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Memorandum

Date:	May 18, 2009
To:	Peter Nemmetz – Assistant Director of Facilities Management, UW-Platteville
From:	Caroline Burger, P.E. and Theran Jacobson, E.I.T.
Subject:	**University of Wisconsin – Platteville Urban Pollution Loading Analysis Platteville, WI** **AECOM Project No. 106805**

Distribution:	Peter Davis – Interim Director of Facilities Management, UW-Platteville Doug Stephens – Director Campus Planning, UW-Platteville Howard Crofoot - Director of Public Works, C. of Platteville

Background / Scope of Work

The analysis described in this memorandum was conducted in partial fulfillment of the University of Wisconsin-Platteville (UWP) Campus Municipal Separate Storm Sewer System (MS4) General Permit. This memorandum documents the stormwater pollution analysis conducted for the area of the UWP Campus regulated under the MS4 permit. The permit requires an estimate of the annual stormwater pollution loadings (sediment and phosphorus) for all storm sewer outfalls that meet the regulatory definition of an "MS4." This pollution loading analysis establishes the base pollution load and the pollution reduction resulting from the existing stormwater best management practices (BMPs) on the campus.

The analysis used the Windows™ version of an urban pollution loading model "Source Loading and Management Model" (WinSLAMM) to model annual pollution loadings under the following two scenarios:

1. Base Conditions: October 1, 2004, land use conditions with no BMPs applied.

2. Existing Conditions: October 1, 2004, land use conditions with the BMPs as of January 2009 applied. The existing BMPs are described later in this memorandum.

If under scenario two, the existing BMPs were not sufficient to meet the required 20 percent and 40 percent Total Suspended Solids (TSS) reduction requirements; additional BMPs would be evaluated to achieve this goal. At the request of the University, an analysis to achieve a TSS reduction goal of 60 percent was also

evaluated.

Base and Existing Conditions Analysis

This section summarizes the analysis conducted for UWP to determine the base conditions pollution load and the amount of pollution load reduction currently being achieved by UWP's existing BMPs. The pollution loads are established using the policies and procedures set forth by the Wisconsin Department of Natural Resources (WDNR) to analyze pollution loading in developed urban areas. These policies can be found at the WDNR website: http://www.dnr.state.wi.us/runoff/stormwater/muni.htm.

Pollution Loading Model Input Information

A GIS database was created characterizing the UWP Campus in terms of urban stormwater pollution generation. Information in the database consists:

- Sub-basin delineations (based on the 2004, Citywide stormwater plan, contour data, and storm sewer mapping)
- Hydrologic soil groups (based on USDA NRCS soil data)
- Land use conditions as of October 2004
- Street drainage type (curb & gutter or swale)
- Catch basins
- Pond locations
- Biofilter locations
- Connected or disconnected impervious surfaces

The data used to create the GIS database was provided by UWP, unless noted above.

Area of Analysis

All of the lands within the campus boundary of UWP as of October 1, 2004, were analyzed with the exceptions as described below. The following list summarizes the lands excluded from the analysis in accordance with WDNR policies.

- Riparian areas (lands that drain directly to Roundtree Branch or tributaries of the Roundtree Branch without passing through an MS4)
- Undeveloped land greater than five acres
- City-owned right-of-way for Greenwood Avenue
- City-owned right-of-way for University Plaza for the section up to western most parking lot to north of the right-of-way boundary

Stormwater Model Description

WinSLAMM version 9.3.1 was used to conduct the analysis. The following supporting parameters files were used.

- WisReg – Madison Five year Rainfall.ran WI_GEO01.ppd
- WI_SL06 Dec06.rsv
- WI_AVG01.psc

- WI_DLV01.prr
- WI_Res and Other Urban Dec06.std
- WI_Com Inst Indust Dec06.std

WinSLAMM data files were created to represent each delineated drainage basin of the campus. Each data file includes the source areas and associated acres of the source area within the drainage basin. Source areas in WinSLAMM include rooftop, parking, driveway, sidewalk, roads, and landscaped areas.

Source areas are further defined using information such as the source areas' connection to the storm sewer system and the soil type for the pervious source areas. Data for the source areas was derived from the GIS data, direct observations, and discussions with UWP staff. Figure 1 shows the source areas for each drainage system within the modeled campus area that was used in the WinSLAMM input (data) files. Note, the source areas depict the land use that existing in October 2004 because that is the benchmark time period set by the WDNR.

Existing Stormwater BMPs

UWP currently has four types of existing BMPs in place. These practices are:

1) Biofilters
2) Catch basins with sumps
3) Wet detention ponds
4) Dry detention ponds

The existing BMPs are described below.

1) Biofilters: Biofilters are specially constructed landscaped depressions in the ground surface. During rain events, stormwater enters the biofilter and soaks into an area with a mixture of sand, compost, and topsoil before being allowed to either infiltrate into the ground or exit through one or more under drain pipes. Biofilters also feature landscaping of various plant species which contribute with aesthetic value and enhance the infiltration rate of the soil.

   UWP has constructed biofilters during renovations in recent years. In addition to the newly constructed facilities, some of these treatment devices service lands that were fully or partially developed prior to October 1, 2004. The pollution control from these existing developed lands was applied to the equivalent land area as of October 1, 2004.

   The pollution control effectiveness of the biofilters was modeled using data provided by UWP. A summary of the biofilter characteristics used for input into the WinSLAMM model is found in Table 1.

Table 1: Biofilter Characteristics Used for Modeling

BMP	Contributing Drainage Area (acres)	BMP Surface Area (sq ft)	Total Depth (feet)	Outlet Structure
Hickory Street Northern Biofilter	0.22	270	4.3	4" dia underdrain & 5' broad-crested weir
Hickory Street Southern Biofilter	0.11	175	4.3	4" dia underdrain & 5' broad-crested weir

Note: Based on plans provided by UWP, and for modeling purposes, the biofilters were assumed to have a total depth of 4.3 feet. Also, it was assumed that each biofilter has a high-flow outlet represented by a 5 foot broad-crested weir. This information was referenced from the plans provided by UWP.

2) Catch Basins With Sumps: These are structures located under the ground surface where stormwater is intercepted and directed to underground storm sewer pipes. Catch basins are typically found in curb and gutter along streets and along the perimeter of parking lots. Catch basins can be rectangular or circular structures with a storage depth below the discharge pipe of the structures which allow sediment to accumulate.

   UWP has constructed catch basins with sumps during renovations in recent years. In addition to the newly constructed facilities, some of these treatment devices service lands that were fully or partially developed prior to October 1, 2004. The pollution control from these existing developed lands was applied to the equivalent land area as of October 1, 2004 where applicable.

3) Wet Detention Ponds: These are depressions in the ground surface featuring a permanent pool of standing water. During rainfall events, stormwater enters the detention pond and is treated before being allowed to flow downstream. Wet detention ponds can be fed by storm sewer and/or swale drainage systems.

   UWP has one wet detention pond serving developed lands that were fully or partially developed prior to October 1, 2004. The pollution control effectiveness of the pond was modeled using data provided by UWP. A summary of the wet detention pond's characteristics used for inputs to the model is found in Table 2.

4) Dry Detention Ponds: These are depressions in the ground surface with an outlet at or near the bottom of the pond. During rainfall events, stormwater enters the detention pond and is treated before being allowed to flow downstream. Dry detention ponds can be fed by storm sewer and/or swale drainage systems.

   UWP has two dry detention ponds serving developed lands that were fully or partially developed prior to October 1, 2004. The pollution control effectiveness of the ponds was modeled using data provided by UWP. A summary of the dry detention ponds characteristics used for inputs to the model is found in Table 2.

Both dry ponds were analyzed in WinSLAMM as wet detention ponds to determine the TSS removal efficiency. Ponds with an outlet less than three feet above the pond bottom have a reduced pollution trapping due to scour. Therefore low-treatment efficiencies, if any, resulted from the two dry detention ponds.

The existing BMPs were modeled to determine the pollution reduction of the load generated by present day (January 2009) land use conditions. The reduction was then applied to pollution load generated by the same contributing drainage areas under the October 1, 2004, land use conditions. The existing BMPs are shown on Figure 2.

Table 2: BMP Descriptions and Drainage Area Characteristics

Location	BMP Type	Site Description	Drainage Basin	Basin Area (acres)	BMP Drainage Area (acres)	Total BMP Drainage Area (acres)	BMP Surface Area	Treatment Efficiency (%)
Hickory Street	Biofilter	Northern Most BMP	RB2B.2	0.15	0.03	0.22	270 sq. ft.	62
			RB3J.6	0.20	0.14			
			RB3J.5	0.13	0.05			
Hickory Street	Biofilter	Middle BMP	RB3J.5	0.13	0.04	0.11	175 sq. ft.	69
			RB3J.4	0.13	0.07			
Southwest Dorm	Wet Pond	----	RB3C.1	16.57	4.21	6.07	0.08 ac*	61
			RB3D.1	22.27	1.44			
			RB3J.1	58.92	0.42			
Engineering Building	Dry Pond	South Pond	RB3C.1	16.57	1.39	3.05	0.14 ac**	0
			RB3J.1	58.92	1.66			
Engineering Building	Dry Pond	North Pond	RB3J.1	58.92	58.92	102.98	0.22 ac**	25
			RB3J.3	1.25	1.13			
			RB3J.7	10.94	10.94			
			City-Owned	31.59	31.59			

* Wet pond permanent pool size
**Top berm is modeled as outer limits of BMP

In addition to the structural BMPs listed in Table 2, when land use or source areas are modified, the change in land use or source areas can result a reduction in TSS load. Changes in sources area between October 2004 and May 2009 were accounted for in the WinSLAMM data files that represent existing conditions. For example, the track shown in the aerial photography in 2005 no longer exists. In the WinSLAMM data file representing that area, the base file contains the track and the existing file contains the landscaped area now present.

Results - Base and Existing Conditions

The results of the WinSLAMM modeling analysis are shown in Table 3. This table shows the annual Total Suspended Solids (TSS) and Total Phosphorus (TP) loadings under the base and existing conditions (see definitions on page one of this memo).

Table 3: Annual Base and Existing Conditions Pollution Loads

Scenario	TSS Load	BMP Reduction			TP Load
		Individual	Individual	Cumulative	
	(tons/yr)	(tons/yr)	(%)	(%)	(lbs/yr)
Base Conditions	**24.3**	**0.0**	**0.0**	**0.0**	**217**
adding catch basins	23.8	0.5	1.9	1.9	214
adding biofilters	23.8	0.0	0.1	2.0	214
adding ponds	21.7	2.1	8.9	10.6	203
Sum of Existing Conditions	**21.7**	**2.6**	**----**	**10.6**	**203**

The University's annual base conditions TSS load is 24.3 tons per year. After accounting for the TSS control from the existing BMPs analyzed, the existing conditions TSS load is 21.7 tons per year which represents a TSS reduction of 10.6%.

Proposed Management

Since the existing BMPs do not achieve the 20 percent or 40 percent TSS control required under the MS4 permit, additional stormwater BMPs were investigated. The campus needs to reduce its TSS loading by an additional 2.3 tons per year to achieve a 20 percent reduction, an additional 7.1 tons per year to achieve a 40 percent reduction, or an additional 12.0 tons per year to achieve a 60 percent reduction.

<u>Retrofitting Existing BMPs</u>

The first step in selection of BMPs to achieve pollution loading requirements is to evaluate existing BMPs that can be retrofit to enhance pollution reduction.

Retrofitting existing BMPs to achieve higher pollution reduction is generally one of the most cost-effective ways to achieve TSS removal. UWP has two existing BMPs that have the potential for retrofit. They are two dry detention ponds located west of Longhorn Drive and north of Southwest Drive; Engineering North and Engineering South, respectively.

Engineering North has a large drainage area with a high TSS loading. There is also a significant amount of open space that could be utilized to expand the existing dry pond into a wet detention pond.

Engineering South pond is an existing dry pond with a small drainage area and a low TSS loading. This is an unsuitable site due to the limited space available for expansion

and the estimated depth to bedrock. UWP staff noted at a January 21, 2009, meeting that during construction of the existing dry pond, bedrock was found at the pond bottom.

Conversion of Source Areas

When reconstruction occurs that modifies a source area it can have an effect on the pollution load. UWP has proposed removing a fraction of one parking lot (totaling 0.61 acres) and replacing the area with roof top (0.18 acres), landscape (0.36 acres), and sidewalk (0.07 acres). This change in land use would reduce the TSS load from the 0.61 acres. Figure 3 shows the location of the proposed source area change.

Load Per Source Area

The next step in determining the location and size of the proposed BMPs is to conduct an analysis that characterizes the project area based on relative pollution load generation. BMPs are generally more cost-effective if they are applied to areas with a relatively large pollution load.

The pollution loading for each impervious source area identified on the UWP campus was calculated. The cumulative load for each impervious source area is listed in Table 4. Note, there are other source areas not shown on Table 4 which account for the base loading difference between 24.3 and the sum of the loads shown on the Table 4 (12.9 tons/yr).

Table 4: Sediment (TSS) Loading by Source Area

Source Area	Area (acres)	TSS Load (tons / yr)
Roof	17.2	1.4
Parking Lot	22.0	6.6
Street	2.6	2.2
Sidewalk	13.2	2.7

As shown in the table, parking lots account for the highest sediment loading for impervious surfaces on campus. Sidewalks account for the next highest sediment loading on campus. One hundred percent of the sediment from the streets would need to be treated to reach the 20 percent reduction goal (reduce the sediment load by 2.2 tons/yr). In addition, almost all of the parking lots would need to be treated to reach the 40 percent reduction goal. Proposed BMPs were evaluated to treat some or all of the parking lots and sidewalks.

Additional BMP Site Selection

The final step in creating a plan to achieve the 20, 40, and 60 percent TSS reduction goals is to review the project areas for other feasible sites. If the above BMPs cannot achieve pollution reduction goals, additional sites must be identified for proposed BMPs.

During a January 21, 2009, meeting with UWP staff and AECOM staff, areas throughout campus were identified that have the potential for a proposed BMP. Additionally, areas

were excluded that would not be feasible for a proposed BMP. Sites were excluded due to concerns such as constructability, social implication, and/or planned development on campus.

After evaluation, a series of BMPs were selected to achieve the 20, 40, and 60 percent TSS reduction goals.

Proposed BMPs

After the proposed BMPs were evaluated, a final series of BMPs were selected. Tables 5 and 6 show the results of the evaluation. The implementation of most of the BMPs listed in Tables 5 and 6 will achieve UWP's 20 and 40 percent pollution reduction goals.

The BMPs proposed for the parking lots were ranked from most TSS removed to least the least TSS removed. That ranking is also shown in Table 5.

Table 5: Parking Lot Proposed Best Management Practices

BMP ID	Overall Rank[1]	Source Area	Parking Lot No.	Area Treated	Proposed BMP	TSS Load	TSS Removed	Percent Control
				(ac)		(tons/yr)	(tons/yr)	(%)
B-1	1	Parking Lot	21	2.90	Biofilter	0.86	0.69	80
B-4	2	Parking Lot	14 & 16	1.70	Biofilter	0.52	0.42	80
B-2	3	Parking Lot	1	0.86	Biofilter	0.26	0.21	80
R-1	4	Parking Lot	25a	0.61	Removal[3]	0.18	0.14	76
B-3	5	Parking Lot	20	0.50	Biofilter	0.15	0.12	80
B-6	6	Parking Lot[2]	23	0.40	Biofilter	0.12	0.10	80
B-6		Rooftop[2]	23	0.70	Biofilter	0.05	0.04	80
B-7	7	Parking Lot	18	0.40	Biofilter	0.11	0.09	80
B-5	8	Parking Lot	22	0.20	Biofilter	0.06	0.05	80
	Total			**8.27**		**2.31**	**1.86**	

[1]Rank determined by TSS removed, greatest to least.
[2]Biofilter facility is treating two source areas - the Giese Facility Management Building rooftop and parking lot.
[3]Parking lot would be removed and replaced with rooftop.

Table 6: Proposed Wet Detention Ponds

Proposed BMP	Drainage Basin ID	Drainage Basin Area	Area Treated	TSS Load	TSS Removed	TSS Remaining	Percent Control
		(ac)	(ac)	(tons/yr)	(tons/yr)	(tons/yr)	(%)
Wet Pond 1	RB3J.1	58.92	58.92				
	RB3J.7	10.94	10.94				
	RB3J.3	1.11	1.11				
	RB3J.2	0.31	0.31				
	RB3J.4	0.13	0.13				
	RB3J.5	0.13	0.13				
	RB3J.6	0.20	0.20				
	RB2B.2	0.15	0.15				
	City Lands[1]	31.59	31.59				
Wet Pond 1 Total[3]		102.83	102.83	8.67	6.94[2]	1.73	80
Wet Pond 2[4]	RB3L.2	64.72	24.02	2.95	2.36	0.59	80
Total				**11.62**	**9.29**	**2.32**	

[1]City TSS load not included in TSS base load or control calculation. Pond efficiency is only applied to TSS generated by land owned by UWP.
[2]Retrofit. This facility removes 2.2 tons of TSS for existing conditions.
[3]Wet Pond 1 permanent pool size is estimated to be 1.5 acres; the outer limits (top berm) of the pond will encompass 2.25 acres.
[4]Wet Pond 2 permanent pool size is estimated to be 0.3 acres; the outer limits (top berm) of the pond will encompass 0.45 acres.

Estimated Cost

The cost to implement these BMPs will vary depending on the size and type of devices that are installed.

Biofilters

A typical biofilter will cost approximately $23,000 per 2,000 square feet of biofilter surface area. This cost is based on the typical installation costs of biofilters constructed in Wisconsin.

Wet Detention Ponds

The estimated construction cost of Wet Pond 1 ranges from $230,000 to $270,000. The annual maintenance cost ranges from $6,100 to $7,000 per year. The estimated construction cost for Wet Pond 2 ranges from $90,000 to $100,000. The annual maintenance cost ranges from $1,700 to $2,600 per year.

The estimated capital and maintenance costs of the wet detention ponds were estimated using data from the *Costs for Urban Nonpoint Source Water Pollution Control Measures*. Technical Report No. 31 published by the Southeastern Wisconsin Regional Planning Commission in 1991. This report documents the costs of a variety of water quality

BMPs. The costs shown in the report were updated to 2009 values using an inflation rate of four percent.

Source Area Classification

Facilities on campus are classified based on their type of use. Classifications can include Academic, Sports / Athletic, Office, Physical Plant, Student Life, and Housing. UWP provided AECOM with a map showing the classification of each facility. Table A-3, at the end of this memorandum, displays the source area to each proposed BMP based on the source area's classification.

Conclusions

The proposed BMPs shown in Table 5 and 6 will achieve a total of 11.6 tons of TSS reduction per year. This, combined with the pollution reduction from existing BMPs, equates to an overall TSS reduction of 52 percent per year. UWP would still need to reduce their pollution loading by an additional 0.43 tons per year in order to achieve the 60 percent reduction in TSS per year.

As stated in the UWP MS4 Permit, the campus must provide:

> ***"2.7.1*** *To the maximum extent practicable, implementation of storm water management practices necessary to achieve a 20% reduction in the annual average mass of total suspended solids discharging from the MS4 to surface waters of the state as compared to implementing no storm water management controls, by March 10, 2008. The permittee may elect to meet the 20% total suspended solids standard on a watershed or regional basis by working with other permittee(s) to provide regional treatment that collectively meets the standard.*
>
> *Note: Pursuant to s. NR 151.13(2), Wis. Adm. Code, the total suspended solids reduction requirement increases to 40% by March 10, 2013."*

The stormwater pollution modeling evaluation conducted for the University of Wisconsin-Platteville followed the guidelines provided by the WDNR for compliance with the MS4 Permit. As a result of this evaluation the following conclusions are made:

1. Accounting for all of the existing management measures, UWP is currently reducing its pollution load by 2.6 tons per year (10.6 percent). Therefore, UWP has not met the TSS reduction requirements of their MS4 Permit for neither the 2008 goal (20 percent) nor the 2013 goal (40 percent).
2. Since both the 20 percent and 40 percent TSS removal goals have not been met, additional BMPs are necessary for UWP to gain MS4 compliance. Proposed BMPs include the conversion of one existing parking lot, the construction of seven new biofilters and the construction of two new wet detention ponds.
3. After construction of the proposed BMPs, UWP would achieve 52 percent TSS reduction. To achieve a 60 percent TSS reduction, UWP will need to reduce the TSS load by an additional 0.43 tons per year.

4. An alternative to UWP constructing more BMPs to further reduce the annual pollution loading may be for UWP to work cooperatively with the City of Platteville. Section 2.10 of the MS4 permit allows for intergovernmental cooperation to perform one or more of the conditions in the permit. It may be more feasible to achieve the UWP pollution control requirements on various locations throughout the city. This approach would likely require long-term agreements between UWP and the City to define the roles and responsibilities of each party.
5. The University of Wisconsin - Platteville should review these results with the WDNR to finalize their MS4 permit compliance for the TSS reduction requirements.

Attachment A: Supporting Documentation

Table A-1
Source Area per Drainage Basin

		Source Area					
Drainage Basin ID	**Total Area**	**Rooftop**	**Parking Lot**	**Driveway**	**Sidewalk**	**Landscape**	**Other Impervious Area**
	(ac)	**(ac)**	**(ac)**	**(ac)**	**(ac)**	**(ac)**	**(ac)**
RB2B.1	8.92	1.71	0.86	0.39	0.86	5.10	-
RB2B.2	0.15	-	-	-	0.01	0.14	-
RB2D.1	15.98	0.07	0.37	-	-	15.55	-
RB2D.2	11.70	1.64	2.16	-	1.42	6.25	0.23
RB2D.3	14.49	1.03	2.28	-	1.26	9.93	-
RB3A.1	7.20	-	-	-	-	7.20	-
RB3C.1	16.57	-	-	0.36	0.03	15.76	0.42
RB3C.2	37.63	0.43	1.32	0.11	1.21	33.72	0.84
RB3C.2.1	0.25	-	-	-	-	0.25	-
RB3D.1	22.27	-	-	-	0.02	22.02	0.23
RB3F.1	20.79	-	-	-	-	20.79	-
RB3G.1	1.34	-	-	-	-	1.34	-
RB3J.1	58.92	7.61	7.78	0.78	3.89	36.61	2.25
RB3J.2	0.31	-	-	-	-	0.31	-
RB3J.3	1.25	-	1.11	-	-	0.14	-
RB3J.4	0.13	-	-	-	-	0.13	-
RB3J.5	0.13	-	-	-	-	0.13	-
RB3J.6	0.20	-	0.11	-	-	0.09	-
RB3J.7	10.94	2.25	0.39	0.05	2.28	5.82	0.15
RB3L.1	12.65	0.85	0.86	0.47	0.67	9.80	-
RB3L.2	64.01	1.59	4.73	1.69	1.55	53.91	0.55
Total	**305.83**	**17.18**	**21.97**	**3.85**	**13.20**	**244.99**	**4.67**

Table A-2
Pollution Load per Drainage Basin
Base and Existing Conditions

Drainage Basin ID	Base Conditions	Existing Conditions	
	TSS Load	TSS Load	TSS Reduction
	(tons/yr)	(ton/syr)	(%)
RB2B.1	0.93	0.93	-
RB2B.2	0.01	0.01	9.9
RB2D.1	0.77	0.77	-
RB2D.2	1.43	1.43	-
RB2D.3	1.43	1.43	-
RB3C.1	0.98	0.74	24.7
RB3C.2	2.54	2.46	3.2
RB3D.1	1.10	1.02	7.6
RB3G.1	0.06	0.06	-
RB3J.1	7.08	5.25	25.8
RB3J.3	0.34	0.26	25.0
RB3J.4	0.01	-	69.0
RB3J.6	0.04	0.02	55.7
RB3J.7	1.20	0.96	19.5
RB3L.1	1.07	1.07	-
RB3L.2	5.29	5.29	-
Total	**24.3**	**21.7**	**10.6**

Table A-3: Source Area Classification

BMP ID	# Acres	Academic		Sports / Athletic		Office		Physical Plant		Student Life		Housing		Other[1]	
		(acres)	(%)	(acres)	(%)	(acres)	(%)	(acres)	(%)	(acres)	(%)	(acres)	(%)	(acres)	(%)
B-1	2.9	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	2.9	100.0
B-2	0.9	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.9	100.0
B-3	0.5	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.5	100.0
B-4	1.7	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1.7	100.0
B-5	0.2	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.2	100.0
B-6	1.1	0	0.0	0	0.0	0	0.0	0.7	61.2	0	0.0	0	0.0	0.4	38.8
B-7	0.4	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.4	100.0
WP-1	72.0	5.0	7.0	6.9	9.6	1.3	1.8	0.1	0.2	1.1	1.5	0.3	0.4	57.4	79.6
WP-2	24.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.5	2.2	23.5	97.8

Notes:
[1]Other includes but not limited to parking lots, sidewalks, green space, etc.

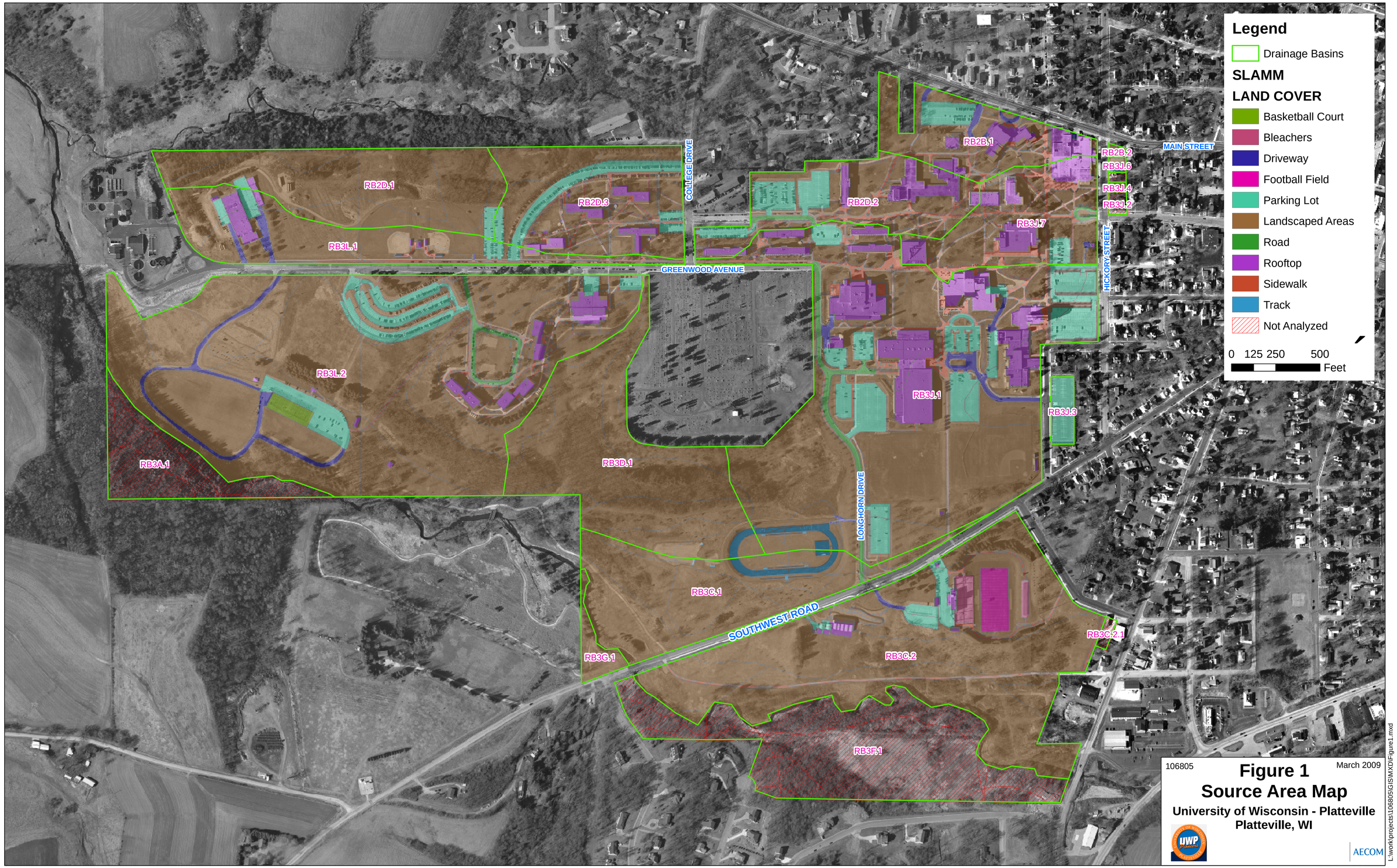

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Figure 1
Source Area Map

University of Wisconsin - Platteville
Platteville, WI

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Source Data: UWP 2005

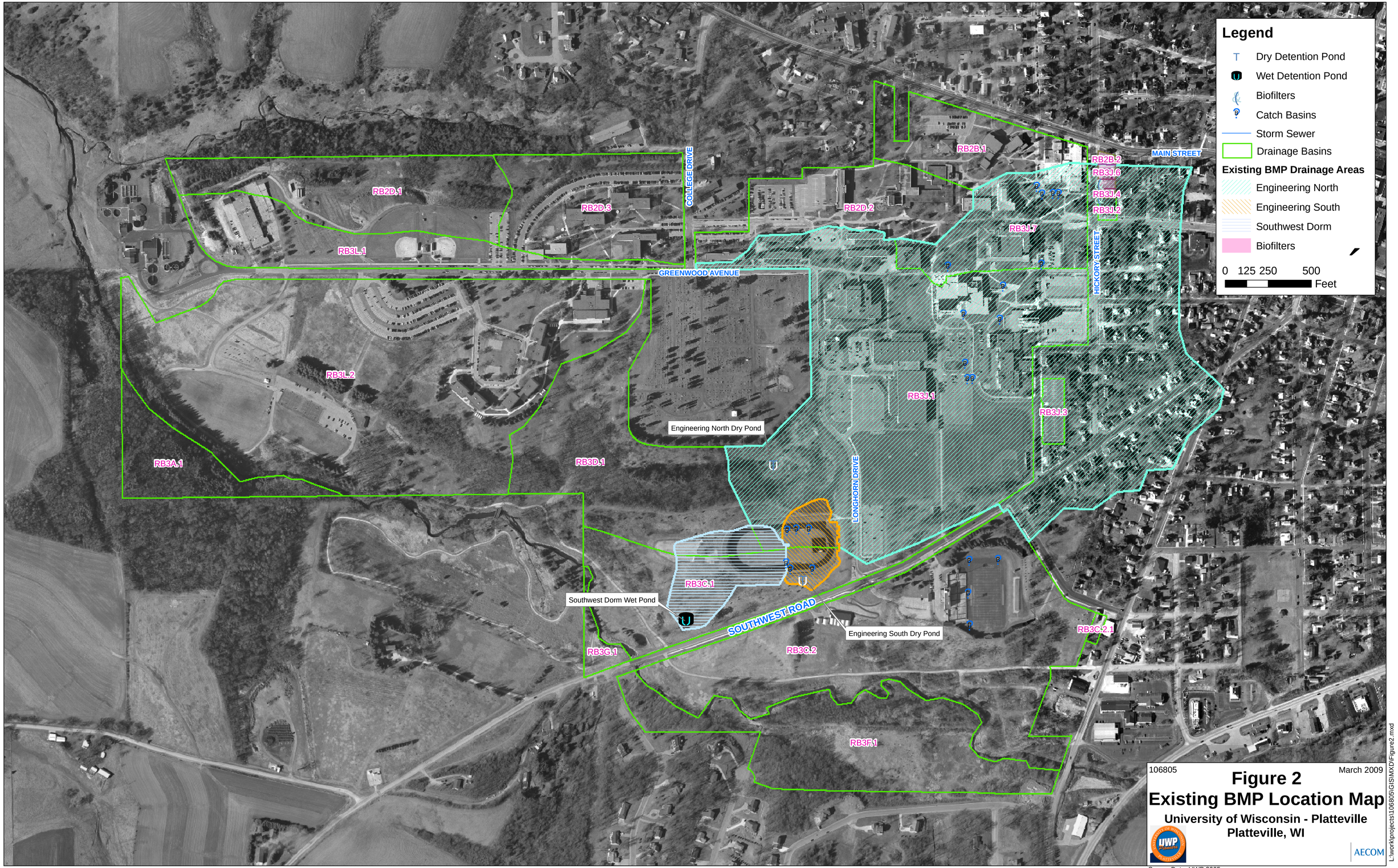

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Figure 2
Existing BMP Location Map

University of Wisconsin - Platteville
Platteville, WI

AECOM

Source Data: UWP 2005

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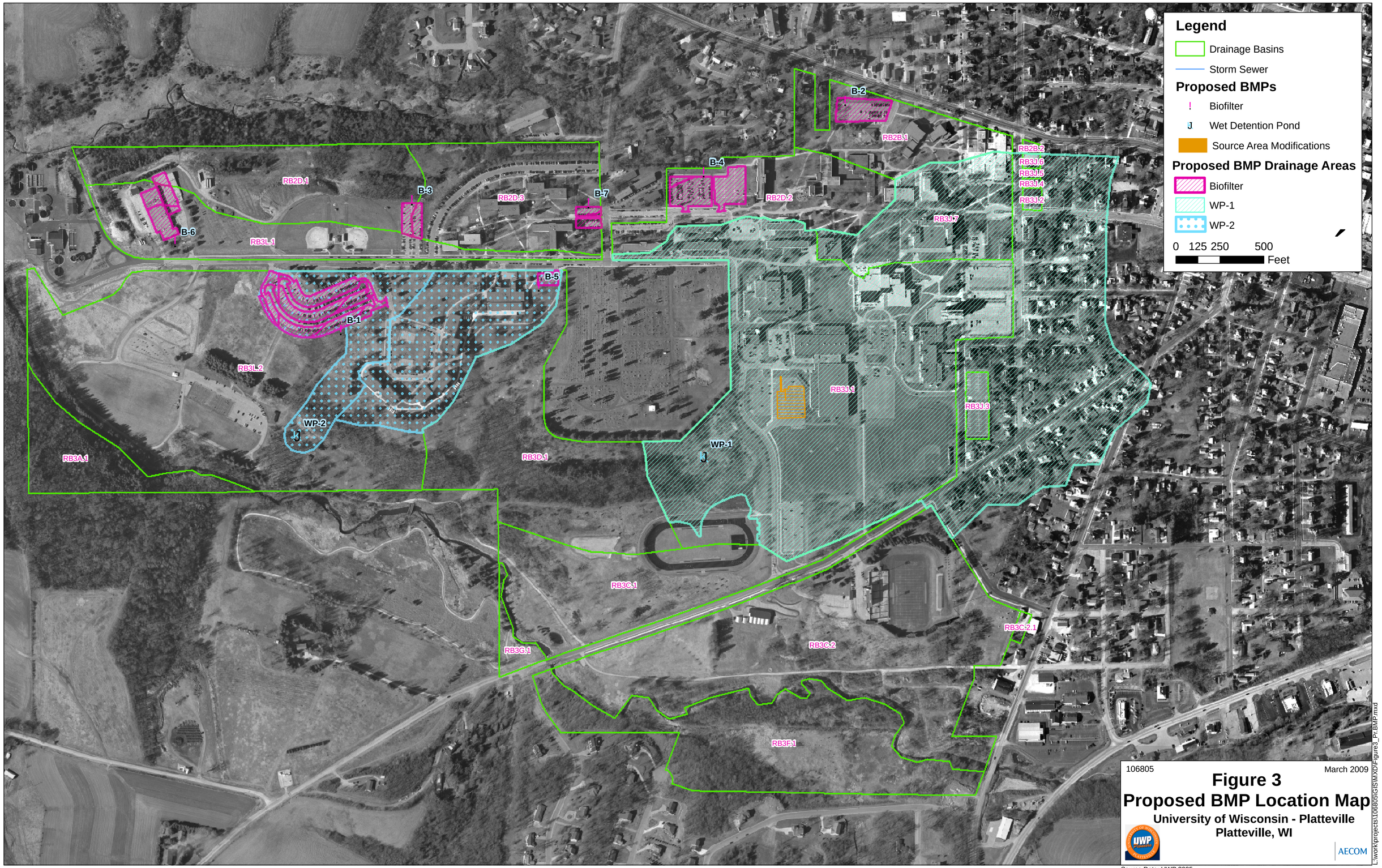

106805 March 2009

Figure 3
Proposed BMP Location Map

University of Wisconsin - Platteville
Platteville, WI

AECOM

Source Data: UWP 2005

L:\work\projects\106805\GIS\MXD\Figure3_Pr.BMP.mxd