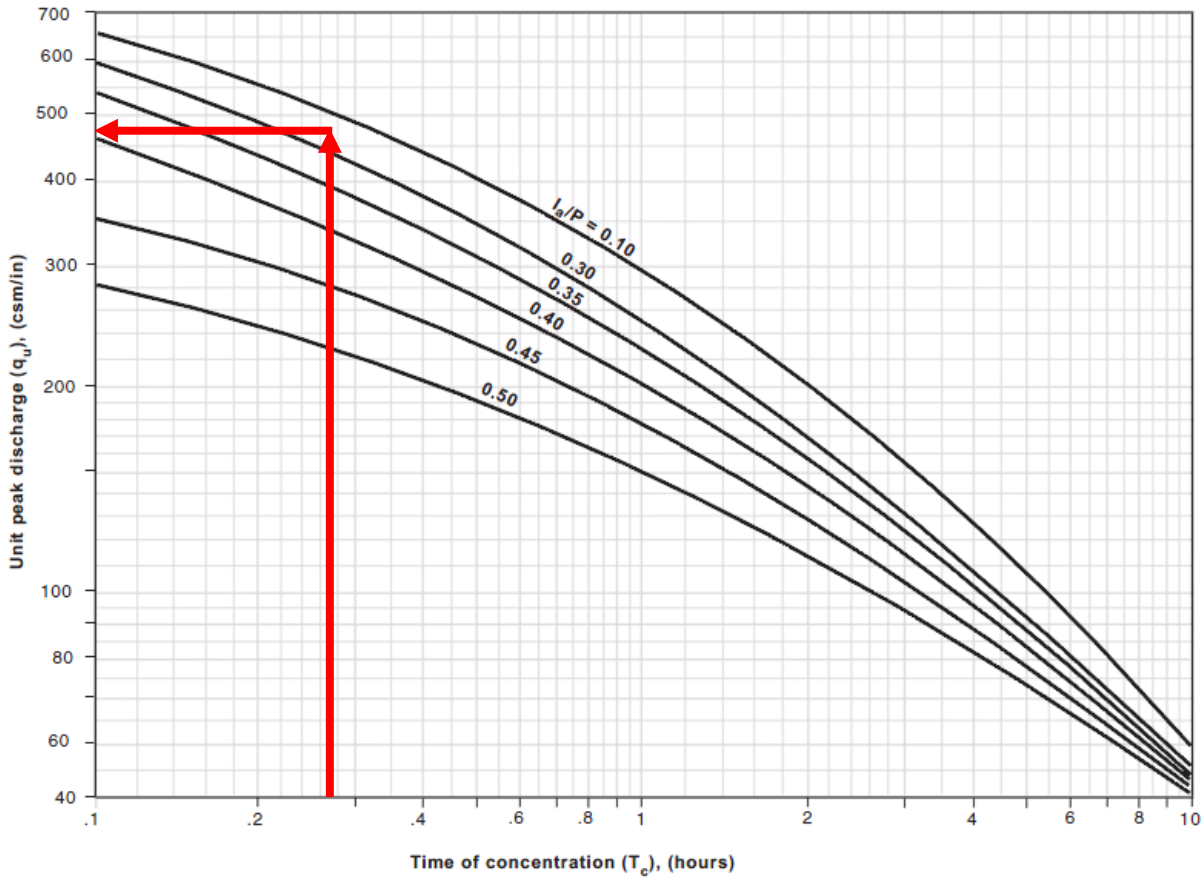
8. Compute unit peak discharge (q_u) using Figure A.2 or A.3.

q_u = 475 csm/in (From Appendix Figure A.3 for t_c = 0.27 hr and I_a/P = 0.22)

9. Calculate peak discharge (Q_p) using Graphical Peak Discharge Method for post-development conditions

$$Q_p = q_u\ A\ Q\ F_p = 475 * 0.0092 * 0.64 * 1 = \mathbf{2.8\ cfs}$$

where, drainage area (A) = 0.0092 mi^2,
runoff volume (Q) = 0.66 in., and
F_p = 1 (From Appendix Table A.2, no pond and swamp areas)



Estimating unit peak discharge for type III rainfall distribution using Figure A.3

Summary of Results

Table 8. Comparison of pre-development and post-development runoff volumes and peak discharges

	Pre	**Post**
Runoff volume, Q (in.)	0.52	0.64
Runoff volume, V (ft^3)	11137	13707
Peak discharge, Q_p (cfs)	2.2	2.8

Post-development runoff volume has increased by 2570 ft^3 or 23% compared to pre-development runoff volume. Peak discharge has increased by 0.6 cfs or 27%. Since there is significant increase in runoff volume and peak discharge, runoff management practices will be required to maintain pre-development hydrology in accordance with GFO 3-73 (ALDOT 2014).

3.5. Sample Calculation (Example 2)

Using steps outlined in Section 3.3, the calculation of pre-development and post-development runoff volumes and peak discharges for the 95th percentile rainfall event for a watershed in Birmingham, Alabama is carried out below:

Pre-development Conditions

1. Determine the 95th percentile rainfall for project location using the isohyetal map.

   95th percentile rainfall (P) = 2.0 in.

2. Delineate watershed boundaries and divide watershed into source areas based on its land use and soil type character. Manual delineation or automatic delineation using GIS tools can delineate watershed boundaries for a given outlet and can divide a watershed into grouped areas based on its land use and soil type characteristics.

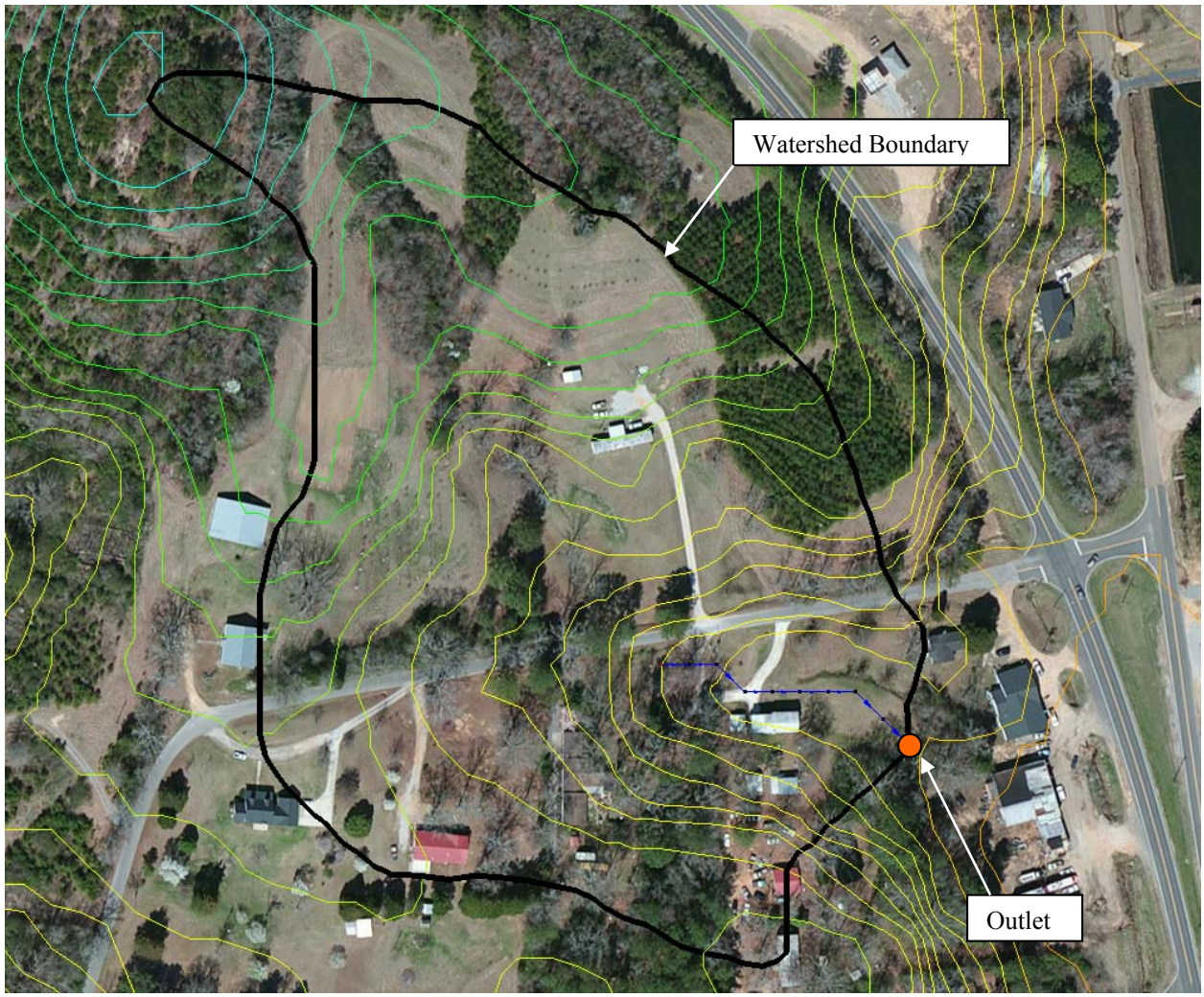


Figure 6. Aerial photograph indicating an outlet and drainage boundary

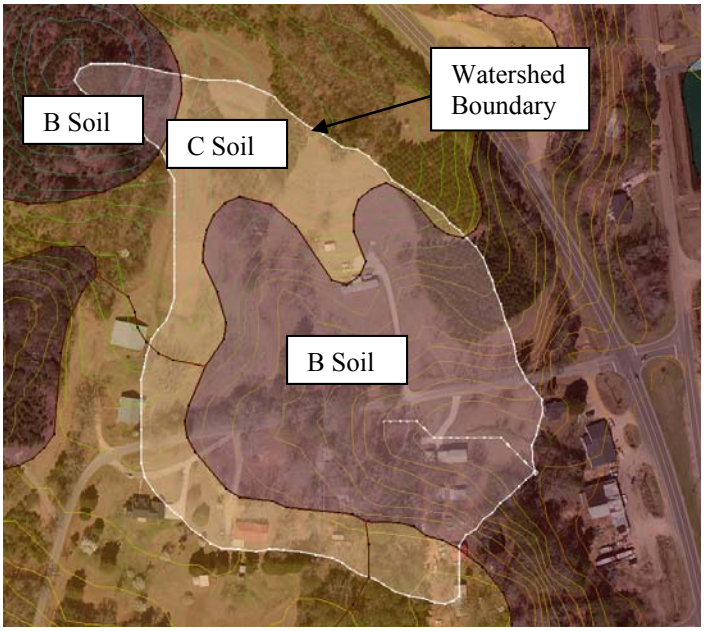


Figure 7. Aerial photograph indicating drainage boundary and soil types

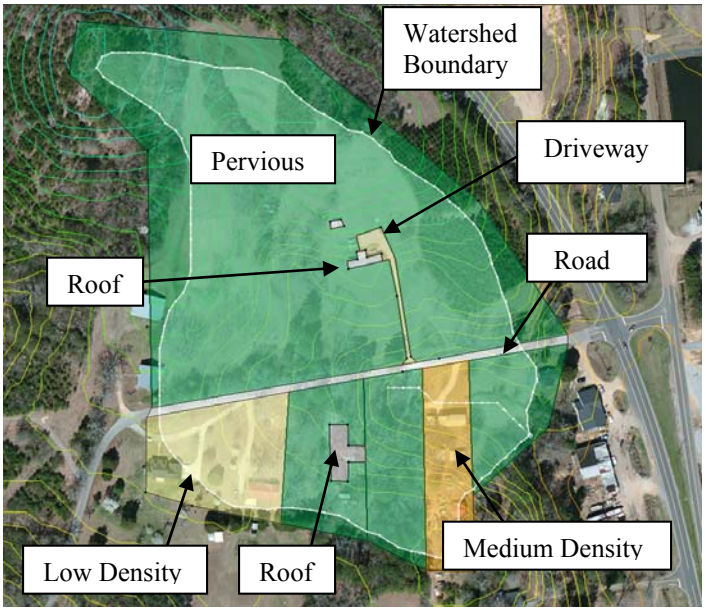


Figure 8. Aerial photograph indicating drainage boundary and pre-development source areas

3. Assign runoff coefficient to source areas using Table 1 and compute the composite runoff coefficient (R_{vc}) by calculating a weighted average.

Table 9. Source areas and corresponding R_v

Source areas	**Area (acres)**	**R_v (2 in)**	**Area * R_v**
Undeveloped or Pervious Areas, B Soil	7.13	0.16	1.141
Undeveloped or Pervious Areas, C or D Soil	4.00	0.26	1.040
Streets, Intermediate or Rough Textured	0.32	0.84	0.269
Low Density, < 2 units / acre	1.12	0.26	0.291
Roof, Flat or Pitched, Unconnected, B Soil	0.15	0.16	0.024
Roof, Flat or Pitched, Unconnected, C or D Soil	0.03	0.26	0.008
Driveway or Sidewalk, Unconnected, B Soil	0.13	0.16	0.021
Driveway or Sidewalk, Unconnected, C or D Soil	0.02	0.26	0.005
Medium Density, between 2 and 6 units / acre	0.87	0.55	0.479
∑ A =	13.77	∑ (A*R_v)=	3.277

Composite runoff coefficient

$$R_{vc} = \frac{\sum A * R_v}{\sum A} = \frac{3.277}{13.77} = \mathbf{0.24}$$

4. Compute runoff volume using Equations (6) and (7).

$Q = P * R_{vc} = 2 * 0.24 = \mathbf{0.48\ in}$.

$$V = \frac{P}{12} * R_{vc} * A * 43560 = \frac{2}{12} * 0.24 * 13.77 * 43560 = \mathbf{23{,}993\ ft^3}$$

5. Compute modified CN using Equation (8)

$$CN = \frac{1000}{10 + 5P + 10Q - 10\sqrt{Q^2 + 1.25\ Q\ P}}$$

$$CN = \frac{1000}{10 + 5 * 2 + 10 * 0.48 - 10\sqrt{0.48^2 + 1.25 * 0.48 * 2}} = \mathbf{78}$$

6. Compute travel time and time of concentration (t_c)

Segment 1 – Sheet Flow

Travel time for sheet flow

$$T_t = \frac{0.007(nL)^{0.8}}{(P_2)^{0.5} S^{0.4}} = \frac{0.007(0.4 * 43)^{0.8}}{(4.1)^{0.5}(0.026)^{0.4}} = 0.146\ hr = 8.8\ min$$

where, overland roughness coefficient (n) = 0.4 (Light Woods) (Appendix Table A.1),

flow length (L) = 43 ft,
2-year 24-hour rainfall (P_2) = 4.1 in., and
slope (S) = 0.026 ft/ft

Segment 2 – Shallow Concentrated Flow

From Figure A.1 based on ground cover (Forest) and slope (0.072), average flow velocity (v)

$$v = 2.516(S)^{0.5} = 2.516 * 0.072^{0.5} = 0.68\ ft/s$$

Travel time for shallow concentrated flow

$$T_t = \frac{L}{60\ v} = \frac{328}{60 * 0.68} = 8.0\ min$$

Segment 3 – Open Channel Flow

For trapezoidal channel of width = 5 feet, flow depth = 0.4 feet (Grassed waterways, shallow concentrated flow, Figure A.1), and side slope (H:V)=1:1,

Area, $A = \frac{1}{2} * 0.4 * (5.8 + 5) = 2.16\ ft^2$

Wetted Perimeter, $P = 0.57 * 2 + 5 = 6.13\ ft$

Hydraulic Radius, $R = {}^{A}/_{P} = {}^{2.16}/_{6.13} = 0.352$

For open channel flow, velocity is estimated using Manning's equation:

$$v = \frac{1.49(R)^{\frac{2}{3}}(S)^{\frac{1}{2}}}{n} = \frac{1.49(0.352)^{\frac{2}{3}}(0.056)^{\frac{1}{2}}}{0.05} = 3.52\ \frac{ft}{s}$$

where, channel roughness (n) = 0.05 and
slope (S) = 0.056 ft/ft

Travel time for open channel flow

$$T_t = \frac{L}{60\ v} = \frac{971}{60 * 3.52} = 4.6\ min$$

Time of Concentration

Table 10. Time of concentration calculation

Segment	Type of Flow	Length (ft)	Slope (ft/ft)	T_t (min)
1	Sheet	43	0.026	8.8
2	Shallow concentrated	328	0.072	8.0
3	Open channel	971	0.056	4.6

$$t_c = 8.8 + 8.0 + 4.6 = 21.4\ min = \mathbf{0.36\ hr}$$

7. Calculate I_a/P using Equations (3) and (5).

$$I_a = 0.2\ S = 0.2 * \left({}^{1000}/_{CN} - 10\right) = 0.2 * \left({}^{1000}/_{78} - 10\right) = 0.564$$

$$\frac{I_a}{P} = \frac{0.564}{2} = \mathbf{0.28}$$

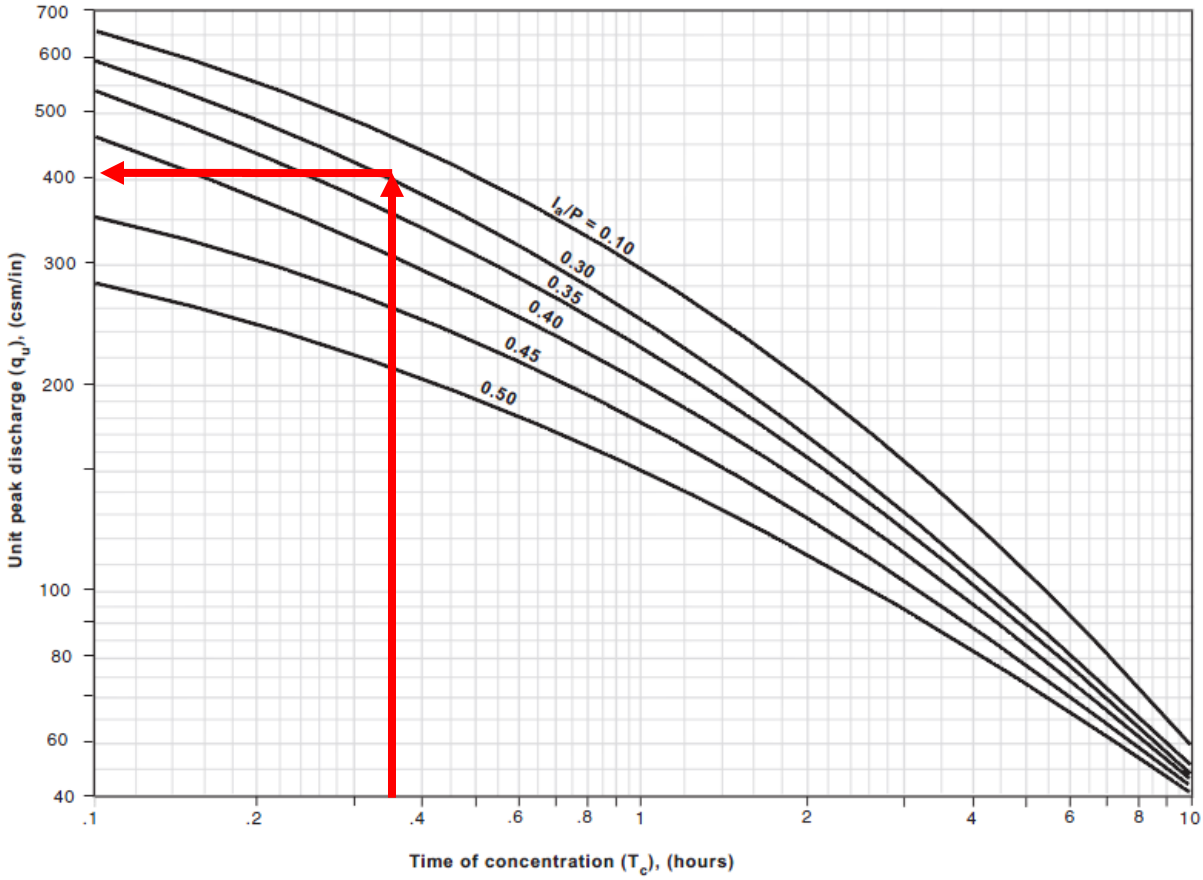
8. Compute unit peak discharge (q_u) using Figure A.2 or A.3.

q_u = 405 csm/in (From Figure A.3 for t_c = 0.36 hr and I_a/P = 0.28)

9. Calculate peak discharge (Q_p) using Graphical Peak Discharge Method for pre-development conditions

$$Q_p = q_u\ A\ Q\ F_p = 405 * 0.0215 * 0.48 * 1 = \mathbf{4.2\ cfs}$$

where, drainage area (A) = 0.0215 mi^2,
runoff volume (Q) = 0.48 in., and
F_p = 1 (From Table A.2, no pond and swamp areas)



Estimating unit peak discharge for type III rainfall distribution using Figure A.3

Post-development Conditions

1. Determine the 95th percentile rainfall for project location using the computer program described in Section 2.

95th percentile rainfall (P) = 2.0 in.

2. Delineate watershed boundaries and divide watershed into source areas based on its land use and soil type characteristics.

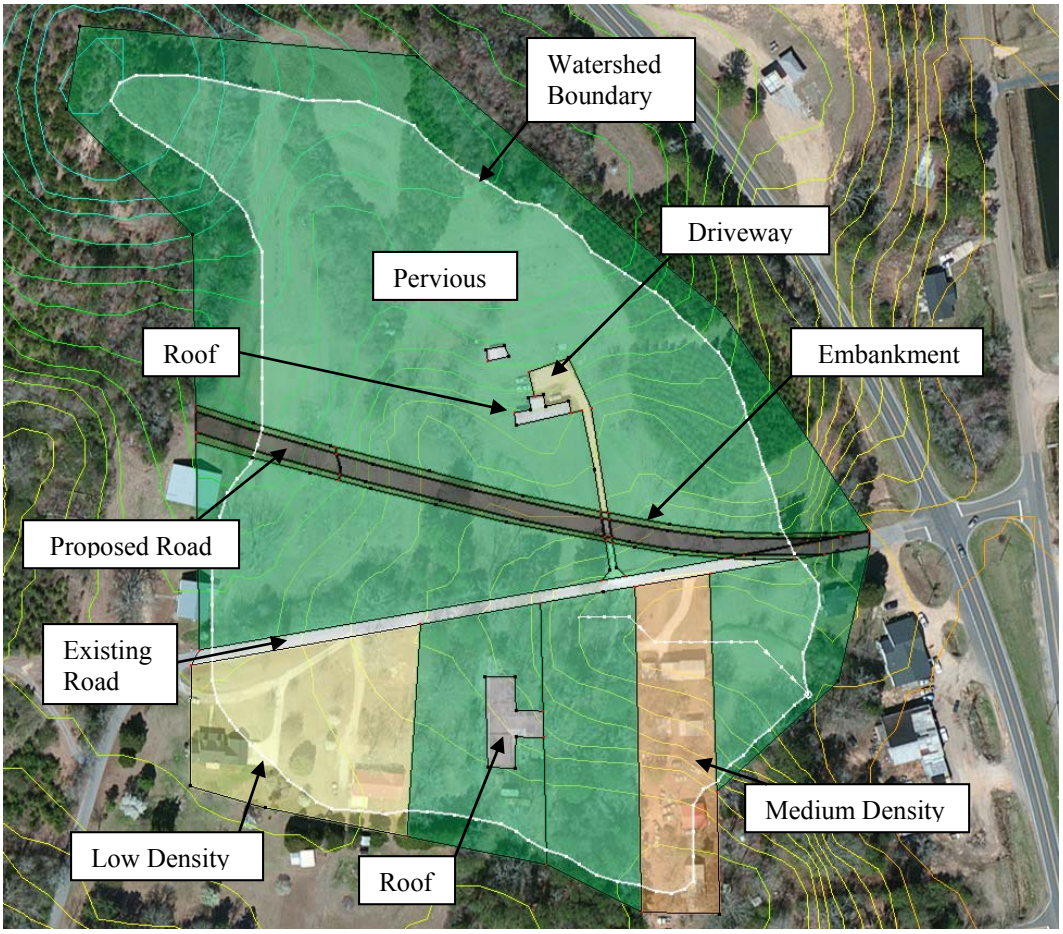


Figure 9. Aerial photograph indicating drainage boundary and post-development source areas

3. Assign runoff coefficient to source areas using Table 1 and compute the composite runoff coefficient (R_{vc}) by calculating a weighted average.

Table 11. Source areas and corresponding R_v

Source areas	**Area (acres)**	**R_v (2 in)**	**Area * R_v**
Undeveloped or Pervious Areas, B Soil	6.58	0.16	1.053
Undeveloped or Pervious Areas, C or D Soil	3.81	0.26	0.991
Streets, Intermediate or Rough Textured	0.26	0.84	0.218
Low Density, < 2 units / acre	1.12	0.26	0.291
Roof, Flat or Pitched, Unconnected, B Soil	0.15	0.16	0.024
Roof, Flat or Pitched, Unconnected, C or D Soil	0.03	0.26	0.008
Driveway or Sidewalk, Unconnected, B Soil	0.12	0.16	0.019
Driveway or Sidewalk, Unconnected, C or D Soil	0.02	0.26	0.005
Medium Density, between 2 and 6 units / acre	0.87	0.55	0.479
Paved Lane and Shoulder	0.50	0.88	0.440
Excavation or Embankment Construction	0.31	0.26	0.081
∑ A =	13.77	∑ (A*R_v)=	3.608

Composite runoff coefficient

$$R_{vc} = \frac{\sum(A * R_v)}{\sum A} = \frac{3.608}{13.77} = \mathbf{0.26}$$

4. Compute runoff volume using Equations (6) and (7).

$Q = P * R_{vc} = 2 * 0.26 = \mathbf{0.52\ in.}$

$$V = \frac{P}{12} * R_{vc} * A * 43560 = \frac{2}{12} * 0.26 * 13.77 * 43560 = \mathbf{25,992\ ft^3}$$

5. Compute modified CN using Equation (8).

$$CN = \frac{1000}{10 + 5P + 10Q - 10\sqrt{Q^2 + 1.25\ Q\ P}}$$

$$CN = \frac{1000}{10 + 5 * 2 + 10 * 0.52 - 10\sqrt{0.52^2 + 1.25 * 0.52 * 2}} = \mathbf{79}$$

6. Compute travel time and time of concentration (t_c)

Segment 1 – Sheet Flow

Travel time for sheet flow

$$T_t = \frac{0.007(nL)^{0.8}}{(P_2)^{0.5}S^{0.4}} = \frac{0.007(0.4 * 43)^{0.8}}{(4.1)^{0.5}(0.026)^{0.4}} = 0.146\ hr = 8.8\ min$$

where, overland roughness coefficient (n) = 0.4 (Light Woods) (Appendix Table A.1),
flow length (L) = 43 ft,
2-year 24-hour rainfall (P_2) = 4.1 in., and
slope (S) = 0.026

Segment 2 – Shallow Concentrated Flow

From Figure A.1 based on ground cover (Forest) and slope (0.204), average flow velocity (v)

$$v = 2.516(S)^{0.5} = 2.516 * 0.072^{0.5} = 0.68\ ft/s$$

Travel time for shallow concentrated flow

$$T_t = \frac{L}{60\ v} = \frac{328}{60 * 0.68} = 8.0\ min$$

Segment 3 – Open Channel Flow

For trapezoidal channel of width = 5 feet, flow depth = 0.4 feet (Grassed waterways, shallow concentrated flow, Figure A.1), and side slope (H:V)=1:1,

Area, $A = \frac{1}{2} * 0.4 * (5.8 + 5) = 2.16\ ft^2$

Wetted Perimeter, $P = 0.57 * 2 + 5 = 6.13\ ft$

Hydraulic Radius, $R = {}^{A}/_{P} = {}^{2.16}/_{6.13} = 0.352$

For open channel flow, velocity is estimated using Manning's equation:

$$v = \frac{1.49(R)^{\frac{2}{3}}(S)^{\frac{1}{2}}}{n} = \frac{1.49(0.352)^{\frac{2}{3}}(0.056)^{\frac{1}{2}}}{0.05} = 3.52\ \frac{ft}{s}$$

where, channel roughness (n) = 0.05 and
slope (S) = 0.056 ft/ft

Travel time for open channel flow

$$T_t = \frac{L}{60\ v} = \frac{971}{60 * 3.52} = 4.6\ min$$

Time of concentration

Table 12. Time of concentration calculation

Segment	Type of Flow	Length (ft)	Slope (ft/ft)	T_t (min)
1	Sheet	43	0.026	8.8
2	Shallow concentrated	328	0.072	8.0
3	Open channel	971	0.056	4.6

$$t_c = 8.8 + 8.0 + 4.6 = 21.4\ min = \mathbf{0.36\ hr}$$

7. Calculate I_a/P using Equations (3) and (5).

$$I_a = 0.2\,S = 0.2 * \left({}^{1000}/_{CN} - 10\right) = 0.2 * \left({}^{1000}/_{79} - 10\right) = 0.532$$

$$\frac{I_a}{P} = \frac{0.532}{2} = \mathbf{0.27}$$

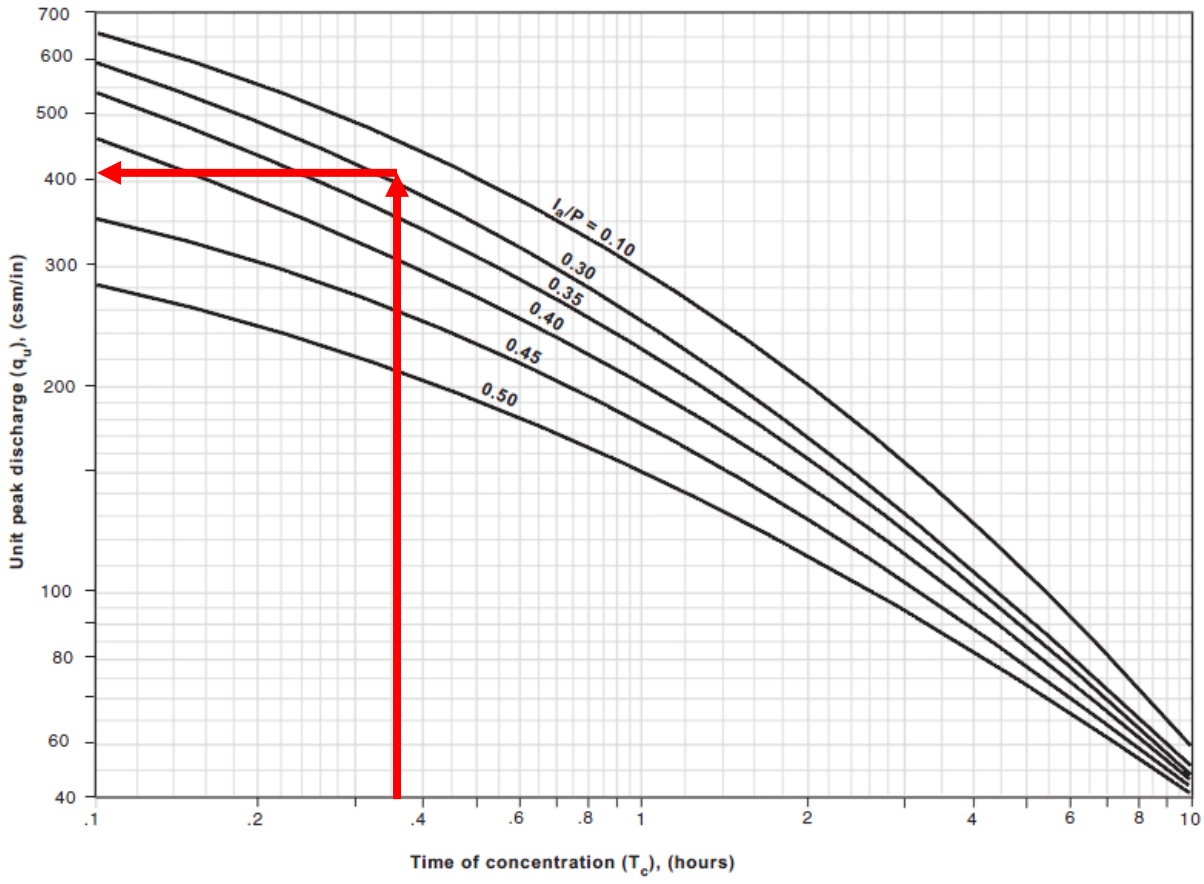
8. Compute unit peak discharge (q_u) using Figure A.2 or A.3.

q_u = 407 csm/in (From Figure A.3 for t_c = 0.36 hr and I_a/P = 0.27)

9. Calculate peak discharge (Q_p) using Graphical Peak Discharge Method for post-development conditions

$$Q_p = q_u\,A\,Q\,F_p = 407 * 0.0215 * 0.52 * 1 = \mathbf{4.6\ cfs}$$

where, drainage area (A) = 0.0215 mi^2,
runoff volume (Q) = 0.52 in., and
F_p = 1 (From Table A.2, no pond and swamp areas)



Estimating unit peak discharge for type III rainfall distribution using Figure A.3

Summary of Results

Table 13. Comparison of pre-development and post-development runoff volumes and peak discharges

	Pre	**Post**
Runoff volume, Q (in.)	0.24	0.26
Runoff volume, V (ft^3)	23,993	25,992
Peak discharge, Q_p (cfs)	4.2	4.6

Post-development runoff volume has increased by 1,999 ft^3 or 8.3% compared to pre-development runoff volume. Peak discharge has increased by 0.4 cfs or 9.5%. Since there is significant increase in runoff volume and peak discharge, runoff management practices will be required to maintain pre-development hydrology in accordance with GFO 3-72 (ALDOT 2014).

4. Acceptable Computer Models

There is a wide variety of both public and private domain computer models available for performing stormwater calculations. The computer models use one or more calculation methodologies to estimate runoff characteristics. Below is a list of few widely used public domain models that use NRCS CN method (Table 14). Once a modified curve number is calculated from R_v coefficients, it can be used in one of the listed models to generate peak discharge.

Table 14. List of acceptable public domain computer models

Program	**Developer**
HEC-1	U.S. Army Corps of Engineers
HEC-HMS	U.S. Army Corps of Engineers
SWMM	U.S. Environmental Protection Agency
WinTR-20	U.S. Department of Agriculture Natural Resources Conservation Service
WinTR-55	U.S. Department of Agriculture Natural Resources Conservation Service

5. References

ALDOT. 2014. Guidelines For Operation. Subject: Post Development Stormwater Runoff Management for Small Frequent Rain Events.

Chow, VT. 1959. Open channel hydraulics, McGraw-Hill Book Company, Inc. New York, NY. pp. 109-113.

Engman, ET. 1986. Roughness coefficients for routing surface runoff. Journal of Irrigation and Drainage Engineering 112 (1): 39-53.

Pitt, R. 1987. Small Storm Flow and Particulate Washoff Contributions to Outfall Discharges. Ph.D dissertation, Department of Civil and Environmental Engineering, the University of Wisconsin, Madison.

Pitt, R. 1999. Small Storm Hydrology and Why it is Important for the Design of Stormwater Control Practices. Advances in Modeling the Management of Stormwater Impacts, Volume 7. (Edited by W. James). Computational Hydraulics International, Guelph, Ontario and Lewis Publishers/CRC Press, 1999.

Pitt, R. 2003. The Source Loading and Management Model (WinSLAMM) - Introduction and Basic Uses. University of Alabama, Tuscaloosa, Alabama.
http://unix.eng.ua.edu/~rpitt/SLAMMDETPOND/WinSlamm/Ch1/Ch1.html

Pitt, R. 2013. WinSLAMM Version 10 Runoff Volume, Total Suspended Solids and Other Pollutant Calculations and Regional Calibration Files.
http://www.winslamm.com/docs/Small%20Storm%20Hydrology%20and%20WinSLAMM.pdf

USDA, NRCS. 1986. Urban hydrology for small watersheds, U.S. Department of Agriculture, technical release 55.
ftp://ftp.wcc.nrcs.usda.gov/wntsc/H&H/other/TR55documentation.pdf

USDA, NRCS. 2004. National Engineering Handbook Part 630 Hydrology Chapter 10 - Estimation of Direct Runoff from Storm Rainfall., U.S. Department of Agriculture, Natural Resources Conservation Service, Washington, DC.
ftp://ftp.wcc.nrcs.usda.gov/wntsc/H&H/NEHhydrology/ch10.pdf

USDA, NRCS. 2010. National Engineering Handbook Part 630 Hydrology Chapter 15 - Time of Concentration., U.S. Department of Agriculture, National Resources Conservation Service, Washington, DC.
ftp://ftp.wcc.nrcs.usda.gov/wntsc/H&H/NEHhydrology/ch15.pdf

USEPA 2009. Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under Section 438 of the Energy Independence and Security Act. EPA 841-B-09-001, U.S. Environmental Protection Agency, Washington, D.C.

APPENDIX

1. Computation of Travel Time and Time of Concentration

Travel time (T_t) is the time it takes water to travel from one location to another in a watershed. T_t is a component of time of concentration (T_c), which is the time for runoff to travel from the hydraulically most distant point of the watershed to a given outlet point. T_c is sum of T_t values for the various consecutive flow segments. These segments can be sheet flow, shallow concentrated flow, open channel flow, or a combination of these.

Sheet Flow

Sheet flow is flow over plane surfaces. It usually occurs in the headwater of streams. Manning's kinematic solution can be used to compute T_t:

$$T_t = \frac{0.007(nL)^{0.8}}{(P_2)^{0.5} S^{0.4}}$$

where, T_t is travel time (hr),
n is Manning's roughness coefficient (Table A.1),
L is flow length (ft),
P_2 is 2 year, 24-hour rainfall (in), and
S is slope

Table A.1 Manning's n for sheet flow (USDA 2010)

Surface description	**n[1]**
Smooth surfaces (concrete, asphalt, gravel, or bare soil)	0.011
Fallow (no residue)	0.05
Cultivated soils: Residue cover ≤20% Residue cover >20%	 0.06 0.17
Grass: Short grass prairie Dense grasses [2] Bermuda grass	 0.15 0.24 0.41
Range (natural)	0.13
Woods:[3] Light underbrush Dense underbrush	 0.40 0.80

[1] The n values are a composite of information compiled by Engman (1986).
[2] Includes species such as weeping lovegrass, bluegrass, buffalo grass, blue grama grass, and native grass mixtures.
[3] When selecting n , consider cover to a height of about 0.1 ft. This is the only part of the plant cover that will obstruct sheet flow.

Shallow concentrated flow

Sheet flow becomes shallow concentrated flow after approximately 100 feet. The average velocity is function of watercourse slope and type of channel and can be determined from Figure A.1. After determining the velocity, travel time for the shallow concentrated flow can be estimated as follows:

$$T_t = \frac{L}{60\ v}$$

where, T_t is travel time (min),
L is flow length (ft), and
v is average velocity (ft/s).

Open channel flow

Shallow concentrated flow occurs at shallow depths of 0.1 to 0.5 feet. Beyond that channel flow is assumed to occur. Manning's equation can be used to estimate average flow velocity for open channel flow:

$$v = \frac{1.49(R)^{\frac{2}{3}}(S)^{\frac{1}{2}}}{n}$$

where, v is average velocity (ft/s),
R is hydraulic radius (ft),
S is channel slope, and
n is Manning's n value for open channel flow

Manning's n value can be obtained from Chow (1959) and other references.

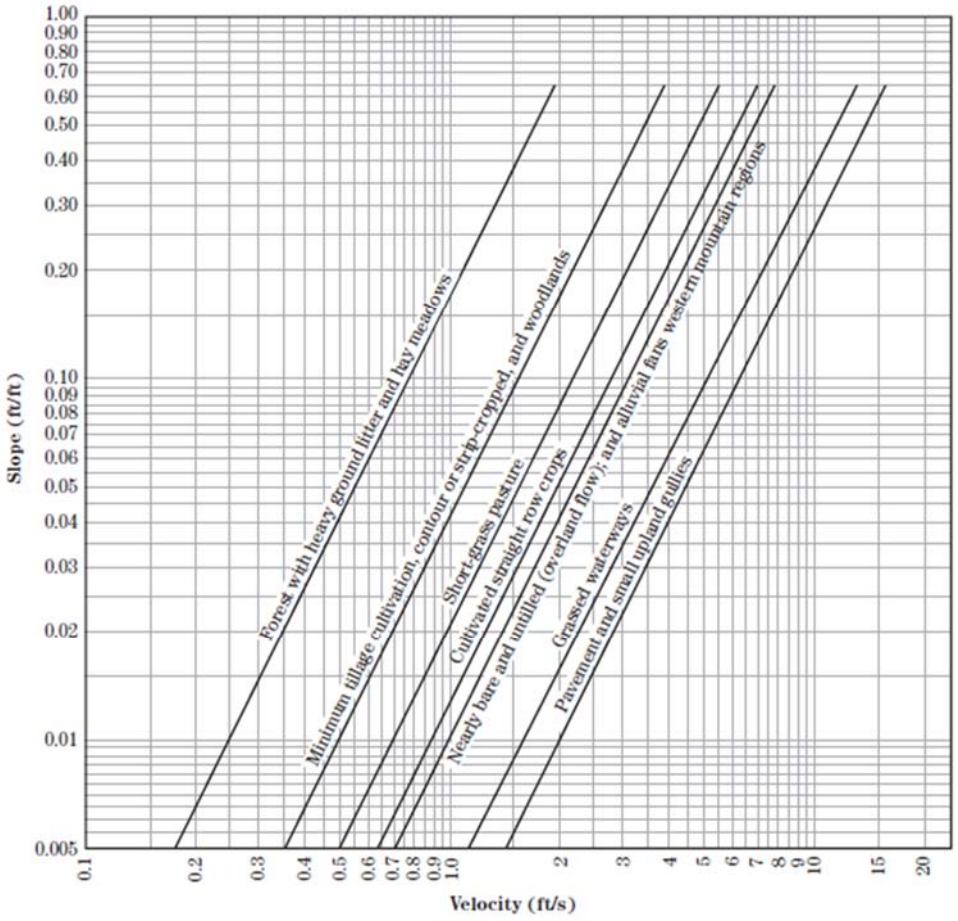
2. Graphical Peak Discharge Method

This method was developed from hydrograph analyses using TR-20, "Computer Program for Project Formulation - Hydrology" (SCS 1983). The peak discharge equation used is:

$$Q_p = q_u\ A\ Q\ F_p$$

where, Q_p is peak dischage (ft^3/s),
q_u is unit peak discharge (csm/in),
A is drainage area (mi^2),
Q is runoff volume (in), and
F_p is pond and swamp factor (Table A.2)

After modified CN and T_c is computed, peak discharge per square mile per inch of runoff (q_u) is obtained from Figure A.2 or A.3 by using rainfall distribution type and I_a/P ratio.



Flow type	Depth (ft)	Manning's *n*	Velocity equation (ft/s)
Pavement and small upland gullies	0.2	0.025	$V = 20.328(s)^{0.5}$
Grassed waterways	0.4	0.050	$V = 16.135(s)^{0.5}$
Nearly bare and untilled (overland flow); and alluvial fans in western mountain regions	0.2	0.051	$V = 9.965(s)^{0.5}$
Cultivated straight row crops	0.2	0.058	$V = 8.762(s)^{0.5}$
Short-grass pasture	0.2	0.073	$V = 6.962(s)^{0.5}$
Minimum tillage cultivation, contour or strip-cropped, and woodlands	0.2	0.101	$V = 5.032(s)^{0.5}$
Forest with heavy ground litter and hay meadows	0.2	0.202	$V = 2.516(s)^{0.5}$

Figure A.1 Average velocities for estimating travel time for shallow concentrated flow (USDA 2010)

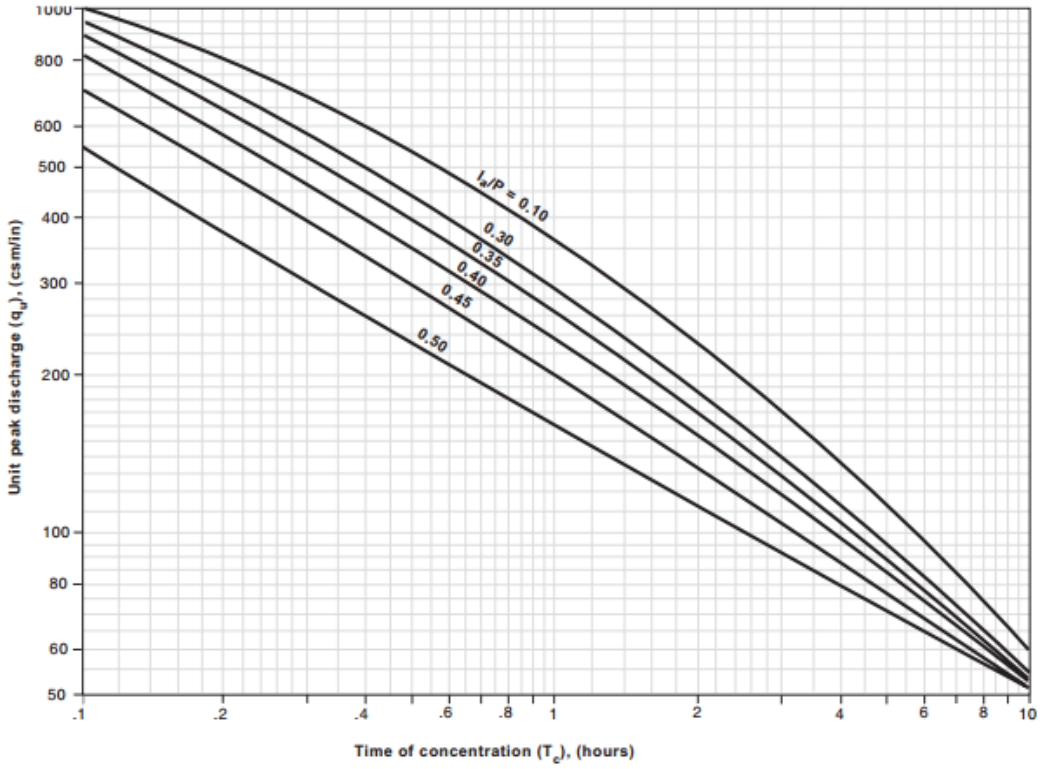


Figure A.2 Unit peak discharge (q_u) for Type II rainfall distribution (USDA 1986)

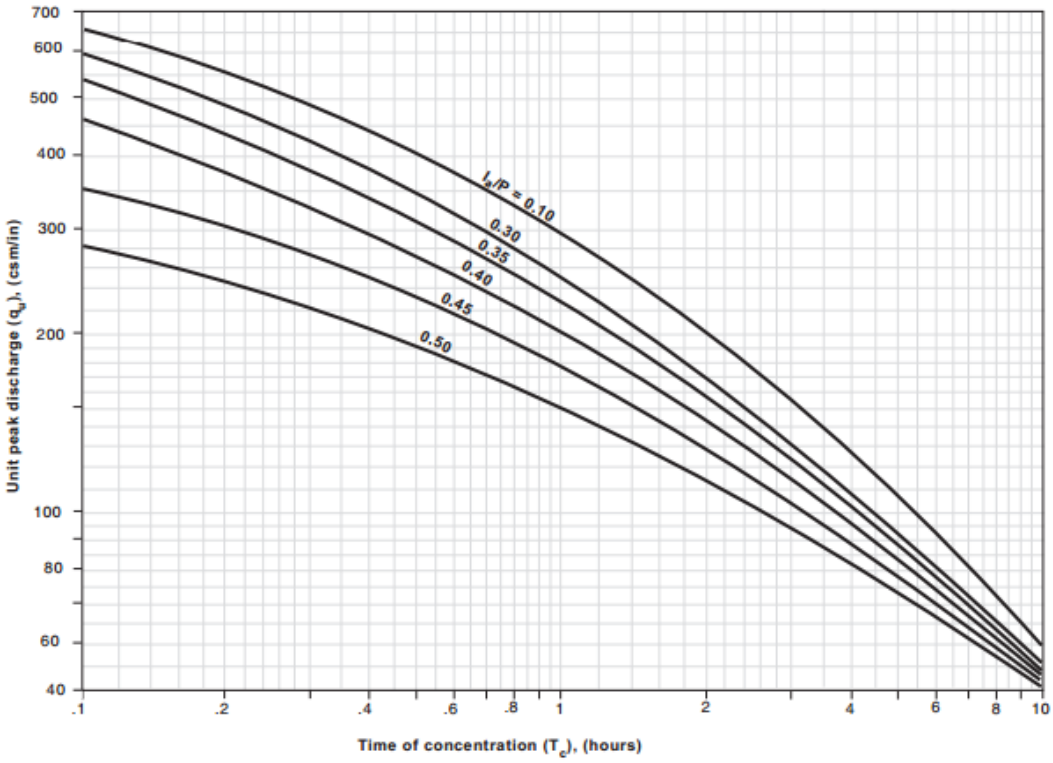


Figure A.3 Unit peak discharge (q_u) for Type III rainfall distribution (USDA 1986)

Table A.2 Factor for Pond and Swamp Areas (USDA, 1986)

Pond and Swamp Areas (%[1])	F_p
0	1.00
0.2	0.97
1	0.87
3	0.75
5 or greater	0.72

[1] Percent of entire drainage basin

POST-DEVELOPMENT STORMWATER RISK ASSESSMENT

This document provides the rationale and sequential procedures for assessing risk of impacts from post-development stormwater discharge.

Pursuant to the GFO 3-73, and working within the constraints of the project, designers must provide features and practices that cause post-development hydrology to mimic pre-development baseline hydrology of the site to the maximum extent practicable for small, frequent rain events up to and including a 95th percentile rain event at all locations of discharge. The risk assessment for post-development changes in stormwater discharges will focus on two categories of possible impacts: impacts to structures near or downstream from the site, and impacts to any streams, ponds or lakes that may receive the stormwater discharges. Although the risk assessment analysis is focused on impacts from the small, frequent rainfall events up to and including a 95th percentile rainfall, these small storm events can predict possible impacts of larger storm events from a 2-year storm up to a 100-year storm. Stormwater discharges may affect downstream structures such as a building, culvert, bridge, levee, dam, etc. by flooding. Such damage could occur as a result of the direct flow of stormwater or by increasing the flow of downstream receiving waters. Evidence of pre-development flood damage and/or evidence of potential post-development damage after small rain events will provide guidance for selection and installation of appropriate stormwater controls that can reduce risk of more significant damage from larger storm events.

Post-development increase in stormwater discharge may also affect the stability and function of existing streams that receive the stormwater discharge. Increased stream flow above baseline caused by stormwater discharge could incise the streambed and/or banks of receiving waters, resulting in post-development changes such as widening or deepening of the streambed, downstream deposition of sediment, impacts to aquatic biological organisms, or other problems. Thus, the potential damage or impairment of the streambeds of receiving waters from increased stormwater discharges should be assessed.

The following procedure serves as guidance for assessing post-development impacts, including scour and erosion, associated with site topographic modification, installation of facilities and related infrastructure, including increased impervious areas, which could result in increased volume and force of stormwater discharges and potential flooding. A flow chart illustrating the procedure is included as Table 1.

Perform Hydrologic Analysis for the 95th Percentile Event

- Run hydrologic models for all discharge points leaving the right-of-way to determine if there will be increases in discharge for the 95th percentile storm event. If increased discharges are predicted, provide BMPs to mimic pre-condition hydrology to the maximum extent practicable and perform hydrologic analysis for larger storm events.

Perform Hydrologic Analysis for Larger Storm Events

- Run hydrologic models for all discharge points leaving the right-of-way to determine if larger events will increase discharge. If a possible increase in discharge is indicated, perform storage routing using the proposed culvert. If increased discharge will be present after storage routing, begin risk assessment.

Perform Risk Assessment

Desktop Review

- Complete Section A of Form HYD-100
  - Determine drainage area to outlet location
  - Review current aerials with drainage areas located
  - Note if there are buildings, ponds, or other structures downstream within the drainage area
  - If ponds exist, determine date of construction if possible.
- Complete Section B of Form HYD-100
  - Review current flood studies
  - View floodplain and/or floodway boundary on the most current aerials
  - Identify other structures downstream that may be located in or near the floodplain or floodway.
  - Identify and interview National Floodplain Insurance Program (NFIP) coordinator regarding community policies
  - Consult city engineer, county engineer, NFIP coordinator, or other public or knowledgeable private personnel regarding information including previous studies, surveys, or other available materials that may identify sensitive features or areas that would require additional attention to avoid or minimize future claims and impacts.
- Complete Section C of Form HYD-100
  - Determine environmental impacts that could affect hydraulic design
  - Determine if the receiving waters are ephemeral, intermittent, or perennial
  - Using soil survey or core borings, identify the types of soil and/or other geological features in or near the site (sand, silt, or clay)
- Complete Section D of Form HYD-100
  - Determine average daily traffic for present year and design year
  - Determine what routes may be affected (school, mail, emergency etc.)

- Determine if detours are available if route is closed
- Determine if the available detour route(s) is an interstate, freeway, arterial, collector, or local
- Describe the existing roadway including the pavement type, shoulder type, number of lanes, median type, and width of each (N/A for new alignment)

Site Visit

- Complete Section A of Form HYD-101
  - Determine the stream slope and if there are any drops greater than 2 feet
  - Determine the material in the stream bottom
  - Determine the material in the stream banks
  - Determine if the stream material is cohesive or non-cohesive
  - Determine if the stream shows evidence of degradation such as bank scour
  - Determine the material in the floodplain
  - Determine the kind and amount of vegetation in and along the channel
  - Determine the kind and amount of vegetation in the floodplain
  - Estimate Manning's n-values for the stream channel and floodplain
  - Determine other features that might affect water surface elevations
- Complete Section B of Form HYD-101
  - Note if scour is present around or near the structure
  - Describe the alignment and size of structure
  - Provide elevations for elements of structure such as low bridge superstructure, pipe or culvert inverts, low point of road, etc.
  - Provide road width, either shoulder-shoulder or curb-curb
  - Describe the condition of the existing structure
- Complete Section C of Form HYD-101
  - Estimate the flood damage potential
  - Note any buildings in and around the floodplain
  - Determine finished floor elevations of buildings
  - Describe the land use upstream and downstream
- Complete Section D of Form HYD-101
  - Determine if there is any historical highwater information
  - List the source and the location of the information
  - If information exists, note the date and elevation of the highwater

  - Estimate allowable highwater
  - Note any informal or available record(s) of damage from previous floods
- Complete Section E of Form HYD-101
  - Photograph pertinent features such as existing drainage structures, stream channel, floodplain, and any other key features
  - Provide an identification number or description for recording photos
- Complete Section F of Form HYD-101
  - Collect cross-section information and stream slope at any proposed crossing if it cannot be effectively obtained from a digital terrain model (dtm)

Risk Factor Assessment Form

Complete the Risk Factor Assessment form to identify any high risk factors are present. If any questions are answered "Yes," further hydrologic and/or hydraulic analysis should be performed to determine the extent of the possible impact.

Structures / Property

- During the desktop review, identify and note buildings or structures of any kind, including ponds, dams, levees, etc., within the boundaries of the FEMA mapped floodplain or special flood hazard area.
- During the site visit, identify and note houses or structures of any kind, including ponds, dams, levees, etc., built near a stream that does not have a FEMA mapped floodplain.
- Determine if there is personal property, including but not limited to vehicles or other movable property that could be impacted by flooding.
- Determine from the property owner, city engineer, floodplain manager, etc. if there have been previous issues with flooding.

Streams

- Determine if the streambed and stream banks consist mostly of a non-cohesive sand or silt. This can be determined during the site inspection or from soil borings.
- Determine if there is pre-development evidence of scouring or incision of the streambed and/or stream banks, and/or if there is little to no stream bank vegetation.
- Determine if the flood flow would likely break over the stream banks into the floodplain during a 2-year flood event.
- Determine if any endangered or threatened species are present within the stream.
- Determine if there will be outlets without energy dissipation that could accelerate channel degradation.

RISK FACTOR ASSESSMENT FORM

Project Name/No: _____ Date: _____

County: _____ Site No: _____

Stream: _____ By: _____

High Risk Factors - Structures and Property

		Yes*	No
1	Is there a structure in the mapped FEMA Special Flood Hazard Area?		
2	Is there a structure built near the stream in an unmapped floodplain area?		
3	Is there a threat of property damage (other than a structure)?		
4	Is there history of previous flooding?		
5	Is there a privately owned pond, levee, etc. that will be impacted?		
6	Other? Describe if Yes.		

* If any of these items were answered Yes, then perform a hydrologic and hydraulic analysis for the 2-year 24-hour event through the 100-year 24-hour storm event

High Risk Factors - Streams

		Yes*	No
1	Does the stream mainly consist of a non-cohesive silt or sand?		
2	Is the stream already degrading and have little to no bank vegetation?		
3	Is the stream unable to utilize the floodplain on a 2-year event?		
4	Are there endangered species that are impacted?		
5	Will proposed outlet flow be concentrated without energy dissipation?		
6	Other? Describe if Yes.		

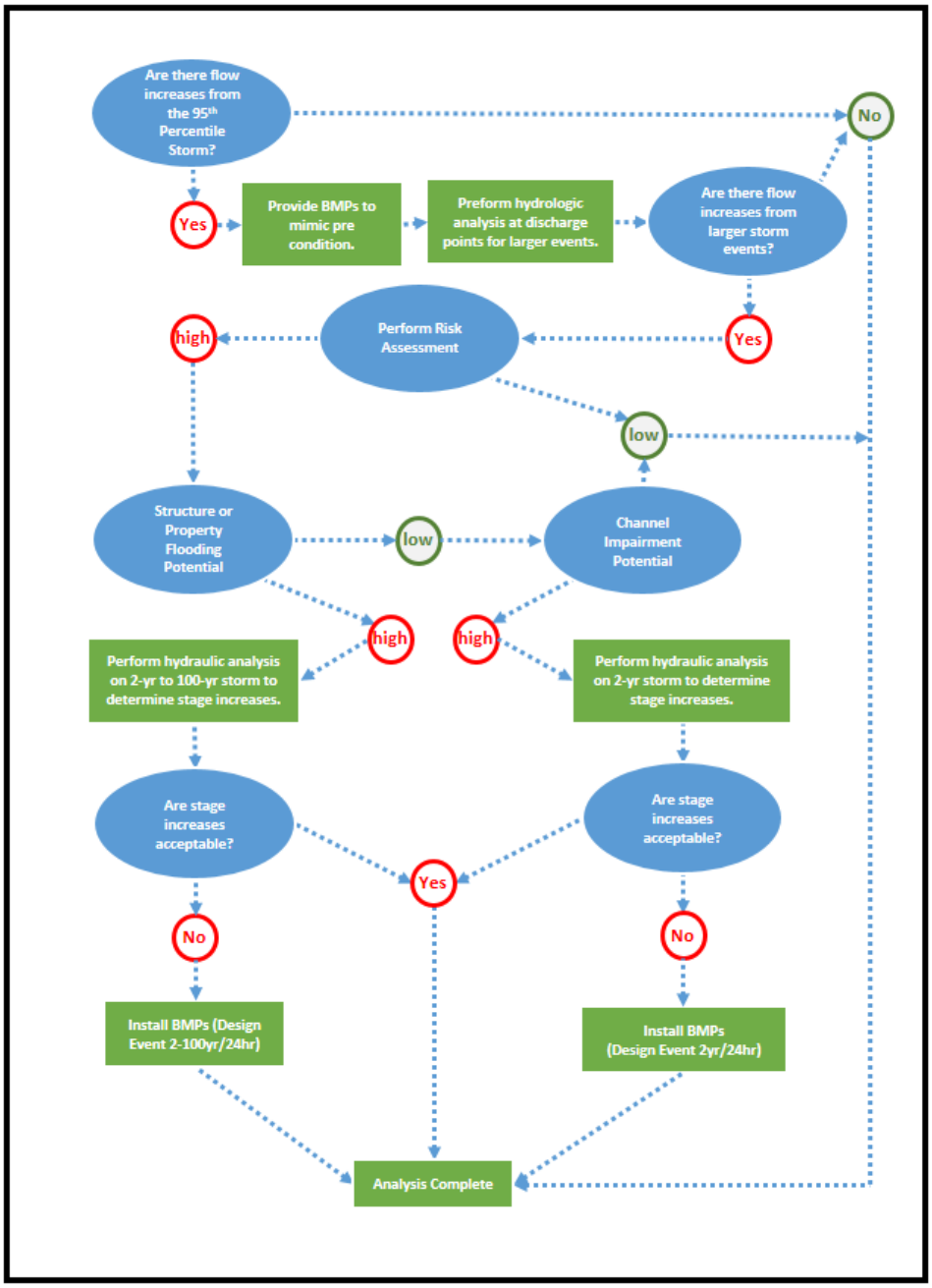
* If any of these items were answered Yes, then perform a hydrologic and hydraulic analysis for the 2-year 24-hour storm event

Criteria of recurrence intervals for hydrologic and hydraulic analysis

- If any items on the Risk Factor Assessment Form were answered "Yes," further hydrologic and hydraulic analysis shall be performed
- If any items on the 'Structures and Property' Form were answered "Yes," analyze the 2-year 24-hour storm and all other events up to and including the 100-year 24-hour storm event
- If any items on the 'Stream' Form were answered "Yes," analyze the 2-year 24-hour storm only
- Interchanges, support facilities, rest areas shall meet the local stormwater ordinance criteria.

In some instances there may be specific sites that require greater management of stormwater due to the conditions of the location. In these cases, a context sensitive design approach will be used.

Table 1: Risk Assessment Flowchart



September 2014

Alabama Department of Transportation
Design Bureau
Location Information-Office

Project No: _____ Date:_____
Division: _____ County: _____ Prepared By:_____
Section: _____ Township: _____ Range:_____
Receiving Water: River_____ Creek_____ Branch_____ Ditch_____
Highway or Road No. _____ Station No._____

A. Site Information

1. Drainage area to outlet location (acres, sq miles)_____
2. Are there houses, ponds or other structures downstream: Yes _____ No_____
   Describe:_____
3. Does outlet discharge directly into a river, pond, swamp or lake: Yes _____ No_____
4. Comments:_____
   _____

B. Flood Studies

1. Any flood zoning (FEMA floodplains, floodways, FIS Studies)? Yes____ No_____
   Type of Study:_____
   _____
2. Are there structures in or near the floodplain or floodway? Yes____ No_____
   Comments:_____
   _____
   _____
3. Governing community has policy or guideline: Yes _____ No_____
   Comments:_____
   _____
   _____

C. Environmental Considerations

1. List commitments in environmental documents that affect hydraulic design.
   None ___, or Comments:_____
   _____
   _____
2. Stream Type: Ephemeral_____ Intermittent_____ Perennial_____
3. Soil type present (sand, silt, clay):_____
4. Resource used to determine soil type (soil survey, soil borings, field determination)
   _____

D. Traffic Related Evaluations

1. Present Year: _____ Traffic Count: _____ A.D.T. % Trucks_____
2. Design Year: _____ Traffic Count: _____ A.D.T. % Trucks_____
3. (Check all that apply) Emergency Route: _____ School Bus Route:_____
   Mail Route:_____
4. Detour Available: Yes ___ No ___ Length of Detour:_____
5. Design Speed: _____
6. Can Route be Closed? Yes _____ No _____
   Comments:_____
   _____
   _____
7. (Please Circle One) Interstate, Freeway, Arterial, Collector, Local, Other.
   Comments:_____
   _____
8. Existing Roadway:
   (a) Pavement Type_____ Width:_____
   (b) Shoulder Type_____ Width:_____
   (c) Curb & Gutter: Yes _____ No _____ (d) No. Lanes:_____
   (e) Median: Yes _____ No _____ Type_____ Width:_____
   (f) Total Roadway Width _____ Ft.
   Description of Existing_____
   _____
9. Other Remarks: _____
   _____

Alabama Department of Transportation
Design Bureau
Location Information-Field Party

Project No: _____ Date:_____
Division: _____ Prepared By:_____
County: _____Section: _____ Township: _____ Range:_____
Receiving Water: River_____ Creek_____ Branch_____ Ditch_____
Hwy. or Road No: _____ Station:_____

A. Description of Stream Channel

1. Stream Slope:_____ Is there a vertical drop in stream 2 feet or greater? Yes__ No___
2. Material Stream Bottom:_____
3. Material in Stream Banks:_____
4. Does Stream Material have any Cohesiveness? Yes_____ No_____
5. Are Banks Scouring? In Which Direction?_____
6. Material in Flood Plain:_____
7. Is Bottom Aggrading (Filling)? _____ Degrading (Deepening)_____
8. Vegetation in and along Channel:_____
9. Vegetation in Flood Plain:_____
10. Estimated Manning's "N" Value for Channel:_____
11. Estimated Manning's "N" Value for Flood Plain:_____
12. Are there Features that might affect Discharges or Tailwater/Headwater Elevations
    a. Levees: Yes__ No__ Comments_____
    b. Diversions: Yes__ No__ Comments_____
    c. Backwater from Another Source: Yes__ No__ Source_____
    d. Debris (driftwood, trash, etc.): Yes__ No__ Comments_____
    e. Downstream drainage structures? Yes__ No__ Comments_____
    f. Other Influences:_____

B. Existing Structures

1. Is scour indicated near structure?_____
2. Alignment and General Description of Structure:_____
3. Size or Waterway Opening of Structure:_____
4. Elevation of: a. Low Superstructure (Bridge):_____
   b. Top of Invert (Culvert or Pipe):_____
5. Invert Elevations: a. Pipe or Culvert: Inlet _____ Outlet_____
   b. (Bridge) Natural Channel:_____
6. Low Point of Existing Roadway in Vicinity of Structure:_____
7. Road Width, Shoulder-Shoulder or Curb-Curb _____Ft.
8. Skew:_____
9. Centerline Elevation of Roadway at Centerline of Stream:_____
10. Condition of Existing Structure:_____
11. Type and Description of Existing Structure:_____

C. Property Related Evaluations

1. Opinion of Existing Flood Damage Potential: Low ____ Moderate_____ High _____
   Reason for Opinion:_____
2. List Buildings in Flood Plain:_____
3. Floor Elevations:_____
4. Upstream Land Use(s):_____
5. Downstream Land Use(s):_____

D. Historical Highwater (H.W.) or Flood Information

1. Source of Information: _____
2. Location of Information: _____
3. Elevation of H.W. of Flood Information: _____
4. Date(s) of H.W. or Flood(s) & source(s) of information _____

   (Please record more than one source if information can be obtained.)
5. Estimated Allowable H.W.: _____
6. Damage from Previous Floods (if available): _____

E. Photographs

1. Existing Drainage Structures
   Inlet _____ Outlet _____ Other _____
2. Proposed Drainage Structure
   Inlet _____ Outlet _____ Other _____
3. Channel
   Upstream _____ Downstream _____ Other _____
4. Floodplain
   Upstream _____ Downstream _____ Other _____
5. Other Photos (Describe) _____

F. Valley Cross Section or Print Out

The submittal normally includes a right angle valley section. This section is taken downstream from the crossing. Enough ground shots are taken to outline the valley to an elevation well above extreme highwater. Care is taken to outline the main channel. Each shot is identified as (FP) flood plain, (TB) top of bank, (ES) edge of stream, etc. Also, the natural stream bottom slope is determined and recorded.

Remarks: _____

_____

_____

Distance	Elevation	Remarks

Other Remarks: _____

_____

_____

Appendix G:

Supplemental Material for Section II.G

ALDOT MS4 Support Facilities

ALDOT MS4 Support Facility Annual Inspections:
Fiscal Year 2015

ALDOT MS4 Transportation Facility Maintenance:
Fiscal Year 2015

ALDOT MS4 Support Facilities*

Last Updated: September 30, 2015

ALDOT Region	Facility Name	County	Address	MS4 Area
N/A	Central Office Complex**	Montgomery	1409 Coliseum Blvd, Montgomery, AL 36110	Montgomery
North	Huntsville District Office	Madison	4711 Governor's House Dr, Huntsville, AL 35805	Huntsville
North	Gadsden District Office	Etowah	4509 Airport Rd, Gadsden, AL 35904	Gadsden
North	Tuscumbia Area Office	Colbert	295 Hwy 20 E, Tuscumbia, AL 35674	Quad Cities
North	Tuscumbia District Office	Colbert	295 Hwy 20 E, Tuscumbia, AL 35674	Quad Cities
East Central	Birmingham Area Office	Jefferson	1020 Bankhead Hwy W, Birmingham, AL 35202	Jefferson/Shelby County
East Central	Birmingham District Office	Jefferson	1020 Bankhead Hwy W, Birmingham, AL 35202	Jefferson/Shelby County
East Central	Calera District Office	Shelby	3805 Hwy 31, Calera, AL 35040	Jefferson/Shelby County
East Central	Anniston District Office	Calhoun	1545 Hwy 431 N, Anniston, AL 35160	Anniston
West Central	Tuscaloosa Area Office	Tuscaloosa	2715 Skyland Blvd, Tuscaloosa, AL 35407	Tuscaloosa
West Central	Tuscaloosa District Office	Tuscaloosa	2715 Skyland Blvd, Tuscaloosa, AL 35407	Tuscaloosa
Southeast	Speigner District Office***	Elmore	3298 Hwy 143, Elmore, AL 36025	Montgomery
Southeast	Montgomery Area Office	Montgomery	1525 Coliseum Blvd, Montgomery, AL 36110	Montgomery
Southeast	Montgomery District Office	Montgomery	608 Chisholm St, Montgomery, AL 36110	Montgomery
Southeast	Dothan District Office	Houston	171 Sam Houston Blvd, Dothan, AL 36302	Dothan
Southwest	Mobile Area Office	Mobile	1701 N Beltline Hwy, Mobile, AL 36618	Mobile
Southwest	Mobile District Office	Mobile	1701 N Beltline Hwy, Mobile, AL 36618	Mobile
Southwest	Tunnel Office	Mobile	150 Dunlap Dr, Mobile, AL 36602	Mobile

* All facilities listed are (i) located in an MS4 regulation-eligible area and (ii) considered to have stormwater runoff pollution potential if mismanaged.

** The State Motor Pool facility at 386 S Ripley St, Montgomery, AL 36130 is considered an annex of the Central Office Complex. Facility acquired by ALDOT during FY 2015.

*** Office located in an MS4 regulation-eligible area, but area not under regulation yet.

ALDOT MS4 Support Facility Annual Inspections:
Fiscal Year 2015

Facility Name	Inspection Date	Summary of Observed Deficiencies
Central Office Complex	11/13/2014	Improper storage: kerosene drum, hazardous waste drum. Improper labeling: spray bottle, water jug, jug of red fluid, Thorocoat containers, hazardous waste containers. Universal wastes older than one year: used bulbs, used batteries, ballasts. Containers not secured properly: Pavon Repair container, 3-gal bucket. MSDSs for multiple chemicals not found. No documentation of GHS training for some personnel.
Huntsville District Office	08/12/2015	SPCC Plan not updated.
Gadsden District Office	08/11/2015	None.
Tuscumbia Area Office	03/11/2015	None.
Tuscumbia District Office	03/11/2015	None.
Birmingham Area Office	08/04/2015	SPCC plan not updated. E-85 UST does not have interstitial monitoring.
Birmingham District Office	08/04/2015	SPCC Plan not updated.
Calera District Office	04/10/2015	None.
Anniston District Office	05/27/2015	No NPDES permit for wash water discharge.
Tuscaloosa Area Office	07/28/2015	Facility UST registration not current. Facility air permit not updated. Submersible pump containment not free of water.
Tuscaloosa District Office	07/28/2015	Facility UST registration not current. Facility air permit not updated. Submersible pump containment not free of water.
Speigner District Office	04/16/2015	None.
Montgomery Area Office	11/14/2014	Improper labeling: spray bottle, jug of red fluid, used batteries, used bulbs, diesel drum, used oil AST. Used batteries stored for more than one year. Used bulbs not secured. Missing documents: MSDSs for two chemicals, auto shop AST inspection, rainwater accumulation in AST secondary containment prior to discharge.
Montgomery District Office	11/14/2014	No explicit permission from municipality to discharge wastewater.
Dothan District Office	06/17/2015	No secondary containment for liquid asphalt tank.
Mobile Area Office	08/27/2015	None.
Mobile District Office	08/27/2015	None.
Tunnel Office	08/27/2015	None.

ALDOT MS4 Transportation Facility Maintenance:
Fiscal Year 2015

MS4 AREA *	Snow & Ice Control (work reports)	Full-Width Litter Pickup (pass miles)	Spot Litter Pickup (work reports)	Cleaning Minor Drainage Structures (structures)	Repairing Minor Drainage Structures (work reports)	Erosion Control (work reports)
Anniston	38	452	127	125	17	5
Auburn / Opelika	0	53	120	439	4	24
Baldwin County	0	898	41	566	97	39
Dothan	0	5,860	211	248	38	0
Gadsden	73	0	234	104	58	10
Huntsville & Decatur	238	1,853	22	459	43	6
Jefferson / Shelby County	369	7,021	540	3,376	39	88
Mobile	0	864	19	649	106	10
Montgomery	1	4,554	0	284	9	14
Phenix City	0	737	59	80	4	0
Quad Cities	105	24	181	10	1	4
Tuscaloosa	81	16	83	0	3	7
TOTAL	**905**	**22,332**	**1,637**	**6,340**	**419**	**207**

* MS4 Area work amounts estimated using data corresponding to ALDOT districts with which MS4 Areas intersect.

Appendix H:

Supplemental Material for Section II.H

ALDOT MS4 Monitoring Activities Summary:
Fiscal Year 2015

ALDOT MS4 Monitoring Activities Summary
Fiscal Year 2015

Introduction

This report summarizes the MS4 monitoring activities ALDOT performed during FY 2015. These activities were motivated by the ALDOT MS4 Monitoring program, a component of the Stormwater Management Program (SWMP) required by the ALDOT MS4 Permit (NPDES Permit No. ALS000006) issued on 21 March 2013. The MS4 Monitoring program is explained in detail in Chapter 8 of the ALDOT SWMP Plan.

Equipment Selection

During FY 2015, ALDOT selected the In-Situ Troll 9500 multi-parameter water quality monitoring sonde to collect water quality data. The In-Situ Troll 9500 records measurements of the following parameters at a 15-minute interval:

- Temperature,
- Turbidity,
- Conductivity,
- Dissolved Oxygen, and
- Water Level.

The primary pollutant of concern for ALDOT is sediment, as argued in the ALDOT MS4 SWMP Plan, so turbidity is the parameter of most interest since it can be an indicator of the presence of sediment (or solids generally).

In January 2015, the ALDOT Maintenance Bureau acquired four (4) In-Situ Troll 9500 multi-parameter water quality monitoring sondes, providing ALDOT with the capability of performing monitoring at two (2) representative locations concurrently with one (1) sonde deployed upstream and one (1) sonde deployed downstream of ALDOT's roadway at each representative location.

Trimble Navigation Limited (Trimble) was enlisted to deploy and maintain the sondes given the firm's extensive experience with this type of monitoring approach. Informed by this experience, Trimble was able to

- develop forms to document routine cleaning and calibration activities,
- clean the equipment approximately every three (3) weeks while deployed,
- check equipment calibration approximately every eight (8) weeks while deployed,
- check equipment calibration prior to each deployment, and
- perform routine maintenance to ensure proper operation and data collection during deployment.

Monitoring Location Selection

ALDOT in its SWMP Plan committed to monitoring six representative locations during the MS4 Permit term (i.e., 1 April 2013 – 30 March 2018). In order for the monitoring to be representative of the ALDOT MS4 Statewide influence, ALDOT selected three (3) locations in different MS4 Phase I areas in the State and three (3) locations in different Phase II areas. Each selected monitoring location is on a 303(d) or TMDL stream with siltation or turbidity as one of its POCs. Deployed sondes will be active at each representative location for a period of approximately six (6) months.

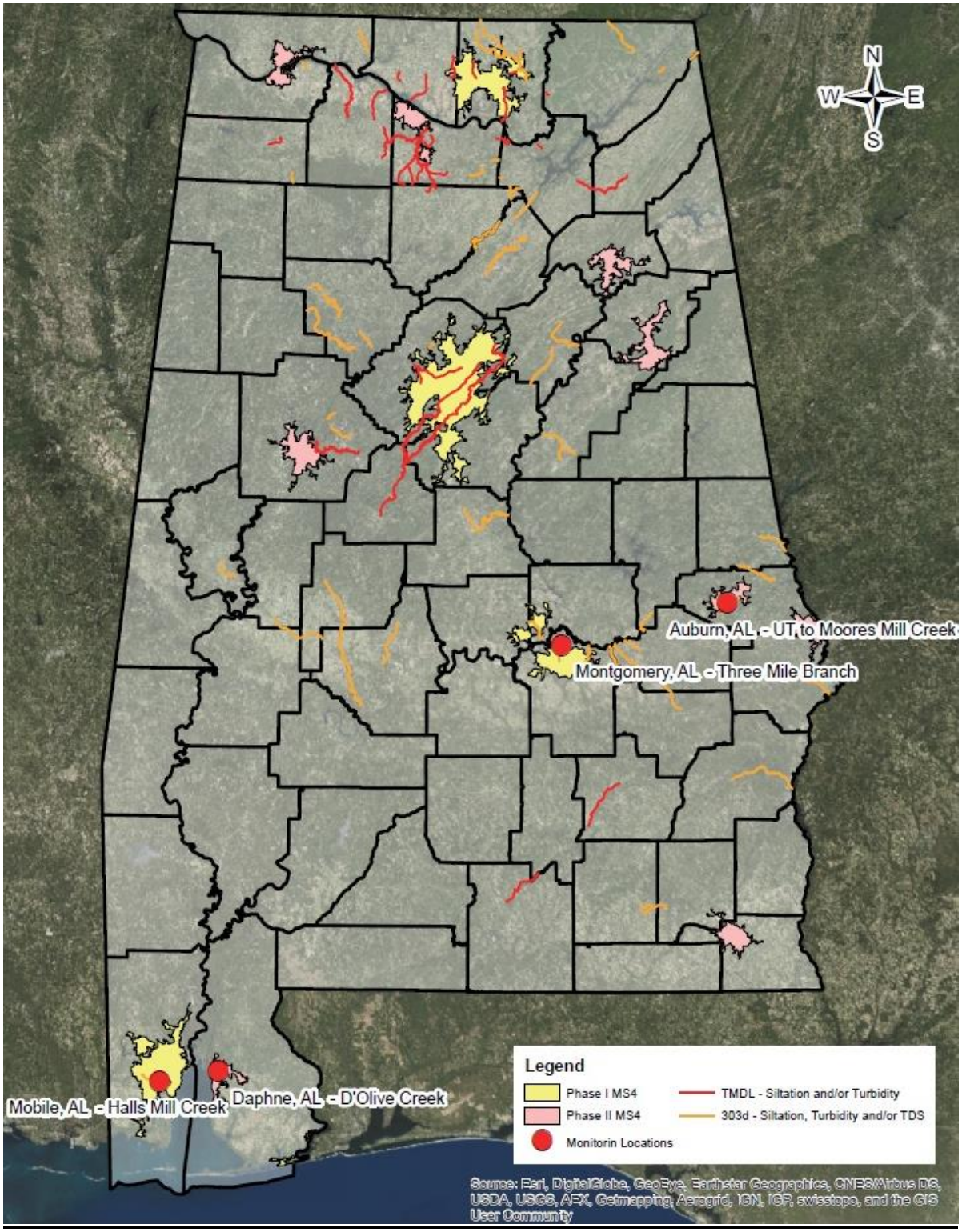
Specific representative monitoring locations were selected prior to any sonde deployment. These locations are listed in Table 1. The locations where sondes were deployed during FY 2015 are depicted on the map in Figure 1.

Table 1
Monitoring Locations

MS4 Area	Area Type	Stream	Impairment 303(d)
Montgomery	Phase I	Three Mile Branch	Siltation
Auburn/Opelika	Phase II	UT to Moores Mill Creek	Siltation
Mobile	Phase I	Halls Mill Creek	Siltation
Baldwin County	Phase II	D'Olive Creek	Siltation
Tuscaloosa	Phase II	Hurricane Creek*	Turbidity
Huntsville	Phase I	Beaverdam Creek*	Siltation

* Location may change if monitoring is infeasible or if a more appropriate location is found.

Figure 1
Sondes Deployed



Field Implementation

Dates when the monitoring sondes were deployed and retrieved at each monitoring location are given in Table 2.

Table 2
Sonde Deployment Schedule

MS4 Area	Stream	Deployed	Retrieved
Montgomery	Three Mile Branch	22 January 2015	13 August 2015
Auburn/Opelika	UT to Moores Mill Creek	12 February 2015	13 August 2015
Mobile	Halls Mill Creek	19 August 2015	
Baldwin County	D'Olive Creek	18 August 2015	

In early 2015, sondes were deployed at the Montgomery representative location and at the Auburn/Opelika location (specifically in Auburn). The monitoring location in Montgomery is the intersection of Three Mile Branch and Northern Boulevard (AL 152). The Auburn/Opelika monitoring location is the intersection of an unnamed tributary to Moores Mill Creek and Interstate 85. Per the SWMP Plan, the sondes at the Montgomery and Auburn/Opelika locations were active for just over six (6) months. Maintenance of the sondes deployed at the Montgomery location included nine (9) cleaning events and three (3) calibration events. Maintenance of the sondes deployed at the Auburn/Opelika location included seven (7) cleaning events and two (2) calibration events. Upon retrieval of sondes, any required maintenance and post-deployment calibration were performed.

In August 2015, the sondes retrieved from the Montgomery and Auburn/Opelika locations were redeployed at representative locations in Mobile and Baldwin County (Daphne specifically). Monitoring at the Mobile and Baldwin County locations is ongoing as of the end of FY 2015; outcomes of that monitoring will be provided in the FY 2016 MS4 annual report.

Data Analysis

At the Montgomery monitoring location, the placement conditions for the upstream sonde consisted of a free-flowing stream and a sandy channel bottom, whereas the downstream sonde was placed in an area with pooling. Photographs of the upstream and downstream sonde sites at the Montgomery location are provided in Figure 2.

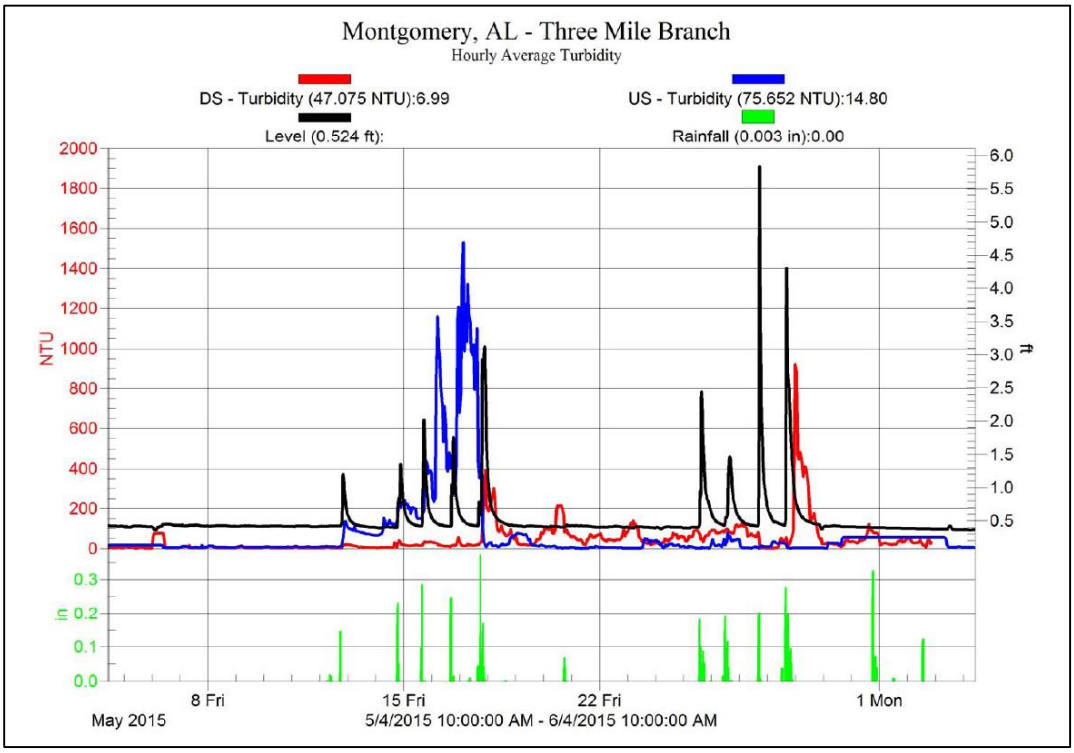
Figure 2
Montgomery Location Sonde Sites

Upstream

Downstream

The data collected by the sondes conflicted with itself in many instances. At times, the hourly-averaged upstream turbidity measurement was higher than the corresponding downstream measurement. At other times, the downstream measurement was higher than the upstream measurement. Occasionally, the upstream and downstream measurements were approximately equal. Some of these instances are illustrated well by the graph in Figure 3 showing turbidity measurements from 4 May 2015 through 4 June 2015.

Figure 3
Montgomery Location Turbidity Measurements



The variance in the difference between upstream and downstream measurements is attributed mostly to the inability to control numerous external factors that can influence the measurements. In particular at this location, site conditions for the upstream and downstream sondes were significantly different given the pooling that occurred at the downstream sonde site. Pooling impacts the mixing and settling of solids in the water and may have led to biased turbidity measurements that do not reflect the on-average condition of the stream.

It is not possible to draw viable conclusions about the impact of the ALDOT MS4 on the turbidity of the stream using the data collected by the sondes. However, the ALDOT MS4 at the Montgomery location should not be a significant contributor of sediment since (i) all areas on ALDOT property at this location except stream banks and those directly underneath the bridge were covered with vegetation and (ii) a significant source of sediment was not observed on ALDOT property during the monitoring period.

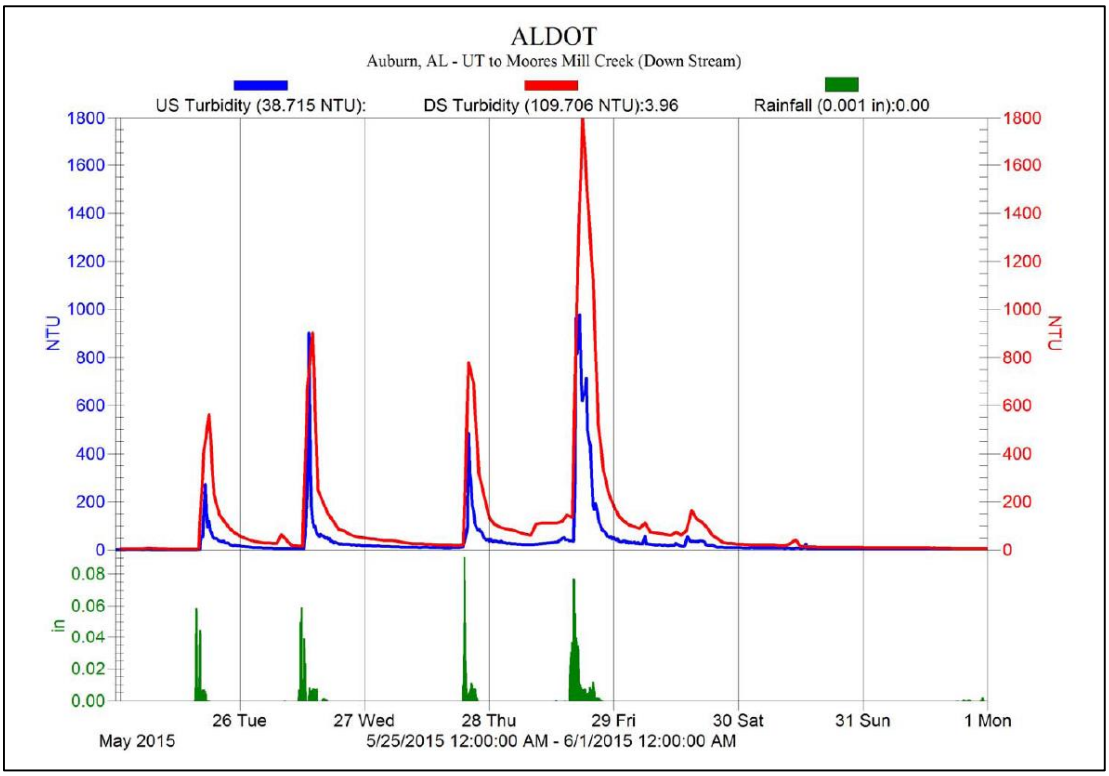
As was the case for the Montgomery location, the downstream sonde at the Auburn/Opelika location was placed where flow pooled. The upstream sonde was placed in a pool as well, although the pool was smaller than the pool present downstream; this pool was due in part to natural debris in the channel. Photographs of the upstream and downstream sonde sites at the Auburn/Opelika location are provided in Figure 4.

Figure 4
Auburn/Opelika Location Sonde Sites

Upstream Downstream

With respect to the data collected by the sondes at the Auburn/Opelika location, external factors seem to have influenced the turbidity measurements as they did at the Montgomery location. Figure 5 provides a sample of hourly-averaged turbidity measurements; these data were collected in the last week of May 2015 during which four (4) significant rainfall events occurred.

Figure 5
Auburn/Opelika Location Turbidity Measurements



While the downstream measurements in Figure 5 are more frequently higher than upstream measurements for the first, third, and fourth rainfall events, upstream and downstream measurements for the second rainfall event are approximately equal. This conflict may be the result of the pooling at the sonde sites. Also, the differences in peak values for the first, third, and fourth rainfall events are much larger than those that would be expected if the ALDOT MS4 were contributing sediment over the relatively short stream distance between the upstream and downstream sondes. If the sondes were providing an accurate indication of stream condition, those peak differences would imply obvious discoloration of discharge from the ALDOT MS4, but no such visual observation was made. Again, the pooling may be responsible for the large peak differences, but a sediment loss from upstream of ALDOT property (at the site of the new Auburn High School) resulting from the fourth rainfall event contributed to the large difference in peak values associated with that event. (The report of the sediment loss is on file at ADEM.)

The monitoring outcomes for the Auburn/Opelika location are similar to those for the Montgomery location. It is not possible to draw viable conclusions about the impact of the ALDOT MS4 on the turbidity of the stream using the data collected by the sondes, but the ALDOT MS4 at the Auburn/Opelika location should not be a significant contributor of sediment given the vegetation present and the absence of any observed significant source.

General Outcomes

In summary, there is no definitive evidence from the monitoring work done through the end of FY 2015 that ALDOT is a significant contributor of sediment to waters receiving discharge from the ALDOT MS4. The data collected exhibited significant bias resulting from site conditions, such as the pooling of water at the sonde sites, and other external factors beyond ALDOT's control. In hopes of ultimately being able to draw viable conclusions about ALDOT's impact on stream water quality, ALDOT is aiming to better manage the factors influencing the integrity of data collected by applying the lessons learned in conducting monitoring at the Montgomery and Auburn/Opelika locations.