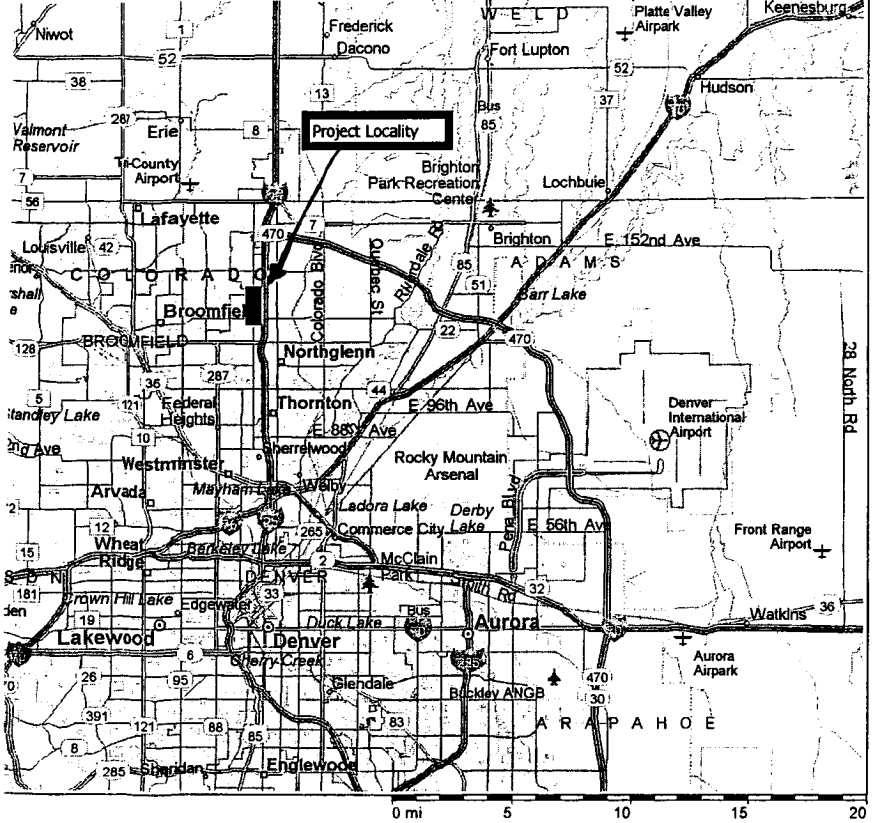

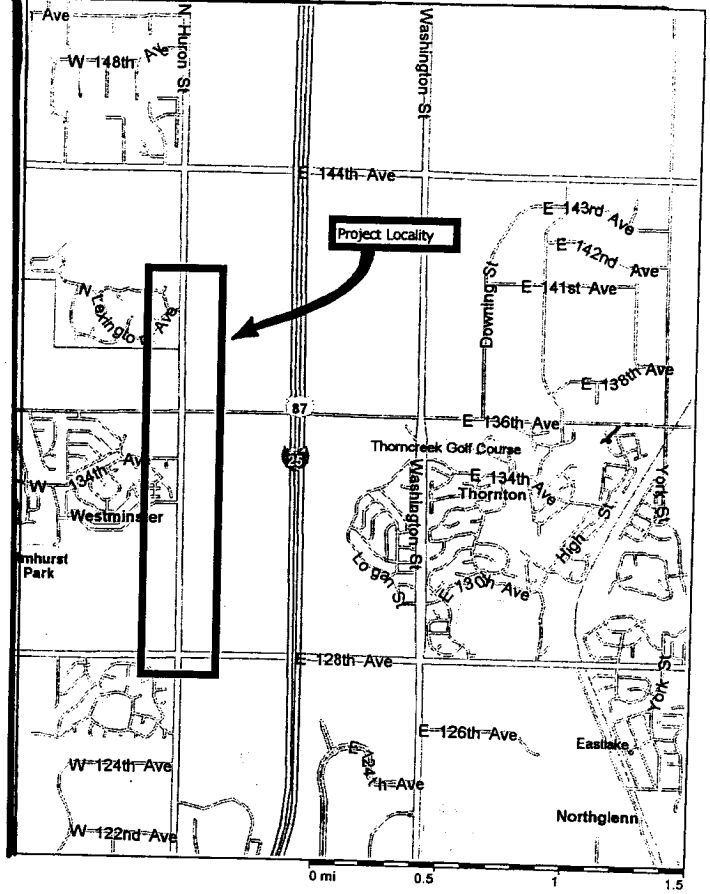

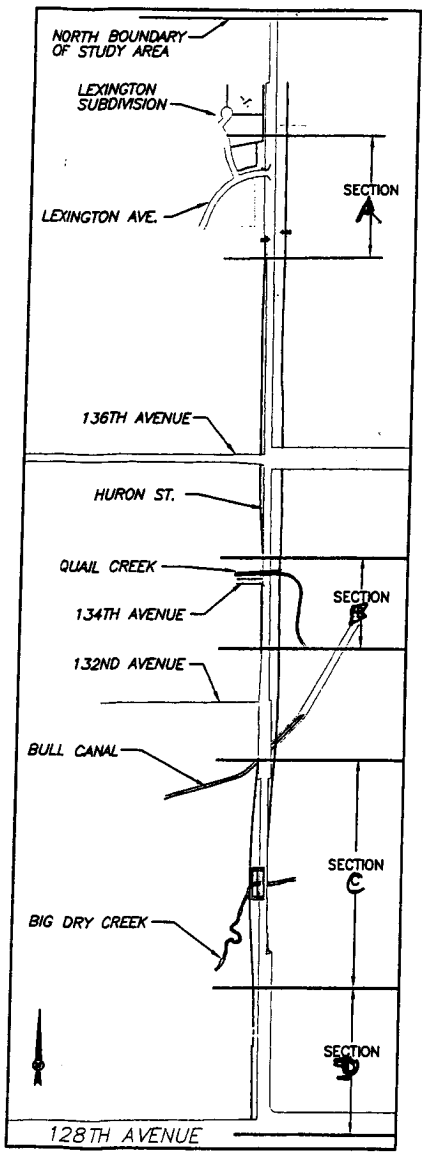

INDEX MAP
SCALE 1"=1000'

Sections A, B, C, + D follow on next page

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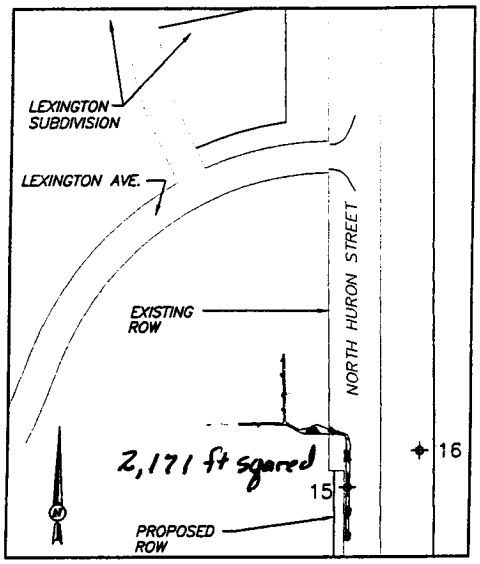
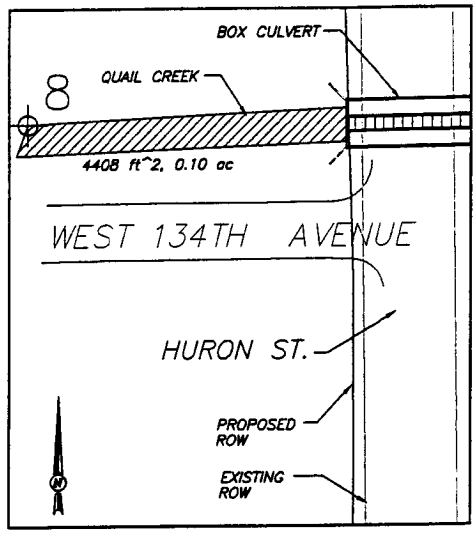


SECTION A



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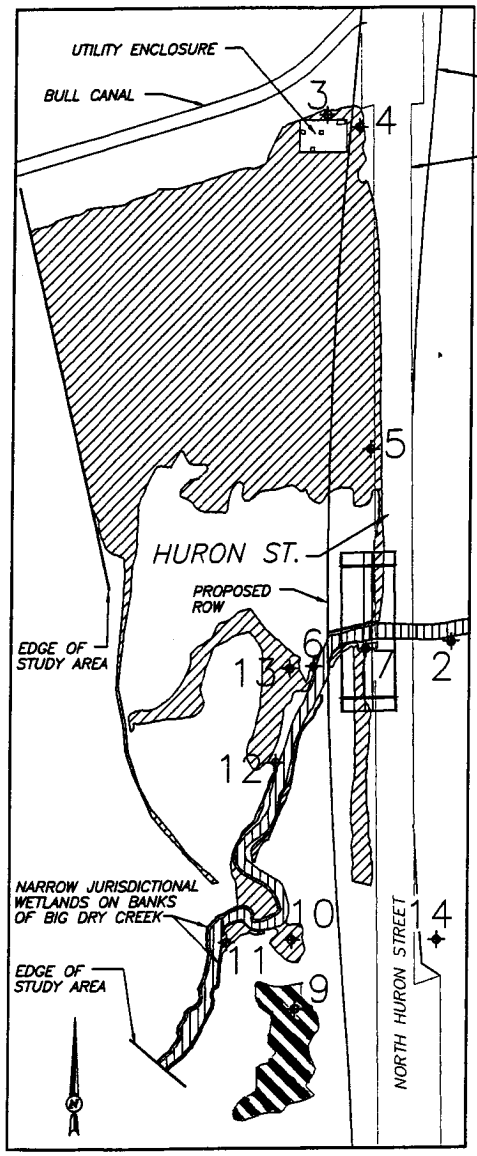

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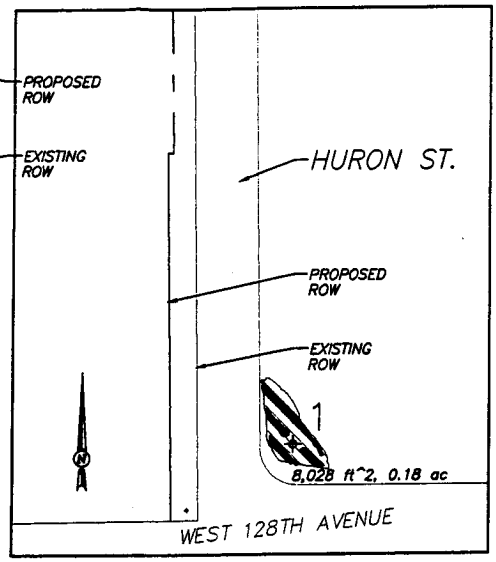

SECTION D

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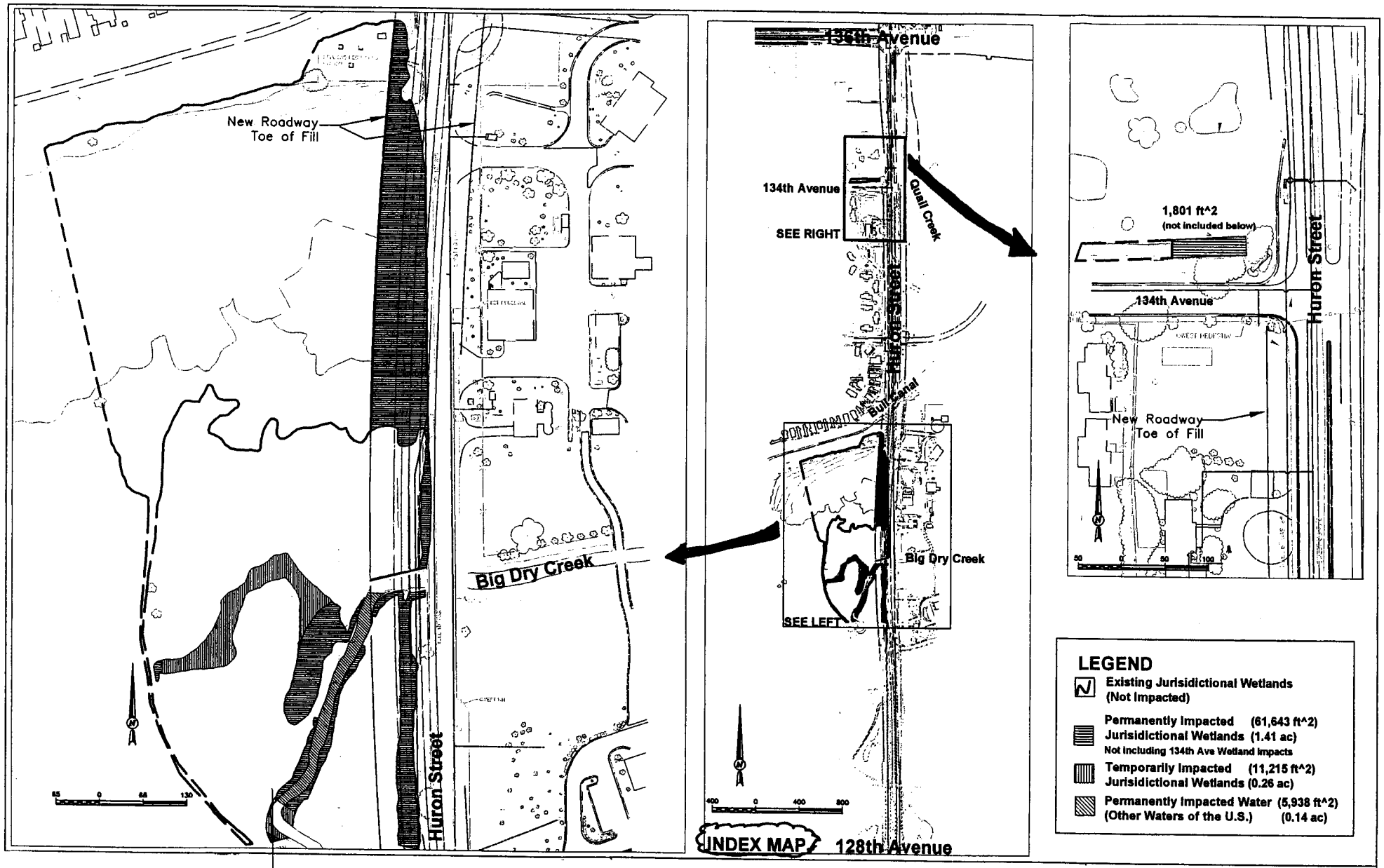
LEGEND

- JURISDICTIONAL WETLAND (For Section C Only:316,740 ft^2, 7.27 ac)
- NON-JURISDICTIONAL WETLAND (For Section C Only: 16,320 ft^2, 0.37 ac)
- OTHER WATERS OF THE U.S. (For Section C Only: 17,770 ft^2, 0.41 ac)
- SAMPLE POINT
- EXISTING ROAD RIGHT OF WAY (ROW)
- PROPOSED ROAD RIGHT OF WAY (ROW)

Sections	A	B	D	TOTAL
	—	0.10	—	7.37
	.05	—	.18	0.60
	—	—	—	0.41
				8.38 acres

EXISTING CONDITIONS



TOTAL = 1.81 ac.

PROPOSED CONDITIONS

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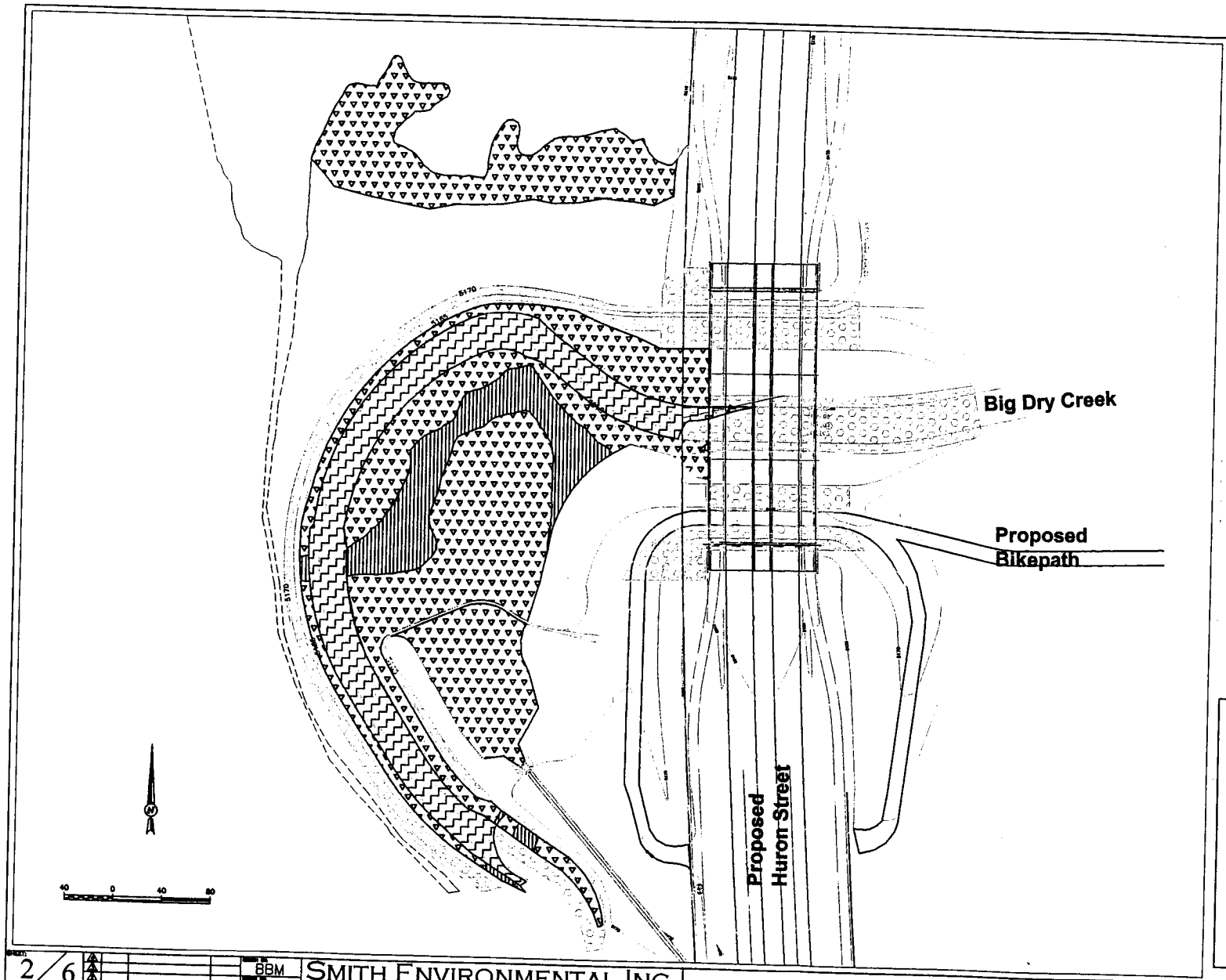

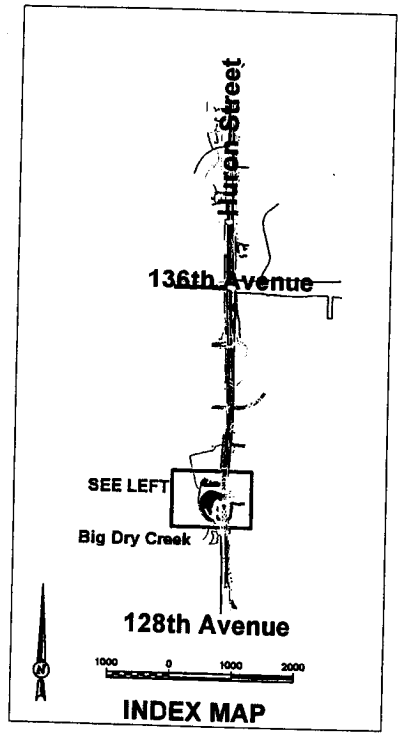

LEGEND

- Created Wetlands (64,562 ft^2, 1.48 ac)
- Created Open Water (OWUS) (20,343 ft^2, 0.47 ac)
- Restored Wetlands (10,418 ft^2, 0.24 ac)
- Existing Wetlands (Not Impacted)
- Soil Covered, Grouted Type L Riprap

1.48
.47
.24
2.19 ac

SHEET 2 OF 6 SHEETS	BBM	SMITH ENVIRONMENTAL INC.	ADAMS COUNTY
PROJECT NO. 2003-84	BBM	1001 W. 120th Ave., Suite 210, Westminster, CO 80234	City of Westminster
	PLS	Phone: (720) 887-4928 Fax: (720) 887-4680	HURON STREET WIDENING
			RESTORED AND CREATED WETLANDS AND OTHER WATERS OF THE U.S. (OWUS)

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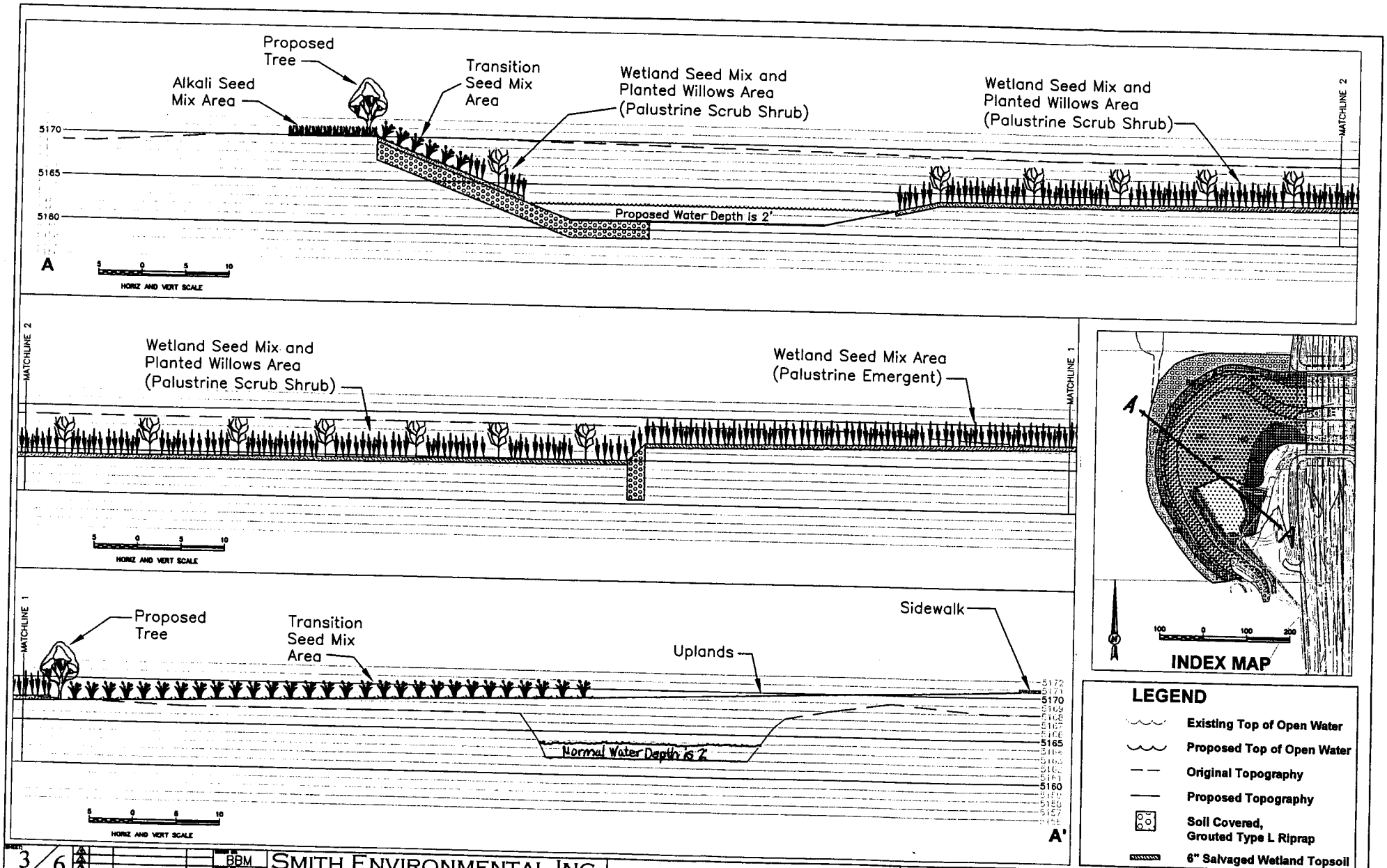

SHEET 3 OF 6 SHEETS
PROJECT NO. 2003-84

BBM
DAS
PLS

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ADAMS COUNTY
City of Westminster

HURON STREET WIDENING

CROSS SECTION OF PROPOSED WETLAND MITIGATION AREA

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Prior to the initiation of any construction activities, the Contractor shall have a pre-construction meeting with the Owner's Construction Manager (or Representative) to discuss the avoidance of wetlands and wetland mitigation areas; location of noxious weeds; the replacement of trees removed by construction activities; and the location of staging areas to insure compliance with the specifications provided herein. Prior to any land disturbance, all utilities shall be located and moved, as needed.

STEP 1

TOPSOIL REMOVAL/REPLACEMENT AND OTHER EARTH WORK

1. Excavate the top 6 inches of wetland topsoil from areas of temporarily or permanently impacted wetlands (see Sheet 1) and stockpile near or in the wetland mitigation areas.
2. Excavate wetland mitigation and restoration areas 6 inches deeper than the final grade to accomodate the respread wetland topsoil to a thickness of 6 inches in the wetland mitigation and restoration areas.
3. Cut down all trees, especially Russian-olive trees (including the two on the western extent of the construction area. Be careful not to drop any of the olive seeds. Remove trunks if possible, if not, follow instructions in Step 8, Number 4.

STEP 2

INSTALL TYPE L GROUTED RIPRAP

1. Install Type L Grouted Riprap in the wetland mitigation areas as shown on Sheet 2.
2. Cover grouted riprap with 6 inches of topsoil, in all areas except the thin strip of riprap in Mitigation Area C.

STEP 3

BIOSOL AND ENDONET MYCORRHIZA

1. Biosol and mycorrhiza will be applied at a rate of 1,200 lbs./ac. and 60 lbs./ac., respectively, to all areas that will be seeded (as shown on Sheet 2). Empty biosol and mycorrhiza bags will be given to the Construction Manager. Biosol and mycorrhiza will be applied as soon as possible after topsoil is replaced.

STEP 4

NATIVE SEEDING

1. The wetland mitigation and restoration areas are comprised of the Wetland Seed Mix. The two non-wetland plant communities are comprised of the Transition and Alkali seed mixes. These wetland and non-wetland mitigation areas shall be seeded with the seed mixture and at the rates shown below and to the right, in the areas shown on Sheet 2. Live plants shall be planted according to Steps 6 and 7 in their respective areas.
2. Wetland seeding shall be conducted anytime the ground is not frozen. Transition and Alkali seed mixes areas shall be applied in the spring or fall.
3. Seed bag labels shall conform to current state and federal regulations. All seed bag labels shall be saved and provided to the Construction Manager.
4. Drill seed to depths of 0.25 inch, with the seed discs set 6-8 in. apart. Where drill seeding is not feasible, broadcast at double the seeding rate and rake 0.5 inch into the soil. Do not hydroseed.

WETLAND SEED MIX

COMMON NAME	SCIENTIFIC NAME	LBS PLS/ACRE
Alkali Bulrush	*Scirpus maritimus*	0.2
Alkaligrass	*Puccinellia airoides*	0.3
Alkaline Cordgrass	*Spartina gracilis*	0.1
Arrowhead	*Sagittaria cuneata*	0.5
Baltic Rush	*Juncus arcticus*	0.2
Blue Vervain	*Verbena hastata*	0.2
Blue-eyed Grass	*Sisyrinchium pallidum*	1.0
Creeping Spikerush	*Eleocharis macrostachya*	0.6
Great Blue Lobelia	*Lobelia siphilitica var. ludoviciana*	0.1
Nebraska Sedge	*Carex nebrascensis*	1.0
Nuttall's Sunflower	*Helianthus nuttallii*	0.1
Prairiecordgrass	*Spartina pectinata*	0.8
Slender Gerardia	*Agalinis tenuifolia*	0.5
Switchgrass	*Panicum virgatum*	1.4
Three-square Bulrush	*Schoenplectus pungens*	1.6
Wild Bergamot	*Monarda fistulosa*	0.2
Wooly Sedge	*Carex lanuginose*	0.1
TOTAL		8.9

TRANSITION SEED MIX

COMMON NAME	SCIENTIFIC NAME	LBS PLS/ACRE
Alkali Sacaton	*Spolobolus airoides*	0.5
Blanket Flower	*Gaillardia aristata*	0.3
Blue Flax	*Linum lewisii*	0.2
Buffalograss	*Buchloe dactyloides*	6.0
Gayfeather	*Liatris punctata*	0.1
Inland Saltgrass	*Distichlis stricta*	1.7
Prairie Coneflower	*Ratibida columnaris*	0.2
Purple Prairie Clover	*Petalostemum purpurea*	0.2
Rocky Mountain Penstemon	*Penstemon strictus*	0.2
Sand Dropseed	*Sporobolus cryptandrus*	4.0
Sheep Fescue (Durar)	*Festuca ovina*	1.3
Slender Wheatgrass	*Elymus trachycaulus*	2.7
Switchgrass (Pathfinder)	*Panicum virgatum*	1.3
Western Wheatgrass (Arriba)	*Pascopyrum smithii*	4.0
TOTAL		22.7

ALKALI SEED MIX

COMMON NAME	SCIENTIFIC NAME	LBS PLS/ACRE
Alkali Sacaton	*Spolobolus airoides*	0.5
Blanket Flower	*Gaillardia aristata*	0.3
Blue Flax	*Linum lewisii*	0.2
Blue Grama (Hachita)	*Chondrosum gracile*	4.0
Buffalograss	*Buchloe dactyloides*	2.0
Canada Goldenrod	*Solidago canadensis*	0.8
Gayfeather	*Liatris punctata*	0.1
Inland Saltgrass	*Distichlis stricta*	1.7
Prairie Coneflower	*Ratibida columnaris*	0.2
Purple Prairie Clover	*Petalostemum purpurea*	0.2
Rocky Mountain Penstemon	*Penstemon strictus*	0.2
Sand Dropseed	*Sporobolus cryptandrus*	4.0
Streambank Wheatgrass (Sodar)	*Agropyron riparium*	5.6
Western Wheatgrass (Arriba)	*Pascopyrum smithii*	7.9
Yellow Stonecrop	*Amerosedum lanceolatum*	0.8
TOTAL		28.5

STEP 5

EROSION CONTROL - SEEDED AREAS

1. Install Erosion Control Blanket (Soil Retention Straw Blanket with photodegradable netting and thread) on channel side slopes, from water line in the channel to the shoulder of the slope, in accordance with the manufacturer's directions.
2. Apply certified weed-free hay or straw mulch (1.5 tons/acre) for erosion control in the seeded areas that are not covered with erosion control blanket.
3. Mechanically crimp straw mulch into the soil.
4. Provide additional anchoring of the mulch by applying an organic mulch tackifier. Apply tackifier at a rate of 300 lbs. of powder, 225 lbs. of fiber and 800 gallons of water per acre.
5. If seeding and planting activities are completed hear the end of the growing season (after August 15) or after the growing season, silt fence and haybales (staked to the ground) shall be installed along the channel bank edge on both sides of the channel.

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ADAMS COUNTY
City of Westminster
PROPOSED HURON STREET WIDENING
WETLAND MITIGATION/ RESTORATION DETAILS

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STEP 6

WILLOW AND COTTONWOOD TREE COLLECTION, TRANSPORTATION AND INSTALLATION

If planting occurs in the spring, plant shrub and tree cuttings (See Cuttings below), otherwise, plant willows and cottonwoods according to STEP 7 - SHRUB AND TREE PLANTINGS .

Materials - Live Willow and Cottonwood Cuttings

Tied bundles of 5 cuttings (4 feet long, 1/2 to 1 inch diameter) from living willows, and plains and narrowleaf cottonwood trees, with all side branches trimmed, from the project area and City of Westminster owned land, upstream and along Big Dry Creek.

Cuttings

1. Branches shall be pruned from live willow and cottonwood trees along Big Dry Creek during early spring when the donor shrub is dormant (i.e., before leaf-out). Branches will be ½-inch to 1-inch in diameter with smooth, undamaged bark. Cuts must be clean, without striping the bark or splitting the wood. Cuts shall be made at a slight angle to identify the root end of the cutting and to allow rapid regeneration of the donor live willow.
2. No more than 50 percent of each donor live willow plant shall be harvested and no more than 50 percent of plants at the harvest site shall be used as donors. Donor live willow plants shall be selected at random at the harvest site to avoid creating large areas of cut plants. The cutting shall be trimmed of all side branches and the top shall be cut off so that the cutting is 4 feet long.
3. The harvesting site shall be left clean and orderly. Large unused material shall be cut up to two foot lengths and evenly distributed around the site.
4. The cuttings shall be tied together with string in bundles of approximately 5 cuttings each.

Transportation

All cut plant material must arrive on the job site within 8 hours of cutting. Plants shall be stored in containers with water at least 1-foot deep. The containers shall be continuously shaded and protected from the wind. Cuttings shall be protected from drying at all times. During transportation, the bundles of cuttings shall be submerged in containers with water at least 1-foot deep and not damaged during transportation. Only healthy, undamaged material shall be accepted.

Cottonwood and Willow Installation

Cottonwood stake bundles shall be planted in areas shown on Sheet 2. Willow stake bundles shall be planted on 10-foot centers in the Wetland Seed Mix and Planted Willows areas (See Sheet 2). If uncertain about location of planting, seek advice from Environmental Construction Manager. Both types of bundles shall be minimally staggered so that they maintain a natural look of randomness. A hand auger or similar device shall be used to create pilot holes in the ground for the cuttings. The root-end of the bundles of cuttings shall be dipped 3-inches into waterbased latex paint to avoid dessication. The root-end of the bundles of cuttings shall be tamped into the pilot hole to a depth of two feet, or until the root-end of the cutting meets groundwater, whichever is shallower. The top of the bundle should protrude a minimum of 2 feet. Dead blow hammers or rubber mallets shall be used to tamp in the cuttings and used in such a manner that they do not cause the wood to split. Soil shall be placed in any spaces around the cuttings and tapped into place to remove any air pockets.

STEP 7

SHRUB AND TREE PLANTINGS

Shrub Plantings

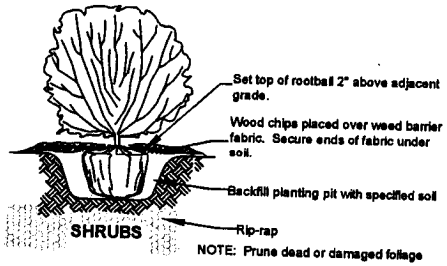
1. Plant all shrubs, 1-gallon size, according to the instructions below.
2. Plant on 10-foot centers in the Wetland Seed Mix and Planted Willows areas in areas shown on Sheet 2. Shrubs shall not be planted in straight rows, but shall maintain a natural look of randomness.

SHRUBS LIST/LEGEND for the Wetland Area

BOTANICAL/COMMON NAME	QUANTITY	ROOT	CONTAINER
Sandbar Willow / *Salix exigua*	250	CONTAINER	NO. 1

SHRUBS LIST/LEGEND for the Transition Area

BOTANICAL/COMMON NAME	QUANTITY	ROOT	CONTAINER
Peach-leaved Willow / *Salix amygdaloides*	250	CONTAINER	NO. 1

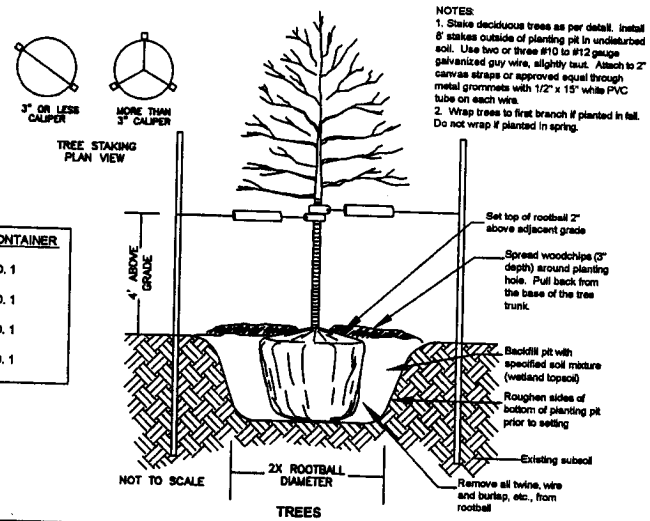


Tree Plantings

1. Healthy trees with a minimum two-inch caliper diameter shall be planted in the designated area (See Sheet 2).
2. For cottonwoods planted in the spring, use cuttings (following Cuttings instructions), otherwise use potted cottonwoods (following instructions below).
3. Use the same number of trees of each species as shown below.

TREE LIST/LEGEND for the Transition and Alkali areas

BOTANICAL/COMMON NAME	QUANTITY	ROOT	CONTAINER
Box-elder / *Acer negundo*	4	CONTAINER	NO. 1
Narrowleaf Cottonwood / *Populus angustifolia*	9	CONTAINER	NO. 1
Plains Cottonwood / *Populus deltoides (sargentii)*	6	CONTAINER	NO. 1
Quaking Aspen / *Populus tremuloides*	2	CONTAINER	NO. 1



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SMITH ENVIRONMENTAL INC.
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ADAMS COUNTY
City of Westminster

PROPOSED HURON STREET WIDENING
WETLAND MITIGATION/ RESTORATION DETAILS

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STEP 8

MAINTENANCE

1. Seeded areas will be mowed as necessary to control weeds. Herbicides may be used but under the supervision of a qualified weed control specialist.
2. Willow seedlings and cottonwood trees shall be replaced as necessary due to mortality. Any wildlife control measures implemented (fencing, removal, etc.) shall comply with state and federal guidelines/regulations.
3. All planted trees and shrubs shall be wrapped in wire to protect from existing beavers in the area.
4. For Russian-olive trunks that cannot be removed, use a hatchet to cut a mark in the trunks and spread Glyphosate in the cut and on the top of the trunks of all Russian-olive trees once a month for 4 winter months (Nov-Feb) for two years. Make sure nearby shoots and sprouts of any Russian-olive trees are removed.

Quantities Summary

Item	Amount	Unit
Wetland Topsoil Excavation and Placement	1,400	cu yds
Biosol	2,160	lbs
Endonet Mycorrhiza	110	lbs
Native Seeding (Restored and Mitigation)		
- Wetland Plant Community	1.4	ac
- Transition Plant Community	0.8	ac
- Alkali Plant Community	0.6	ac
Erosion Control Blanket	2,610	sy
Hay or straw Mulch (Weed Free)	2.2	ac
Tackifier (powder)	540	lbs
Shrub Plantings		
- Peach-leaved Willow (cutting bundles or pots)	250	each
- Sandbar Willow (cutting bundles or pots)	250	each
Tree Plantings		
- Box-elder (pots)	4	each
- Narrowleaf Cottonwood (saplings or pots)	9	each
- Plains Cottonwood (saplings or pots)	6	each
- Quaking Aspen (saplings or pots)	2	each

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