Agenda Item 6

Memorandum

To: Programs, Projects, and Operations Subcommittee

Re: Urban Conservation Assistance Program – Eastern Nebraska Veterans Home

Date: August 2, 2010

From: Lori Ann Laster, Stormwater Management Engineer

The City of Bellevue has submitted an application for the Urban Conservation Assistance Program to address erosion issues at the Eastern Nebraska Veterans' Home. The site was constructed in 2007 without stormwater best management practices (BMPs). As a result, stormwater is allowed to run off approximately seven acres of impervious area into Quail Creek.

While planning for a Veterans' Memorial Garden, erosion issues were identified. Before the memorial can be constructed, the drainage issues must be resolved. The City is proposing to install ten bioretention gardens and two bioswales to allow water to infiltrate rather than drain overland to Quail Creek.

At this time, only seven of the proposed twelve BMPs will be constructed. The cost estimate for the BMPs is $58,354. The City is requesting a cost share of $29,177.

- **Management recommends that the Subcommittee recommend to the Board that the District approve the City of Bellevue application for the Eastern Nebraska Veterans' Home in the amount of $29,177 for District Program 17.0 Urban Conservation Assistance Program, subject to inclusion in the Fiscal Year 2011 budget.**

PAPIO-MISSOURI RIVER NATURAL RESOURCES DISTRICT
8901 S. 154th Street
Omaha, NE 68138-3621
402-444-6222
www.papionrd.org

URBAN CONSERVATION ASSISTANCE PROGRAM

SPECIAL PROJECT REQUEST APPLICATION

1. DATE: 07-27-2010

2. PROJECT NAME: Eastern Nebraska Veteran's Home BMP's

3. PROJECT SPONSOR: City of Bellevue, Nebraska

ADDRESS: 210 West Mission Ave.

Bellevue, NE 68005

4. CONTACT PERSON: Phil Davidson

TITLE: Special Projects

5. TELEPHONE: (402)293-3052

6. PROJECT LOCATION: The Eastern Nebraska Veterans Home is located on 20 acres off of 40th Street and Capehart Road in Bellevue, Nebraska.

7. DESCRIPTION OF PROBLEM: The City of Bellevue and Sarpy County are very excited to have the veteran's home in the military community of Bellevue. It has always been the intent to make this Home a beautiful place to live and visit. A Veteran's Memorial Garden was always envisioned for our new Eastern Nebraska Veterans Home in Bellevue.

State and federal money are not available for this project so a coalition of volunteer Veteran's and Leadership Sarpy participants began the process of fund raising and designing the memorial. Joining them are the City of Bellevue, Green Bellevue, Master Gardeners, CM's Custom Landscape and Big Muddy Workshop. During the planning phase, landscape drainage problems were identified. In order to create the memorial, remedial drainage engineering is necessary. Such work presents both an additional financial challenge and an opportunity for a retrofit demonstration project along Quail Creek.

8.PROPOSED SOLUTION:
See attachment "A"

Attachment "A"
For Question #8

Eastern Nebraska Veterans' Home

12 June 2010

BMP Concept Design Summary

Multiple community interests have proposed a number of site improvements for the Veterans' Home including a courtyard plaza and other landscape improvements. Best management practices (BMPs), namely bioretention gardens, were suggested by interested community and Veteran's Home administration members to correct some drainage problems and manage stormwater on the site. The following is a summary of Big Muddy Workshop's preliminary analysis for retrofitting the site with BMPs.

The current site includes approximately 7.30 acres of impervious surfaces. The building roof accounts for 2.80 acres of imperviousness. These impervious surfaces prevent rain falling on this area from infiltrating into the soil to replenish local groundwater. The soil on the site consists of clay which has been severely compacted from the construction of the building. Poor soil quality also reduces the ability for rain to infiltrate. Both impervious surfaces and poor soil quality have lead to increased surface runoff and significant erosion problems within the site.

The site would benefit from BMP retrofits that would reduce the volume of surface runoff, increase rainfall infiltration, and beatify the site. The city owns much of the adjacent property and has a vested interest in the beatification and stabilization of the site. The receiving stream, Quail Creek, has been impacted by the increased volume of stormwater as can be observed from visual assessment.

A total of twelve BMP retrofits have been proposed to mitigate the stormwater issues, ten bioretention gardens and two bioswales. The retrofits are numbered on the accompanying drawing in order of importance relative to the benfits received as a result of their construction. They should be implemented in this order if the project requires phasing.

The design and makeup of each bioretention area is slightly different due to varying size of incoming drainage areas and type of outgoing drainage relief. The design variables include the amended soil depth, the ponding depth and outlet type. The amended soil depth was determined by the outgoing drainage relief. Bioretention gardens that utilize infiltration as a sole means of discharging water will have a 30 inch amended soil depth. All other bioretention gardens are equipped with a subdrain pipe and outlet that daylights. These gardens have an 18 inch amended soil depth. The ponding depths are also slightly different depending on the condition of the surface water overflow. Bioretention gardens that only include a surface overflow outlet have a 6 inch ponding depth while all other bioretention gardens equipped with an underdrain system have a deeper ponding depth of 9 inches.

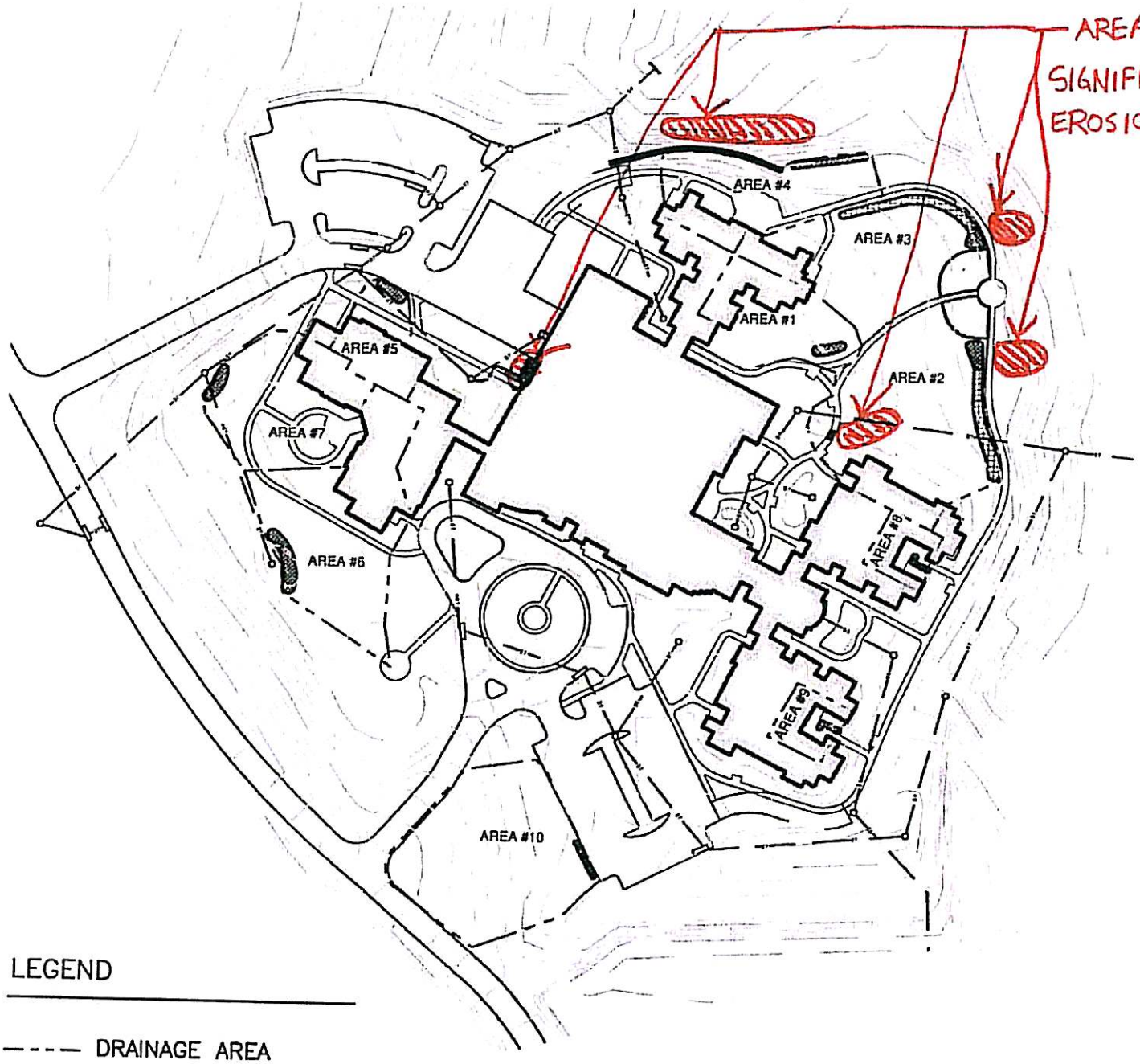
Due to the low soil infiltration rates, additional precautions have to be made to insure that the gardens won't hold water over 36 hours. Five bioretention gardens have a subdrain pipe system. Five bioretention gardens use a gravel sump system that is five feet deep to penetrate the compacted soil layers, allow vertical and lateral water movement of water for infiltration

and to provide temporary storage of water. An inspection port will be provided in each sump to allow the owner to monitor the infiltration rate of each sump and to allow water to be pumped out of the sump during times of extremely wet weather. Bioretention gardens utilizing a subdrain pipe system are referred to in associated documents as 'Type A' and gardens utilizing a sump system are referred to as 'Type B'.

The bioswales direct stormwater to the bioretention gardens at their terminus while both cleaning and slowing the water within the swale. As the stormwater slows, silt and other pollutants are taken up or broken down by the plant material and other microbiota in the amended soil. The swales include six inches of amended soil roto-tilled into the natural soil to create a more favorable soil environment for the plantings and provide a small level of water storage and infiltration.

The amended soils are an even mix of sand and compost which provides a rich and nurturing media for perennials to thrive. Native perennials which include native grasses and wildflowers provide deep root penetration which after time increases the percolation rate of the soil. When the bioretention gardens are saturated, the plantings also provide transpiration. A two-inch layer of mulch on top of the amended soil enables the amended soil to retain moisture between rain events.

Although retrofits are less effective as if they were implemented in the original design, the proposed bioretention and bioswales offer effective mitigation to the surface runoff from 15% of the impervious surfaces on the site. The retrofits are sized to hold the first 1.5 inches of rainfall volume created in their respective drainage areas. This volume is the estimated depth required to contain approximately 95% of all storms that occur at the site. The proposed retrofits would greatly enhance the site aesthetically while helping to decreased stormwater runoff and prevent erosion problems.



LEGEND

---- DRAINAGE AREA

BIORETENTION GARDEN

ENHANCED SWALE

BRICK PAVERS

NORTH

0 75' 150' 300' 450'

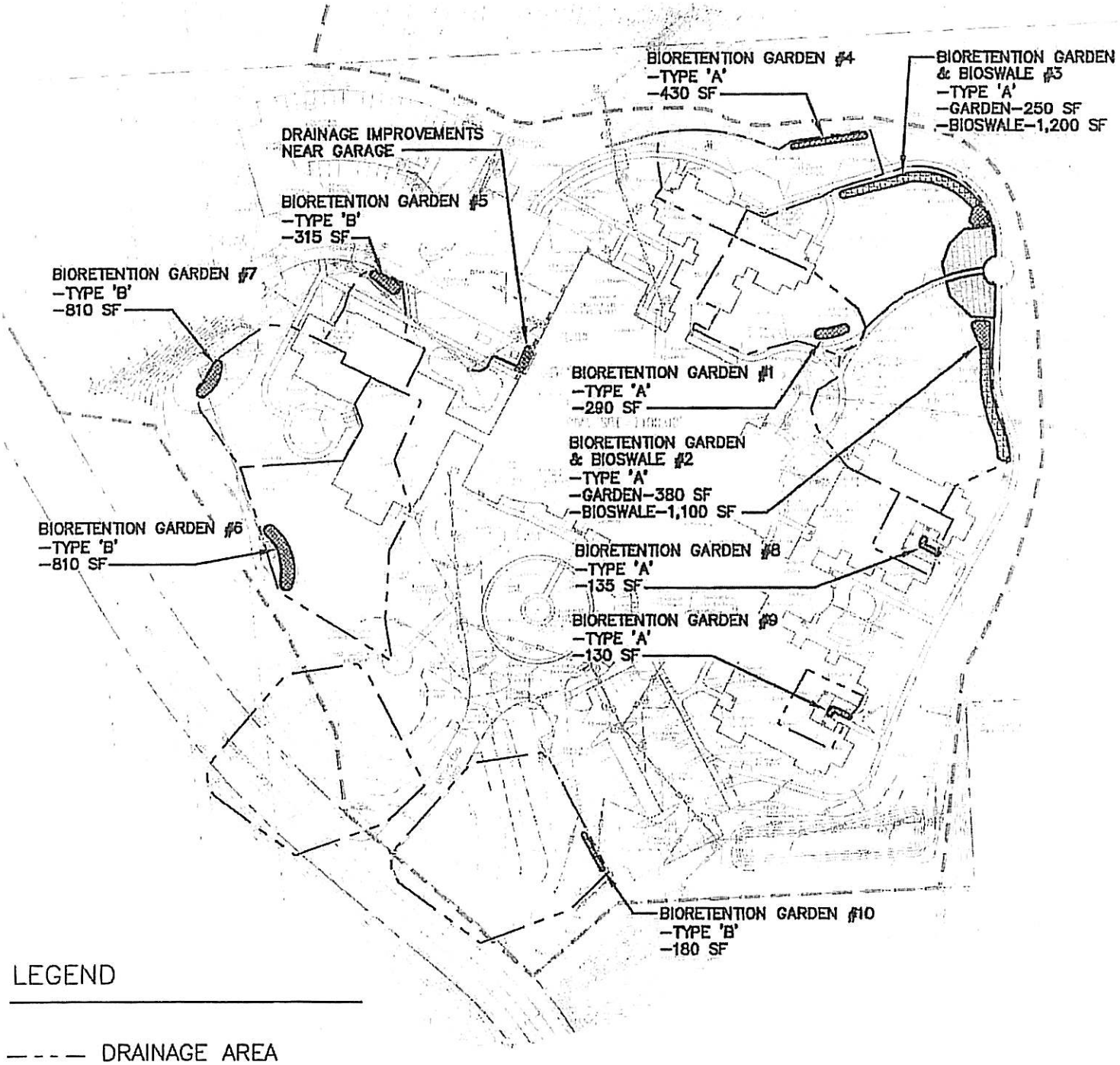
SCALE: 1" = 150'-0"

Eastern Nebraska Veterans' Home

BMP Concept Design Plan
Bellevue, Nebraska

The Big Muddy Workshop inc

June 22, 2010



LEGEND

- DRAINAGE AREA
- BIORETENTION GARDEN
- ENHANCED SWALE
- BRICK PAVERS

NORTH

the Big Muddy Workshop
Landscape Architects / Interpretive Planners
Omaha, Nebraska

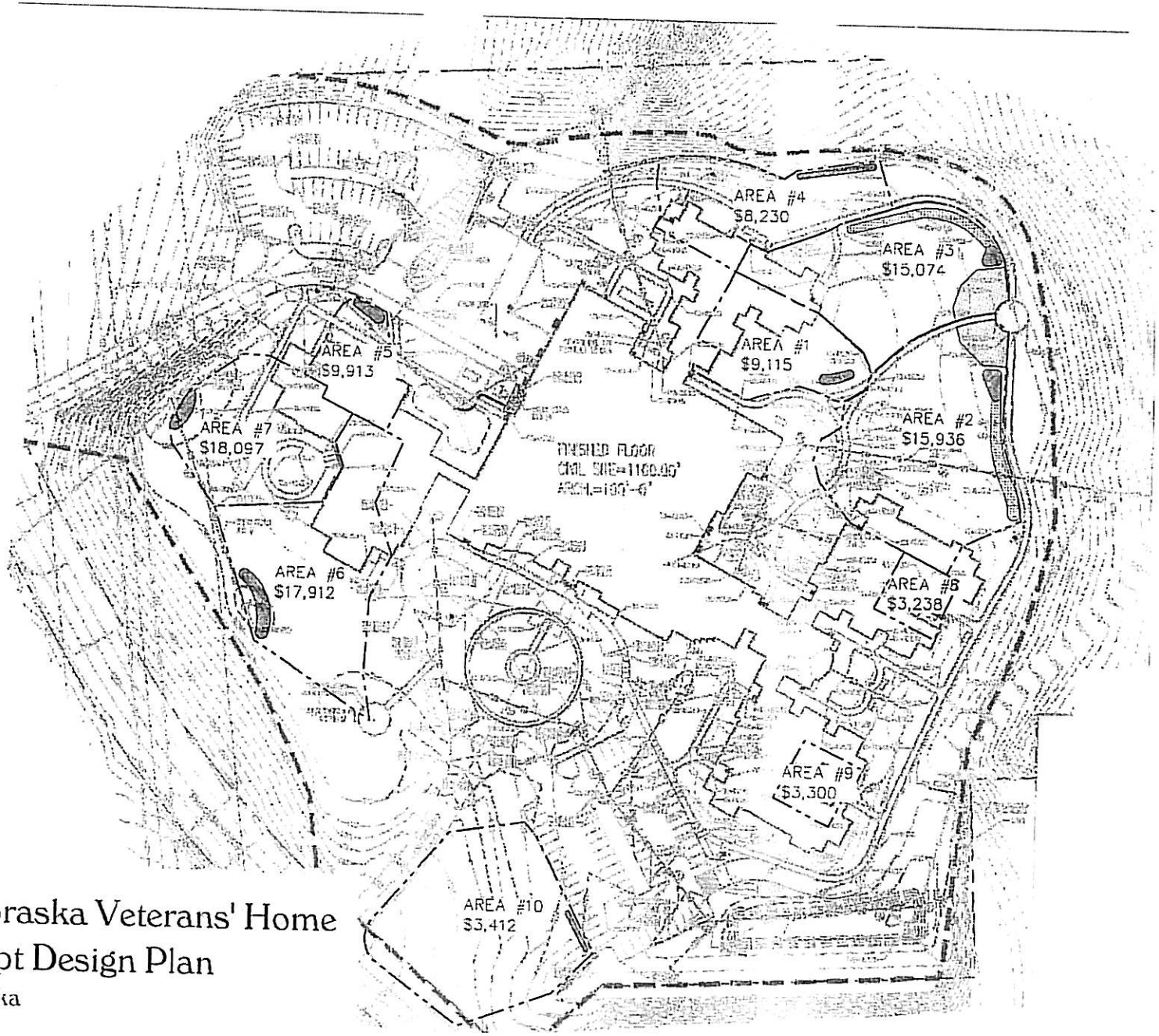
Eastern Nebraska Veterans' Home

BMP Concept Design Plan
Bellevue, Nebraska

0 75' 150' 300' 450'

SCALE: 1" = 150'-0"

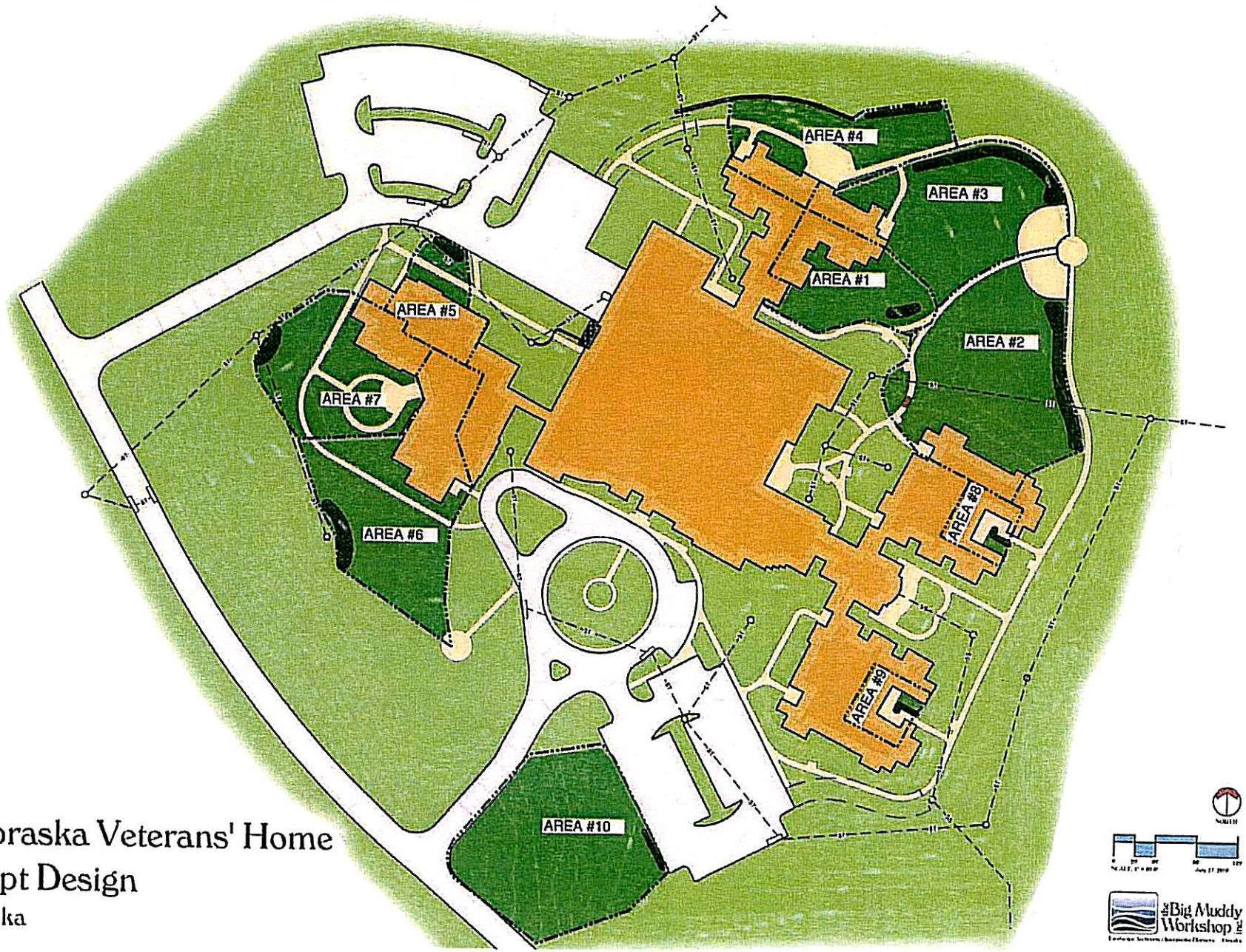
June 22, 2010



Eastern Nebraska Veterans' Home
BMP Concept Design Plan

Bellevue, Nebraska

Big Muddy Workshop



Eastern Nebraska Veterans' Home
BMP Concept Design

Bellevue, Nebraska

The Big Muddy Workshop LLC

Opinion of Probable Construction Costs
Prepared by Big Muddy Workshop and CM's Custom Lawn and Landscape

Eastern Nebraska Veteran's Home – BMP Concept Design
Bellevue, Nebraska

Bioretention Garden #1	$9,115
Bioretention Garden and Bioswale #2	$15,936
Bioretention Garden and Bioswale #3	$15,074
Bioretention Garden #4	$8,230
Bioretention Garden #8	$3,287
Bioretention Garden #9	$3,300
Bioretention Garden #10	$3,412
TOTAL	$58,354

Opinion of Probable Construction Costs

Eastern Nebraska Veterans' Home - BMP Concept Design

Bellevue, Nebraska

Design Firm: Big Muddy Workshop, Inc

June 29, 2010

Project Number: #0593

Filename: Cost_Opinion_6-29-10.xls

Bioretention Garden #1 - Type 'B' - 290 SF

Grading/excavation	27	CY	$10.00	$270
Load, haul excess soil offsite	27	CY	$15.00	$405
Gravel sump - 18" dia. - 5' depth	4	EA	$150.00	$600
Inspection port in sump	4	EA	$75.00	$300
Import and place amended soil mix and finish grade	27	CY	$60.00	$1,620
Metal edging	70	LF	$7.00	$490
Native grasses and wildflowers - quart size	560	EA	$5.00	$2,800
Shredded wood mulch	12	CY	$35.00	$420
				$6,905
20% Project Contingency				$1,381
12% Design Fee				$829
Subtotal Construction Costs				$9,115

Bioretention Garden and Bioswale #2 - Type 'A' - 1480 SF

Grading/excavation	41	CY	$10.00	$410
Load, haul excess soil offsite	41	CY	$15.00	$615
4" underdrain pipe w/ aggregate	80	LF	$8.00	$640
4" outlet	1	EA	$150.00	$150
4" ratguard	1	EA	$25.00	$25
Intake riser	1	EA	$450.00	$450
Import and place amended soil mix and finish grade	41	CY	$60.00	$2,460
Hand finish grading in bioswale	1,100	SF	$0.80	$880
Roto-till ammended soil into soil profile	122	SY	$1.50	$183
Metal edging	165	LF	$7.00	$1,155
Native grasses and wildflowers - quart size	895	EA	$5.00	$4,475
Shredded wood mulch	18	CY	$35.00	$630
				$12,073
20% Project Contingency				$2,415
12% Design Fee				$1,449
Subtotal Construction Costs				$15,936

Bioretention Garden and Bioswale #3 - Type 'A' - 1450 SF

Grading/excavation	36	CY	$10.00	$360
Load, haul excess soil offsite	36	CY	$15.00	$540
4" underdrain pipe w/ aggregate	60	LF	$8.00	$480
4" outlet	1	EA	$150.00	$150
4" ratguard	1	EA	$25.00	$25
Intake riser	1	EA	$450.00	$450
Import and place amended soil mix and finish grade	36	CY	$60.00	$2,160
Hand finish grading in bioswale	1,200	SF	$0.80	$960
Roto-till ammended soil into soil profile	133	SY	$1.50	$200
Metal edging	170	LF	$7.00	$1,190
Native grasses and wildflowers - quart size	855	EA	$5.00	$4,275
Shredded wood mulch	18	CY	$35.00	$630
				$11,420
20% Project Contingency				$2,284
12% Design Fee				$1,370
Subtotal Construction Costs				$15,074

Bioretention Garden #4 - Type 'A' - 395 SF

Grading/excavation	22	CY	$10.00	$220
Load, haul excess soil offsite	22	CY	$15.00	$330
4" underdrain pipe w/ aggregate	90	LF	$8.00	$720
4" outlet	1	EA	$150.00	$150
4" ratguard	1	EA	$25.00	$25
Intake riser	1	EA	$450.00	$450
Import and place amended soil mix and finish grade	36	CY	$60.00	$2,160
Native grasses and wildflowers - quart size	380	EA	$5.00	$1,900
Shredded wood mulch	8	CY	$35.00	$280
				$6,235
20% Project Contingency				$1,247
12% Design Fee				$748
Subtotal Construction Costs				$8,230

Opinion of Probable Construction Costs

Eastern Nebraska Veterans' Home - BMP Concept Design

Bellevue, Nebraska

Design Firm: Big Muddy Workshop, Inc

June 29, 2010

Project Number: #0593

Filename: Cost_Opinion_6-29-10.xls

Bioretention Garden #8 - Type 'A' - 135 SF				
Grading/excavation	8	CY	$10.00	$80
Load, haul excess soil offsite	8	CY	$15.00	$120
4" underdrain pipe w/ aggregate	80	LF	$8.00	$640
4" outlet	1	EA	$150.00	$150
4" ratguard	1	EA	$25.00	$25
Intake riser	1	EA	$450.00	$450
Import and place amended soil mix and finish grade	8	CY	$60.00	$480
Metal edging	25	LF	$7.00	$175
Native grasses and wildflowers - quart size	60	EA	$5.00	$300
Shredded wood mulch	2	CY	$35.00	$70
				$2,490
20% Project Contingency				$498
12% Design Fee				$299
Subtotal Construction Costs				$3,287

Bioretention Garden #9 - Type 'A' - 130 SF				
Grading/excavation	8	CY	$10.00	$80
Load, haul excess soil offsite	8	CY	$15.00	$120
4" underdrain pipe w/ aggregate	80	LF	$8.00	$640
4" outlet	1	EA	$150.00	$150
4" ratguard	1	EA	$25.00	$25
Intake riser	1	EA	$450.00	$450
Import and amend topsoil	8	CY	$45.00	$360
Place amended soil mix & finish grade	8	CY	$20.00	$160
Metal edging	25	LF	$7.00	$175
Native grasses and wildflowers - quart size	60	EA	$4.50	$270
Shredded wood mulch	2	CY	$35.00	$70
				$2,500
20% Project Contingency				$500
12% Design Fee				$300
Subtotal Construction Costs				$3,300

Bioretention Garden #10 - Type 'B' - 180 SF				
Grading/excavation	10	CY	$10.00	$100
Load, haul excess soil offsite	10	CY	$15.00	$150
Gravel sump - 18" dia. - 5' depth	1	EA	$150.00	$150
Inspection port in sump	1	EA	$75.00	$75
Import and amend topsoil	10	CY	$45.00	$450
Place amended soil mix & finish grade	10	CY	$20.00	$200
Metal edging	60	LF	$7.00	$420
Native grasses and wildflowers - quart size	200	EA	$4.50	$900
Shredded wood mulch	4	CY	$35.00	$140
				$2,585
20% Project Contingency				$517
12% Design Fee				$310
Subtotal Construction Costs				$3,412

ITEM	QTY.	UNIT	UNIT COST	ITEM TOTAL
Drainage Improvements near Garage				
Remove vegetation	1	Allow	$100.00	$100
Fine grading - create swale & meet grades	3	CY	$30.00	$90
Load, haul excess soil offsite	3	CY	$15.00	$45
Geotextile fabric under pea gravel and river rock	45	SY	$2.00	$90
Pea gravel - 275 sf	5	CY	$125.00	$625
River rock - 50 linear feet	3	CY	$80.00	$240
Trench drain - 5' length	1	EA	$375.00	$375.00
				$1,565
20% Project Contingency				$313
12% Design Fee				$188
Subtotal Construction Costs				$2,066
Total Costs				$106,342.50

9. TOTAL ESTIMATED COST: $__$58,354

10. COST SHARE REQUESTED: $__$29,177

11. SIGNATURE/TITLE: Spec. Al Projects Coord.

FORM 17.0B