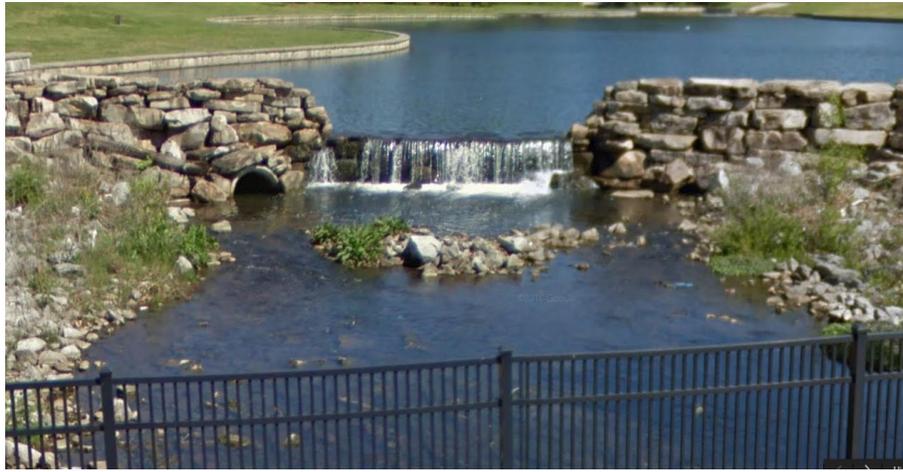


The University of Alabama in Huntsville



NPDES Phase II Storm Water Management Plan (MS4)



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1.0 INTRODUCTION

The Storm Water Management Program Plan (SWMPP) is required by Part II of the Alabama Department of Environmental Management (ADEM) National Pollutant Discharge Elimination System (NPDES) Individual Permit ALS000014 for discharges from The University of Alabama in Huntsville to Huntsville municipal separate storm sewer system (Madison MS4).

1.1 Regulatory Background

This Storm Water Management Plan (SWMP) is required under Federal Environmental Protection Agency Phase II storm water regulations, promulgated under the Clean Water Act. These regulations require The University of Alabama in Huntsville to apply for a National Pollution Discharge Elimination System (NPDES) permit and submit a SWMP.

Polluted storm water runoff is often transported to municipal separate storm sewer systems (MS4s) and ultimately discharged into local waterways (rivers, streams, lakes, and bays) without treatment. EPA's Storm Water Phase II Rule establishes an MS4 storm water management program that is intended to improve the nation's waterways by reducing the quantity of pollutants that storm water picks up and carries into storm sewer systems during storm events. Common pollutants include oil and grease from roadways and parking lots, pesticides from lawns, sediment from construction sites, and carelessly discarded trash, such as cigarette butts, paper wrappers and plastic bottles. These pollutants are deposited into nearby waterways, discouraging recreational use of the resource, and interfering with the habitat for fish, other aquatic organisms, and wildlife.

In 1990, EPA promulgated rules establishing Phase I of the NPDES storm water program. The Phase I program for MS4s requires operators of "medium" and "large" MS4s, that is, those that generally serve populations of 100,000 or greater, to implement a storm water management program as a means to control polluted discharges from these MS4s. The Storm Water Phase II Rule extends coverage of the NPDES storm water program to certain "small" MS4s but takes a slightly different and simplified approach to how the storm water management program is developed and implemented. NPDES Phase II regulations require operators of small MS4s to develop a program in order to:

- Reduce the discharge of pollutants to the "maximum extent practicable" (MEP);
- Protect water quality;
- Satisfy the appropriate water quality requirements of the Clean Water act and Regional Water Quality Control Board Basin Plan.

1.2 Purpose of the SWMP

This document has been developed to comply with Federal Environmental Protection Agency Phase II National Pollutant Discharge Elimination System requirements promulgated under the Clean Water Act. The purpose of the SWMP is: (1) to identify pollutant sources potentially affecting the quality and quantity of storm water discharges; (2) to provide Best Management Practices (BMPs) for municipal and small construction activities implemented by The

University of Alabama in Huntsville staff and contractors and; (3) provide measurable goals for the implementation of this SWMP to reduce the discharge of the identified pollutants into the storm drain system and associated waterways. This SWMP covers The University of Alabama in Huntsville campus.

1.3 SWMP Development Committee

The SWMP was developed with input from representatives from various campus departments with a potential to impact surface water quality. The campus committee members ranged from departmental directors to operations personnel as follows:

- Office of Environmental Health & Safety(OEHS)
- Physical Plant - Utilities, Refuse and Recycling, Gardeners, Custodial Services
- Building Maintenance and Construction
- Auxiliary Services/ Housing and Residence Life

Public input is solicited in the development and implementation of the Stormwater Management Plan (SWMPP). The plan is reviewed at least annually by OEHS. Revisions will be made as necessary and will be submitted to ADEM for review.

1.4 The Storm Water Management Plan

The SWMP has been developed and designed to manage the discharge of pollutants from The University of Alabama in Huntsville small MS4 to the maximum extent practical. The purpose is to protect the water quality of the Unnamed Tributary to McDonald Creek and to satisfy requirements of the Clean Water Act. The University of Alabama in Huntsville SWMP includes various management practices, control techniques, engineering methods, and other provisions which will be described in detail in the body of this document.

1.5 Minimum Control Measures

There are six minimum control measures outlined in the permit requirements. These are:

1. Public Education and Outreach.
2. Public Involvement and Participation.
3. Illicit Discharge Detection and Elimination (IDDE).
4. Construction Site Stormwater Runoff Control.
5. Post-Construction Stormwater Management in new Development and Redevelopment.
6. Pollution Prevention and Good Housekeeping.

Each minimum control measure will be addressed and detailed separately as part of the SWMP.

1.6 Contacts List

Part IV.3.a of the NPDES Permit requires that The University of Alabama in Huntsville provide a list of contacts and responsible parties involved in the preparation of the Annual Report. The following personnel are responsible for the preparation and review of this report:

Mr. Bryce Morgan,

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Responsibility for management of the Stormwater program lies with OEHS and Construction Administration. The personnel responsible for operational aspects of the program are Bryce Morgan and Kristy Olive at OEHS.

2.0 SITE INFORMATION

2.1 Facility Description

The University of Alabama in Huntsville (UAH) is a public Tier 1 national university located in Huntsville, Alabama. UAH offers nearly 90 degree programs of study at the undergraduate and graduate level, with colleges in Engineering; Education; Nursing; Science; Business Administration; Arts, Humanities, & Social Sciences; Graduate Studies; and Professional & Continuing Studies. UAH is a fast growing University with current year's record-setting enrollment of nearly 8,500. The current student population plus the faculty and staff does not trigger the Standard Urban Storm Water Mitigation Plan (SUSMP) requirements for new construction projects.

The university's 432-acre campus, which includes 16 research centers and labs, serves the anchor tenant for the second-largest research park in the nation. It also maintains strong partnerships with federal agencies and commercial organizations that include the Hudson Alpha Institute for Biotechnology, NASA's Marshall Space Flight Center, the Missile Defense Agency, the DIA Missile and Space Intelligence Center, and the U.S. Army Materiel Command.

The University of Alabama in Huntsville campus is situated in Huntsville, Madison County. The facility is generally bounded by University Drive to the north, Interstate I565 to the south, Sparkman Drive to the west and residential neighborhoods to the east. However, as shown on the attached Campus Plan, a few of UAH buildings are situated to the west of Sparkman Drive.

This SWMP covers facilities in urbanized areas operated by The University of Alabama in Huntsville.

2.2 Facility Operation

The University of Alabama in Huntsville employs maintenance, custodial, and grounds staff for day-to-day operations. This includes building maintenance (cleaning, painting, repairs), completion of department work requests, daily cleaning of common buildings, grounds maintenance, small construction jobs, and various repair and maintenance activities.

Campus Facilities Management staff and outside contractors do electrical, plumbing, roofing, asphalt, painting, sewer line cleaning, utility repairs, vehicle repairs, pool maintenance and janitorial duties.

3.0 DESCRIPTION OF POTENTIAL SOURCES OF POLLUTION

3.1 Potential Pollutant Activity or Sources List

In order to aid in the identification of pollutant sources, historic spills as well as knowledge on the day to day operations to identify activities and sources of potential pollutants of concern were utilized to prepare this SWMP. Best Management Practices (BMP) to address the pollutant sources and activities described below will be developed as described in the Minimum Control Measures (Section 4.03).

Activity/Source	Pollutants of Concern
Building maintenance (washing, graffiti abatement)	Wash water, paint chips, cleaning products, dirt and sediment
Chemical Spills	Various- cleaning compounds, diesel, paint, hazardous materials, vehicle fluids
Construction activities	Concrete, drywall, paint, sediment
Erosion	Sediment, organic matter
Food service operations	Wash-water, food residue, oil and grease
Grounds maintenance	Green waste, fuel, oil, pesticides, herbicides, sediment
Impervious areas	Increased flows and pollutant loading
Litter and debris	Litter and debris
Loading/Unloading Areas	Petroleum products, fertilizers, pesticides, herbicides,
Outdoor Storage of Raw Materials	Sand, asphalt, soil, pesticides, herbicides, fertilizer, paint, solvents, fuel
Painting (indoor)	Paint or rinse water (oil and water based), paint thinner
Painting (outdoor)	Paint or rinse water (oil and water based), paint thinner
Parking lot runoff	Oil/grease, litter, heavy metals
Roof runoff	Particulate matter and associated pollutants
Sewer line blockages	Raw sewage
Sewer line seepage	Raw sewage
Trash storage areas	Organic materials, litter and debris
Vehicle and equipment washing	Cleaning products, oil/grease, vehicle fluids
Utility line maintenance and repairs (water/ irrigation/ sewer)	Chloramines, chlorine, sediment, adhesive cements, primers & fire protection system water
Animal feces	Coliform bacteria
Swimming Pool	Chlorinated water, pool chemicals
Fleet Maintenance & Repair	Oil, grease, antifreeze

4.0 MINIMUM CONTROL MEASURES

4.1 What are Minimum Control Measures

MEP, and BMPs “Minimum Control Measures” is the term used by the EPA for the six MS4 program elements aimed at achieving improved water quality through NPDES Phase II requirements listed below:

- Public Education and Outreach on Storm Water Impacts
- Public Involvement / Participation

- Illicit Discharge Detection and Elimination
- Pollution Prevention / Good Housekeeping
- Construction Site Storm Water Runoff Control
- Post-construction Storm Water Management in New Development and Redevelopment

The goal of the SWMP is to reduce the discharge of pollutants to the Maximum Extent Practicable (MEP), as defined by the EPA, and to identify activities or structural improvements that help reduce the quantity and improve the quality of the storm water runoff. Best Management Practices (BMPs) have been developed for the SWMP to reduce the discharge of pollutants to the storm drain system to the MEP. BMPs include treatment controls, engineering controls, operating procedures, and practices to control site runoff, spills and leaks, sludge or waste disposal, or drainage from raw material storage. BMPs will be updated as appropriate to comply with any additions or changes to NPDES permit requirements.

4.2 How to use BMPs to Meet MEP Requirements

The BMPs described in this document in the measurable goals section are to be implemented by The University of Alabama in Huntsville staff and outside contractors. Whenever UAH staff or contractors perform work on the campus or associated areas, steps outlined in each relevant BMP, or other proven technique that reaches the same goal, must be used in order to ensure compliance with storm water discharge regulations. The University of Alabama in Huntsville has already initiated many of the BMPs listed in the Minimum Control Measures in this SWMP. In some cases the measure has not been formalized into a written plan or program. The SWMP will formalize and document these Minimum Control measures and associated BMPs. Full development and implementation of BMPs will be completed through the five-year implementation plan as presented in the measurable goals for each Minimum Control Measure in the following sections.

4.3 Minimum Control Measures

4.3.1 Public Education and Outreach on Storm Water Impacts

The goal of this minimum control measure is to develop and distribute educational materials and perform outreach to inform students, faculty, and staff about the impact of polluted storm water runoff discharges, and that their actions can make a positive impact on water quality.

Maximum Extent Practicable (MEP) Standards

- Implement a public education program to distribute educational materials to the community, or conduct equivalent outreach activities about the impacts of storm water discharges on local water bodies and the steps that can be taken to reduce storm water pollution;
- Determine the appropriate Best Management Practices (BMPs) and measurable goals for this minimum control measure.

Measurable Goals to Meet MEP Requirements

Year 1:

- Develop storm water pollution prevention educational materials.
- Develop poster to educate students regarding storm water pollution prevention.
- Stencil: “Flows to River” at accessible campus storm drains.
- Develop storm water pollution prevention information for OEHS website.

Year 2:

- Maintain campus storm drain stencils and replace as needed.
- Distribute educational material to faculty and staff.
- Post storm water pollution prevention information on OEHS website.
- Increase storm water pollution prevention outreach surrounding community.

Year 3:

- Continue stenciling campus storm drains as needed.
- Distribute educational material to students.
- Sponsor

Year 4:

- Continue stenciling campus storm drains as needed.
- Continue sponsoring and/or participating in storm water pollution prevention events such as campus and levee clean-ups.
- Outreach to faculty/academic programs for possible guest lecture opportunities.

Year 5:

- Continue stenciling campus storm drains as needed.
- Continue sponsoring and/or participating in storm water pollution prevention events such as campus and levee clean-ups.
- Write articles on storm water program for campus publications and newsletters.
- Include educational information in new student and new employee orientation packets.
- Give guest lectures on storm water runoff impacts/pollution prevention at community events.

OHES is the Department responsible for implementation of the above goals.

4.3.2 Public Involvement / Participation

The goal of this minimum control measure is to provide opportunities for students, faculty, and staff to participate in program development and implementation on a storm water management working-group. MEP Standards

- Interact, comply and insure consistency with applicable State, and local public program requirements;
- Determine the appropriate best management practices (BMPs) and measurable goals for this minimum control measure.

Measurable Goals to Meet MEP Requirements

Year 1:

- Establish on-going storm water working group and conduct for public comment.
- Establish and maintain working relationship with the joint City/County Storm Water Program.
- Make copies of the SWMP available at OEHS office and website.
- Place e-mail link on OEHS website to report storm water pollution concerns.

Year 2:

- Contact campus community environmental event organizers.
- Convene campus storm water working group.
- Use Media and publications to promote program and participation

Year 3:

- Participate in campus storm water pollution prevention event(s).
- Continue to convene campus storm water working group.

Year 4:

- Organize and sponsor campus volunteer clean-up event.
- Continue to convene campus storm water working group.

Year 5:

- Organize and sponsor another campus volunteer clean-up event.
- Participate in campus storm water pollution prevention event(s).
- Continue to convene campus storm water working group.

OHES is the Department responsible for implementation of the above goals.

4.3.3 Illicit Discharge Detection and Elimination

The goal of this minimum control measure is to develop and implement a plan to detect and eliminate non-storm water discharges (illicit discharges) such as process water, wash water, chemical spills, and other non-rainwater discharges to the storm drain system (not applicable to exempt discharges).

MEP Standards

- Have a storm water map, showing outfall locations and the names and location of the waters of the United States that receive discharges from those outfalls;
- Through management, contracting, or other mechanism, prohibit (to the extent allowable under State, or local law) non-storm water discharges into the MS4, and establish appropriate enforcement procedures and actions;
- Have a plan to detect and address non-storm water discharges, including illegal dumping, into the MS4;
- Educate the campus community about the hazards associated with illegal discharges and improper disposal of waste;
- Determine the appropriate best management practices (BMPs) and measurable goals for this minimum control measure.

Measurable Goals to Meet MEP Requirements

Year 1:

- Review and update campus notification system for sewage spills and other non-storm water discharges.
- Develop a storm drain sump and outfall monitoring program to visually identify dry weather flows into the storm drain system.

Year 2:

- Implement updated campus notification system for sewage spills and other non-storm water discharges.
- Provide drain blockers and related training to campus police and parking staff.
- Implement the storm drain sump and outfall monitoring program.

- Develop educational material

Year 3:

- Develop a campus policy that includes prohibiting non-storm water discharges or improper disposal of wastes to the storm drains.
- Continue to implement storm drain sump and outfall monitoring program.
- Develop an inspection and enforcement program for illegal discharges/improper disposal. The enforcement program will include a plan for escalation in penalties depending on the severity of the act and the number of offenses.
- Train employees of the hazards associated with illegal discharges/improper disposal.
- Provide educational materials on the hazards of illegal storm water discharges at environmental events on campus and in the local community. Make educational materials available on the OEHS website.
- Conduct a storm drain assessment to identify potential sources of non-storm water discharges. Categorize those sources by major functions on campus.

Year 4:

- Implement an inspection/enforcement program for illegal discharge/improper disposal.
- Evaluate the results of the storm drain assessment. Assign risk factors to the potential sources and develop a matrix by area on campus. Develop a prioritization scheme to identify those units that are exposed to the greatest risk.
- Develop a list of procedural and physical BMPs to be used as measures to control nonstorm water discharges.
- Develop an action plan to re-route any illicit connections identified in the assessment. Determine any interim measures necessary to prevent illicit discharges from contaminating storm water.

Year 5:

- Continue to implement the inspection/enforcement program for illegal discharge/disposal.
- Implement procedural and physical BMPs to reduce risk of illegal discharges and improper disposal to storm drains.
- Implement any interim measures to reduce the risk of illicit discharges from cross connection until permanent re-routing takes place.
- Develop a long-term sanitary sewer maintenance/upgrade program.

OHES is the Department responsible for implementation of the above goals.

4.3.4 Pollution Prevention / Good Housekeeping for Facilities Operation and Maintenance

The goal of this minimum control measure is to develop and implement a program to prevent or reduce pollutant runoff from facilities operation and maintenance activities. The program must include training to relevant staff on pollution prevention measures and techniques (e.g., regular street sweeping, reduction in the use of pesticides, or frequent sump grate cleaning).

MEP standards

- Have a program with the ultimate goal of preventing or reducing pollutant runoff from facilities and maintenance operations into the storm sewer system;
- Include employee training on how to incorporate pollution prevention/good housekeeping techniques into facilities operation and maintenance such as park and open space maintenance, fleet and building maintenance, new construction and land disturbances, and storm water system maintenance. To minimize duplication of effort and conserve resources, the MS4 operator can use training materials that are available from EPA, their State, or relevant organizations;

- Determine the appropriate best management practices (BMPs) and measurable goals for this minimum control measure.

Measurable Goals to Meet MEP Requirements

Measurable Goals to Meet MEP Requirements

Year 1:

- Review and evaluate Best Management Practices (BMPs) for major campus physical operations (grounds; facilities maintenance; physical plant/utilities; fleet services; custodial services; housing and dining services).
- Develop a multi-level training program for Facilities Management staff. The first level would cover the basics on sources of storm water pollution. The second level would cover campus storm water policies/procedures and the implementation of the BMP's.
- Create a maintenance schedule for periodic cleaning of storm water system sump grates.

Year 2:

- Select appropriate BMPs for major campus physical operations and use them as the basis to develop a Storm Water Pollution Prevention Plan (SWPPP) for each major campus physical operation.
- Continue to develop the multi-level training program on the sources of storm water pollution and how to implement selected BMPs.
- Implement the sump grate cleaning program.

Year 3:

- Implement the multi-level storm water training program.
- Begin implementation of the Storm Water Pollution Prevention Plan (SWPPP) for major campus physical operations.
- Develop an inspection program for compliance with BMPs.
- Continue sump grate cleaning schedule.

Year 4:

- Continue implementation of SWPPP with selected operational BMPs.
- Implement an inspection program for compliance with BMPs.
- Continue implementation of the multi-level storm water training program.
- Continue sump grate cleaning schedule.

Year 5:

- Continue implementation of SWPPP with selected operational BMPs.
- Continue implementation of the multi-level storm water training program.
- Continue implementation of an inspection program for compliance with BMPs.
- Continue sump grate cleaning schedule.

OHES is the Department responsible for implementation of the above goals.

4.3.5 Construction Site Storm water Runoff Control

The goal of this minimum control measure is to develop, implement, and enforce an erosion and sediment control program for construction activities.

MEP Standards

- Have a management, contracting, or other mechanism requiring the implementation of proper erosion and sediment controls, and controls for other wastes, on applicable construction sites;
- Have procedures for site plan review of construction plans that consider potential water quality impacts;
- Have procedures for site inspection and enforcement of control measures;
- Have sanctions to ensure compliance (established in management, contracting, or other mechanism);
- Establish procedures for the receipt and consideration of information submitted by the public;
- Determine the appropriate best management practices (BMPs) and measurable goals for this minimum control measure.

Measurable Goals to Meet MEP Requirements

Year 1:

- Review and evaluate construction contract sediment and erosion control BMP specifications and site pollution control requirements.
- Review and evaluate construction contract sanctions/penalties for violations of storm water sediment and erosion runoff controls.
- Review and evaluate construction site inspection procedures for BMPs.
- Develop training for construction project managers/inspector

Year 2:

- Develop a campus policy statement regarding storm water runoff controls for minimizing sediment and erosion impacts from construction sites.
- Develop formal review procedures and checklists to document site plan, including pollutant source assessment for pre-construction campus site plan and BMP review process.
- Incorporate construction sanctions/penalties where needed in construction contract language.
- Include revised storm water BMP specifications in large construction projects with the potential to impact water quality.
- Train project managers and inspectors on the campus storm water policy and how the procedures will be incorporated into the construction project planning and contract development. The implication of violations and the importance of the enforcement of storm water specifications will be stressed.
- Train contractors and sub-contractors at pre-construction meetings regarding storm water issues related to the job site and the Storm Water Pollution Prevention Plan (SWPPP) for the construction project.
- Develop construction site inspection procedures.

Year 3:

- Implement campus BMP enforcement procedures and responsibilities.
- Implement construction site inspection procedures.

Year 4:

- Include storm water specifications in smaller projects (less than \$50,000) including Physical Plant, and other departments' minor construction activities.
- Continue implementation of construction site inspection procedures.
- Conduct pollutant source assessment during site plan and BMP review.

- Develop standard procedures to receive and respond to public and/or campus reporting/incidents regarding storm water runoff impacts from construction sites.

Year 5:

- Implement standard procedures to receive and respond to public and/or campus reporting/incidents regarding storm water runoff impacts from construction sites.
- Continue implementation of construction site inspection procedures.
- Continue to conduct pollutant source assessment during site plan and BMP review.

OHES is the Department responsible for implementation of the above goals.

4.3.5.1 Construction Projects Greater than One Acre

Construction projects that encompass an area greater than one acre (including Small Linear Underground/Overhead Projects) must develop a specific Storm Water Pollution Prevention Plan (SWPPP). The SWPPP shall conform to the Alabama Department of Environmental Management (ADEM) Template and shall include appropriate BMP's related to the specific project. At project completion, a Notice of Completion shall be submitted. All inspection and monitoring records will be retained for three years.

4.3.5.2 Construction Projects Less than One Acre

Construction projects that encompass an area less than one acre shall follow the guidelines for Construction Project Storm Water Pollution Prevention. All inspection and monitoring records obtained during the project timeframe will be retained for three years.

4.3.6 Post-construction Storm water Management in New Development and Redevelopment

The goal for this minimum control measure is to develop, implement, and enforce a program to address discharges of post-construction storm water runoff from new development and redevelopment areas.

Post-construction storm water management controls include permanent structural and non-structural best management practices (BMPs) (e.g. conservation of natural and permeable areas, permeable pavers, rooftop runoff infiltration galleries, and mechanical storm drain filters) that remain in place after the project is completed and prevent pollution from the new development in the long-run.

MEP standards

- Develop and implement strategies which include a combination of structural and/or non-structural post-construction BMPs;
- Have a management, contracting, or other mechanism requiring the implementation of post construction runoff controls,
- Ensure adequate long-term operation and maintenance of controls;
- Determine the appropriate BMPs and measurable goals for this minimum control measure. Measurable Goals to Meet MEP Requirements

Year 1:

- Review and evaluate current procedures for developing structural and non-structural post construction BMPs for both new development and re-development projects.
- Review current procedures for transitioning responsibility of BMPs from construction phase into long term maintenance.

Year 2:

- Develop a campus policy/enforcement program regarding post-construction storm water controls for new development and re-development project sites.
- Develop standard specifications for selected structural and non-structural post-construction BMPs.
- Develop procedures to incorporate inspection of new development and re-development project facilities into overall campus storm water inspection program.

Year 3:

- Provide training for construction staff on post-construction BMP site planning, design, implementation, and inspection/enforcement protocols.
- Develop procedures for a post-construction audit of the effectiveness of structural and nonstructural BMP's.
- Develop procedures for long-term operation and maintenance of BMPs.
- Develop inspection program for long-term operation and maintenance of BMPs.

Year 4:

- Implement inspection and enforcement program for post-construction structural and nonstructural BMP's.
- Begin post-construction audits of BMP effectiveness and incorporate any findings into the BMP specifications.
- Provide training for operations and maintenance staff for long-term site BMPs

Year 5:

- Implement procedures for transitioning long-term site BMPs into campus storm water inspection program.
- Implement procedures for the long-term operation and maintenance of BMPs.

OHES is the Department responsible for implementation of the above goals.

5.0 RECORD KEEPING

5.1 SWMP Updating

The SWMP will be reviewed annually and The University of Alabama in Huntsville will update the SWMP whenever a change in activities or operations occur which may significantly affect the discharge of storm water pollutants.

5.2 SWMP Public Access

This SWMP is meant for use by The University of Alabama in Huntsville staff and is a public document. Any request for a copy of the SWMP by the governmental agency, or citizen is to be forwarded to The University of Alabama in Huntsville, Office of Environmental, Health & Safety (OEHS), 301 Sparkman Drive, Huntsville, AL 35899.

5.3 SWMP Annual Reports

OEHS will complete and submit annual reports regarding the implementation of the SWMP and measurable goals to the ADEM Water Division.

Appendix

7.01 Appendix 1

Campus Facility Information

Location Description

The University of Alabama in Huntsville campus is situated in Huntsville, Madison County. The facility is generally bounded by University Drive to the north, Interstate I565 to the south, Sparkman Drive to the west and residential neighborhoods to the east. However, as shown on the attached Campus Plan, a few of UAH buildings are situated to the west of Sparkman Drive.

Facility Operations

The University of Alabama in Huntsville employs skilled trades, grounds, and custodial staff for day to day operations. Typical duties include building maintenance, plumbing and electrical repairs, clogged sewer line clean-outs, and grounds maintenance.

Climate and Rainfall

Meteorological conditions at The University of Alabama in Huntsville are as follows:

Climate	Jan	Feb	Mar	Apr	May	June	July	August	Sept	Oct.	Nov.	Dec.
Avg. High °F	51	56	65	74	81	88	91	91	85	75	64	53
Avg. Low °F	32	35	42	50	50	67	70	69	62	51	42	34
Avg. Precipitation	4.88	4.84	5.2	4.33	4.33	4.29	4.06	3.62	3.7	3.58	4.92	5.79

Source: US Climate Data

Facility Drainage

There are over 100 point sources that discharge into the storm drain system from the campus. These point sources drain areas such as streets, parking lots, loading docks, roofs, landscaped areas and any other surfaces that receive rainwater. All of the point sources drain into the existing lakes which are situated to the immediately to the east of Sparkman Drive (i.e., western end of the campus). Flow from these lakes then discharges into the Unnamed Tributary to the McDonald Creek which is situated in the southwestern end of the campus.

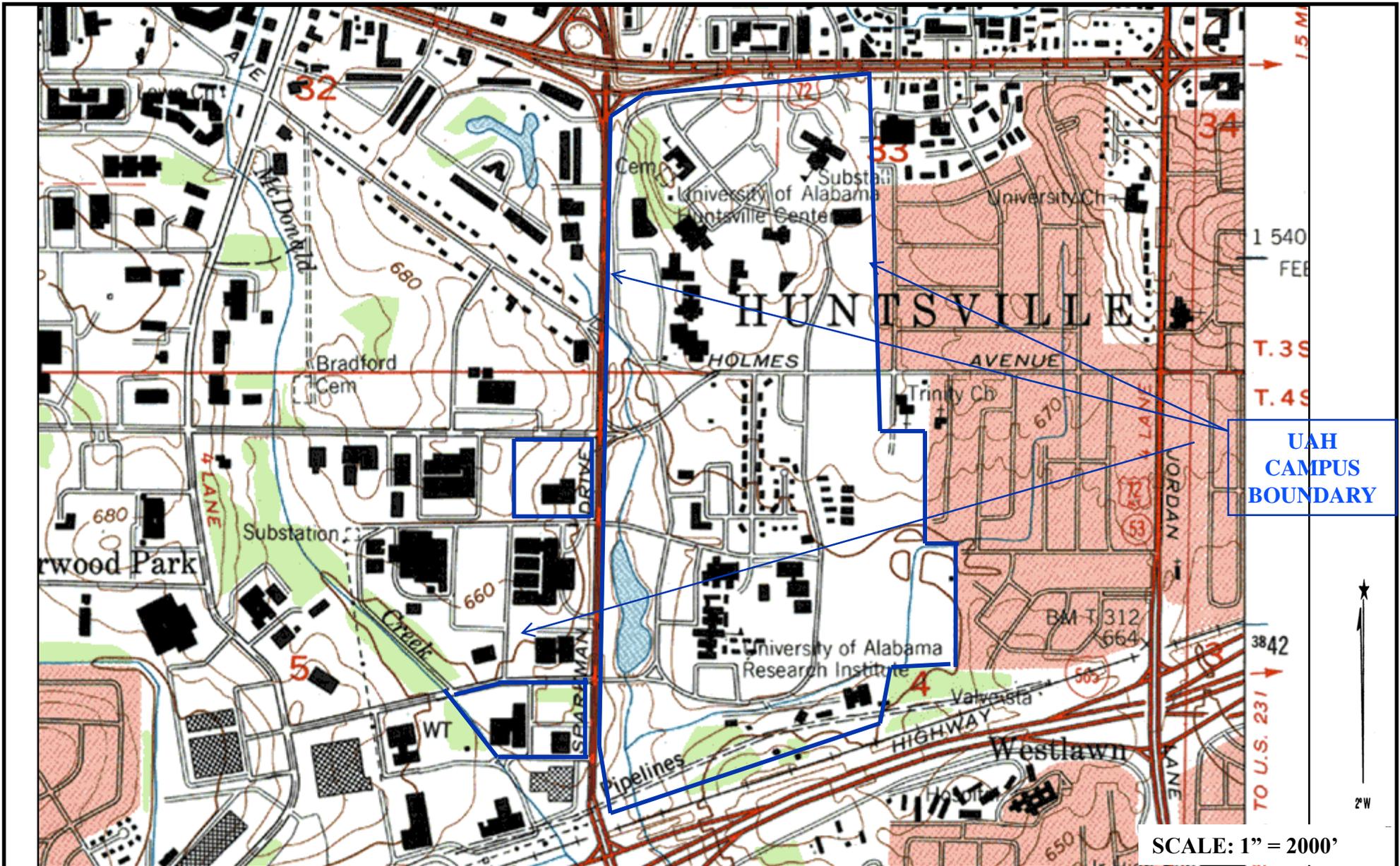
Local Geology

The University of Alabama in Huntsville is underlain by Tuscumbia Limestone, which is of the Mississippian age. Tuscumbia Limestone is composed of coarsely crystalline, fossiliferous

limestone with small amounts of chert. The formation weathers to a deep soil mixed with chert boulders, which may be 12 inches or more in dimension.

Since the Tusculumbia is primarily a carbonate rock, it is subject to solutioning along both joints and bedding planes. The solutioning process tends to initially form vertical slots in the limestone. In many instances, the overlying residual soil is eroded downward into these vertical slots, which subsequently become filled with soft, wet cohesive soils. As a result, the surface of the rock in many instances is characterized by relatively hard blocks (or boulders) and pinnacles separated by soil filled slots. The overlying residual clay is derived from the solution weathering of the limestone strata. The soil mantle has a varying thickness from a few to $50\pm$ feet because of the irregular configuration of the underlying limestone.

The groundwater is poorly defined and subject to seasonal changes. Flow is often very slow and nonuniform. In limestone, the Geologic structure is the major influence on the movement of groundwater. The permeability of rock is generally increased by faulting and fracturing, which results in severe rock weathering in these areas. In this formation, the groundwater flows along the bedding planes and joints, resulting in solutioning of the limestone bedrock. The solution activity along the joints often produces deep vertical slots.



UAH
CAMPUS
BOUNDARY

SCALE: 1" = 2000'

<p>AMIRI ENGINEERING Geotechnical, Materials & Environmental Engineers 2609 Artie Street SW - Huntsville, AL 35805 Phone: (256) 536-9992 - Fax: (256) 536- 9982 www.amiriengineering.com</p>		SCALE	DATE	<p>UNIVERSITY OF ALABAMA IN HUNTSVILLE CAMPUS 301 SPARKMAN DRIVE HUNTSVILLE, MADISON COUNTY, ALABAMA</p>
		1"=2000'	4/13/2017	



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AERIAL PLAN

PROJECT NO.	SCALE	DATE
211036	-	11/8/20116

**UNIVERSITY OF ALABAMA
 IN HUNTSVILLE
 HUNTSVILLE, ALABAMA**

THE UNIVERSITY OF ALABAMA IN HUNTSVILLE



1. [0202](#) North Campus Residence Hall
2. [6302](#) Frank Franz Hall
3. [0203](#) Morrison Hall
- 3a. Studio 106/Black Box Theatre
4. [0205](#) Union Grove Gallery and Meeting Hall
5. [6303](#) Springs Hall
6. [6305](#) Roberts Hall
- 6a. Roberts Recital Hall
7. [6308](#) Conference Training Center
- 7a. Exhibit Hall
8. [6309](#) Central Campus Residence Hall
9. [6307](#) Bault Conference Center & Hotel
10. [6306](#) Nursing Building
11. [6304](#) Salmon Library
12. Amphitheater
13. [6308](#) Wilson Hall/Disability Support
- 13a. Wilson Theatre
14. [6309](#) Business Administration Building
- 14a. Clean Auditorium
15. [6304](#) University Fitness Center
16. [6302](#) Innomodal Parking Facility
- 16a. Public Safety
17. [6005](#) Charger Union
18. [6308](#) Shelby Center for Science and Technology
19. Fraternity/Sorority Row
20. [6300](#) Southeast Campus Housing
21. Charger Village Food Court
22. [6000](#) Charger Village I
23. [6300](#) Credit Union
24. University Greenway
25. [6303](#) Student Services Center /Admissions/Campus Vitals
26. [6301](#) Robert "Bud" Carter Research Hall (National Space Science and Technology Center and NASA Weather Forecasting Office)
27. [6203](#) SWRL (Severe Weather Institute Radar and Lightning Laboratory)
28. [6200](#) Charger Park
29. [6300](#) Optics Building
30. [6201](#) Materials Science Building
- 30a. McDonnell Douglas Auditorium
31. [6200](#) Engineering Building



32. [6300](#) Warner von Braun Research Hall
33. V&H Annex
34. [6202](#) Physical Plant
35. [6204](#) Central Receiving and Shipping
36. [6206](#) Johnson Research Center
37. Population Research Lab
38. [6103](#) V&H Radio Station
39. [6103](#) Business Services Bldg./Copy Center
40. [6101](#) Sheila King Hall
41. [6004](#) Olin B. King Technology Hall
- 41a. Oak Ridge/Huntsville Partnership
42. [6003](#) UAH Rice School
43. [6002](#) University Park

UAH-Campus-Map-E-numbered_7.27.16.png

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