

A Proposal for
BMP and Dry Weather Storm Drainage Assessment

Submitted to:

Mr. Ben Higgins (441-7589)
Public Works and Utilities Department
Engineering Services
531 Westgate Boulevard
Lincoln, Nebraska 68528-1563

Introduction

This work concerns two related storm water management issues for Lincoln, NE: monitoring of dry weather flows and best management practice (BMP) review.

The monitoring of dry weather flows from storm drains is to provide a field screening analysis for illicit connections and illegal dumping for either selected field screening points and major storm drain outfalls. Approximately 20% of the storm drain field sampling stations will be monitored during this period covered by this project.

Best management practices (BMPs) are used to ensure that storm water discharges from the city are as free from pollutants as practical. The BMP Review portion of the study will identify BMPs currently operating in the city, identify and evaluate BMPs that have been reported in the technical literature, develop an Implementation Plan and Schedule to implement any needed additional BMPs, and develop a Monitoring Plan to monitor the effectiveness of BMPs that have been implemented.

Overall Scope of Work

The scope is separated into the two sections, one each for monitoring of dry weather flows and for best management practice (BMP) review.

Dry Weather Flow Monitoring.

This project will consist of three phases as discussed below.

Phase I. Visit Field Sampling Sites, Collect Samples and Record Observations.

1. UNL Civil Engineering will have a team of at least two students visit each of approximately 60 field sampling sites during the summer of 2002. Each site will be visited at least three days after a measurable rainfall. The field sites to be visited are listed in the "Dry-Weather Stormwater Monitoring" Report dated March 2001. No more than 5 additional sites will be added to the summer of 2002 monitoring reflecting new outfall sites in newly developed portions of Lincoln.
2. UNL Civil Engineering will provide new information found concerning the storm drain outfalls during sample collection to the City.

3. UNL Civil Engineering will report the following concerning each site:
 - time, day, and weather during site visit, and
 - a narrative description of site appearance (e.g., if it appears that dry weather flows may have occurred).
4. If there is flowing water at a field site, UNL Civil Engineering will
 - collect two grab samples of water during a 24 hour period, with a minimum of 4 hours between samples,
 - prepare a narrative description of the water for the color, odor, turbidity, presence of an oil sheen or surface scum as well as any other relevant observations regarding the potential presence of non-storm water discharges or illegal dumping, and
 - a description of the flow rate.

Phase II. Analyze Samples and Perform Quality Control Analyses.

5. The analyses listed in Table 1 will be performed by UNL Civil Engineering (CE) on water samples collected from each field site with flowing water. The total copper analysis will be performed by the UNL Water Sciences Laboratory.

Table 1. Summary of Laboratory Analyses

Procedure	Method	Anticipated Minimum Detection Limit	Max. Sample Hold Time
Temperature	thermometer	NA	On-site testing
Flow Measurement		NA	On-site testing
PH	Probe	NA	4 hours
Chlorine	Hach 8167 (Std. Methods 4500)	0.07 mg/L	On-site testing
Chloride	Hach 8113	0.9 mg/L	7 days
Total Phenol	Hach 8047	0.02 mg/L	28 days
Total Copper	Std. Methods 3030 with Atomic Absorption	30 µg/L	3 months
Detergents / Surfactants	Hach 8028	0.02 mg/L	24 hours
Fluoride	Hach 8029 (US EPA 340.1)	0.5 mg/L	7 days
Nitrate	Hach	0.9 mg/L	7 days
Sulfate	Hach 8051 (US EPA 375.4)	3. mg/L	7 days

6. UNL Civil Engineering will test half the samples in duplicate (over the course of the summer) to estimate the "relative percentage error" for each analysis performed by UNL CE.
7. UNL Civil Engineering will test at least 10 blank samples (over the course of the summer) for each analysis performed by UNL CE.
8. UNL Civil Engineering will determine the Minimum Detection Limit [MDL] (following Standard Methods for Water and Wastewater Analysis) at the start of the summer for each analysis performed by UNL CE.

9. UNL Civil Engineering will test at least 15 standard samples with known concentrations (over the course of the summer) for each analysis performed by UNL CE. A new MDL will be determined using this data.
10. For at least 15 field sampling sites that have no flowing water, place a block of wood in the path of flow and return 24 to 48 hours later and determine if the block of wood has moved due to water flow.

Phase III. Prepare Final Report.

11. UNL Civil Engineering will perform an analysis of the data, including obtaining data concerning groundwater monitoring wells in Lincoln and developing catchment area estimations for each sampling location. This data will be analyzed and incorporated into the final report.
12. UNL Civil Engineering will prepare a final report summarizing the field notes and water sample analysis data collected in the first three Phases. The final report will include several pages of discussion of the data and engineering suggestions. The final report will include tables that make it easy to compare the '02 results to those found in previous studies. Computer disks will be attached to the final report containing excel spreadsheets of data.

BMP Review

The BMP Review portion of this study will include four parts: 1) literature review, 2) review of current BMPs in place in the city, 3) development of an Implementation Plan and Schedule to implement any needed additional BMPs, and 4) development of a Monitoring Plan to monitor the effectiveness of BMPs that have been implemented. The Work Plan for each of the study segments is as follows.

Literature Review

1. Conduct a thorough search of the technical literature and review all pertinent storm water management BMPs that have been reported in the technical literature.
2. Evaluate the usefulness of the identified BMPs for the city of Lincoln. Factors that will be considered in this evaluation are:
 - a. Implementability and feasibility
 - b. Cost effectiveness
 - c. Technical effectiveness
 - d. Applicability to the city of Lincoln; including:
 - i. Effectiveness of the BMP for managing target parameters
 - ii. Applicability for the geography in eastern Nebraska
 - iii. Applicability for the climate in eastern Nebraska

Review of Current BMPs

1. Identify and evaluate storm water BMPs that are currently operating in the city of Lincoln
2. Compare the current BMPs with EPA's recommended and required BMPs
3. identify needs for additional BMPs for the city
 - a. assess both literature review and review of currently operating BMPs

Implementation Plan and Schedule

1. Develop a plan for implementing identified new BMPs for the city
 - a. Identify which additional BMPs are needed for the city
 - b. Identify requirements for implementation of new BMPs, including:
 - i. Locations
 - ii. Structural requirements
 - iii. Land requirements
 - iv. Manpower requirements
2. Develop a schedule for implementation
3. Coordinate with the city to determine feasibility of implementation plan and schedule.

BMP Monitoring Plan

1. Identify parameters of interest to be monitored. These will include those parameters identified in the Storm Water NPDES Permit.
2. Identify sampling locations for monitoring.
3. Identify sampling frequency.
4. Identify sampling methods.
5. Coordinate with Wet Weather sampling effort to optimize these sampling efforts.

Final Report

UNL will develop a final report that will detail the findings of the four segments of the BMP Review.

Other Items.

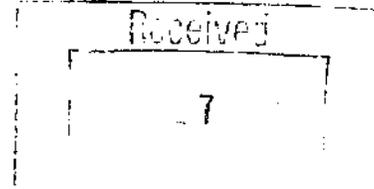
All equipment and supplies purchased for this project remain the property of UNL at the end of this project. This contract will be paid as a lump sum. This contract will be initiated as soon as possible after 1) appropriate approval by both UNL and the City of Lincoln, and 2) a qualified UNL student is recruited to carry out the work as specified above. The work will be carried out during the period between the approval date and March 30, 2003.

Budget:

COST CATEGORY	Project Total Cost
A) Personnel	
A1) Principal Investigators:	
B. Dvorak (0.5 month)	\$3,750
J. Stansbury (0.5 month)	\$3,750
A3) Support Personnel	\$200
A4) Subtotal: (A1 thru A3)	
A5) Fringe Subtotal = A4 x .23	\$1,771
A6) GRA (0.125 FTE for 2 mo.)	\$557
A7) Graduate Fringe = A6 x .23	\$128
A8) Undergraduate (\$8.0/hr x 1280 hr)	\$9,600
Personnel & Benefits Total	\$19,756
A) Lab Testing Fees (Total Cu)	\$700
B) Materials & Supplies, Equip. Maintenance	\$1,250
C) Travel	\$750
D) Operating (phone, copying, postage)	\$300
TOTAL DIRECT COSTS (A-E)	\$22,756
F) Indirect Costs Rate: Total Direct Costs x .10 (A thru E)-D-A7-.5E	\$2,276
TOTAL PROJECT COSTS (A-F)	\$25,032

PROJECT TITLE: BMP and Dry Weather Storm Drainage Assessment

SUBMITTED TO: Ben Higgins
Engineering Services
Public Works
531 Westgate Boulevard
Lincoln, Nebraska 68528-1563
Lincoln, NE 68508



APPLICANT INSTITUTION: The University of Nebraska-Lincoln
303 Canfield Administration Building
P.O. Box 880430
Lincoln, NE 68588-0430

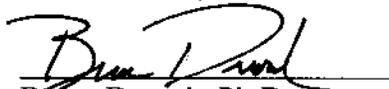
PROJECT PERIOD: April 1, 2002 through March 30, 2003

AMOUNT REQUESTED: \$25,032

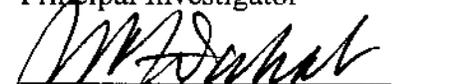
PRINCIPLE INVESTIGATOR: Bruce Dvorak, Associate Professor
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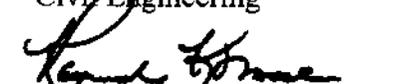
PROJECT DIRECTOR: Same as above

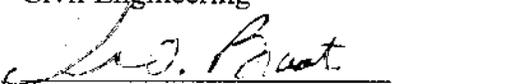
SIGNITURES:


Bruce Dvorak, Ph.D.
Principal Investigator


John Stansbury, Ph.D.
Civil Engineering


Mohamed Dahab, Ph.D., Co-Chair
Civil Engineering


Ray Moore, Ph.D., Co-Chair
Civil Engineering


Norm Braaten
Director, Pre-Award Development
Research Grants and Contracts Office

PROPOSAL ACCEPTANCE:

Mayor Don Wesely
City of Lincoln