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PART I: PROPOSED 1994 WORK

SUBAREA 1 DEMONSTRATION PLOTS: PEST PLANT CONTROL AND GRASS SEEDING APRIL THROUGH SEPTEMBER 1994

INTRODUCTION

A landscape composed primarily of native grassland species has been identified by METRO as the most appropriate plantings to be used for the permanent closure of the landfill. In order to accurately determine protocols for the site preparation, establishment, and first year maintenance of these grasslands, a series of demonstration plots are proposed. Data collected from these test plots will then be used to prepare contract specifications for future work.

Demonstration Plots 1 through 3 are proposed to be established on the long, shallow, south facing slopes of Subarea 1. This area, seeded with the covercrop Regreen in the fall of 1992, has now totally reverted to a vegetative cover composed primarily of Ryegrass (*Lolium sp.*) and other undesirable crop weeds such as Vetch (*Vicia spp.*), Mustard (*Brassica spp.*) and Radish (*Raphanus spp.*). This area is adjacent to the main Subarea 1 road and free of surface piping. Demonstration Plot 4 is proposed to be sited on the shallow, south facing slope of Subarea 2 on either side of the main haul road. This area was seeded with the covercrop Regreen in the fall of 1993; but, at this time there are large patches of Ryegrass (*Lolium sp.*) and the aforementioned undesirable throughout the area. The exact locations of the demonstration plots can be sited in the field by the METRO consultant.

Following are descriptions of proposed: Pest Plant Control Work Schedules; Native Grass Seeding and; Cost Estimates for all proposed work.

description of pest plant work:

Demonstration Plot Number 1:

Proposed Pest Plant Control Methods- Herbicide/No till
Herbicide/Till

Area: 1 acre of each control method = 2 Acres Total

WORK GOAL- Achieve an 80% kill of all perennial and annual weeds at time of herbicide application. Thereafter, use both till or no till practices to determine the best means of seedbed preparation.

Discussion

These Subarea 1 demonstration plots will contrast the effectiveness of preparing ground for the seeding of native grasses using: 1) An Herbicide/Till approach of applying herbicide and then repeatedly discing, harrowing, etc.; and 2) An Herbicide/No till method of seeding directly into herbicide killed thatch using a no-till drill or a heavy harrow.

WORK SCHEDULE-

ASAP: Field Identify Plots/Test Soil Seedbank in each Subplot

April:

fourth week- Apply Herbicide (both subplots)

May:

third week - Repeat Herbicide Application (both subplots)

June:

second week- Flail Mow (both subplots)

fourth week- Disc the Till Subplot

July through mid September:

once/month - Repeat Discing the Till Subplot

September:

second week- Test Soil Seedbank in each Subplot

Seed both subplots w/ native grasses

SEE HERBICIDE SPECIFICATION AND PESTICIDE NOTE IN APPENDIX A-

Demonstration Plot Number 2:

Proposed Pest Plant Control Method-Soil/Seedbank Solarization

Area: .3 Acre Total

WORK GOAL- Use solarization plastic to achieve sufficient soil heating necessary to kill perennial and annual seeds and propagules in the seedbed.

Discussion

Solarization uses sunlight to raise soil temperatures. This Subarea 1 demonstration plot will utilize solar heat trapped beneath plastic sheeting to sterilize the top few inches of a soil seedbank contaminated with noxious (or undesirable) plant propagules and seeds.

WORK SCHEDULE-

ASAP: Field Identify Plots/Mow/Test Soil Seedbank in each Subplot

April:

fourth week - Disc Plot/Install Solarization Plastic

September:

second week- Remove Solarization Plastic

Test Soil Seedbank

Seed both subplots w/ native grasses

SEE SOLARIZATION SPECIFICATIONS IN APPENDIX A-

Demonstration Plot Number 3:

Pest Plant Control Methods- Acid Ph Manipulation
Alkaline Ph Manipulation

Area: 1 acre of each control method = 2 Acres Total

WORK GOAL- Manipulate the soil Ph to disfavor ryegrass and other undesirable grasses.

Discussion

These Subarea 1 demonstration plots will utilize both Calcium (Ca) and elemental Sulphur (S) to either raise or lower the soil Ph. The alkaline Ph goal is 8.5; the acid Ph goal is 5.5. See Ryegrass Fertilizer Guide in Appendix B for additional information.

WORK SCHEDULE-

ASAP: Field Identify Plots/Mow/Test Soil Seedbank & Ph in each Subplot/Conduct tests to determine Ca/native soil mixture.

April:

fourth week- Disc Plots/Amend soil w/ Sulphur and Calcium

late May through August:

once/month - Repeat Disc Acid & Alkaline Subplots

September:

second week- Test Soil Seedbank & Ph in each Subplot
Seed both subplots w/ native grasses

SEE CALCIUM/SOIL TEST MIXTURE SPECIFICATIONS IN APPENDIX A-

Demonstration Plot Number 4: 4 Acres Total Area

Proposed Pest Plant Reduction Methods-Swathing (Side cutting)
Flail Mowing
Control Burning
No Manipulation
(No action)

Area: 1 acre of each control method = 4 Acres Total

WORK GOAL- Using selected mechanical and controlled burning techniques, determine the best means of reducing populations of undesirable grasses.

Discussion

These Subarea 2 demonstration plots will determine the best means of reducing the seedbank and seed set of undesirable grasses and agricultural weeds during the first growing season after the final closure of each Subarea. Three of the proposed methods will utilize either cultural or mechanical methods; the fourth, a control plot will demonstrate the affect of taking no action.

WORK SCHEDULE-

ASAP: Field Identify Plots/Test Soil Seedbank in all Subplots

Mid April:

Swath(side cut) existing vegetation in subplot prior to grass flowering/Leave cut hay on surface

Flail mow existing vegetation in subplot prior to grass flowering

Mid May through Mid July:

Repeat Sidecutting and Flail mowing as required once/monthly (or more often as required) to prevent undesirable grasses from seeding

Mid August:

Disc fireline/Control burn subplot using Field Flammer

September:

second week- Test Soil Seedbanks in all Subplots
Seed both subplots w/ native grasses

SEE FIELD FLAMMER AND SIDECUTTER MANUFACTURER'S BROCHURES IN APPENDIX B

description of seeding work:

DESCRIPTION OF AREA TO BE SEEDED:

Approximately 4.5 Acres of Subarea 1 is proposed for seeding with native grasses in the fall of 1994. This area corresponds to the acreage total of Demonstration Plots 1 through 3.

PROPOSED SCHEDULE OF WORK:

April 1994-

Seed Acquisition.

METRO recently established a native grass seed credit account with Granite Seed in Utah. A seed order on this account should be placed this spring by the METRO consultant, MGW. Two native grasses are recommended to be seeded in the Subarea 1 Demonstration Plots: *Bromus carinatus* (California Brome) and *Elymus glaucus* (Blue Wildrye).

September 1-15, 1994

Seedbed Preparation.

Final seedbed preparations for seeding Demonstration Plots 1, 2, and 3 should be completed during this time. Such prep work can be accomplished by METRO staff but work should be inspected by a qualified expert prior to seeding.

September 15-20, 1994

Seeding of Native Grasses.

The recommended method for seeding the native grasses is by drilling; preferably with a range or billion drill or similar equipment capable of cutting the seed into dead thatch or soil. MGW, the METRO consultant, will try to arrange to borrow or rent a suitable grass seed drill.

Spring 1995

Demonstration Plot Monitoring and Maintenance.

All Demonstration Plots should be monitored during the spring and early summer of 1995. High mowing, using an adjustable flail mower will probably be a necessary maintenance practice during the first growing season.

REQUIRED SUBMITTALS:

Seed Tags. All ordered native grass should be labeled with a tag specifying its purity, viability and weed and crop seed content. After the tags are submitted, seeding rates for Pure Live Seed can be calculated.

Soil Test Results. In order to make needed fertilizer recommendations for the native grasses soil samples from the Demonstration Plots should be submitted for testing.

SEE NO-TILL DRILL MANUFACTURER'S BROCHURE IN APPENDIX B

**DEMONSTRATION PLOTS: ESTIMATED PEST PLANT CONTROL AND SEEDING COSTS
APRIL THROUGH SEPTEMBER 1994**

NOTE: It should be realized that there is an economy of scale relative to the size of the proposed treatment areas; costs for the treatment of small 1-2 acre areas may be comparable to costs for much larger acreage.

An off-set cover crop disc, sized to fit the Kubota tractor, is specified for use in the preparation of the soil and seedbed of all Demonstration Plots. Multnomah County Parks may own and loan a suitable disc or it could be purchased from a farm equipment dealer as reconditioned equipment. A sidecutter bar (swather) (sized to fit the Kubota tractor) is specified for use on Demonstration Plot Number 4; the cost of the sidecutter has been included in the estimate for Plot Number 4. Both the disc and the sidecutter could be used throughout the landfill for future site prep, and vegetation establishment and maintenance.

Three work tasks are specified to be carried out by skilled subcontractors: herbicide application; field flammng; and native grass seed drilling. Permits for both herbicide application and field flammng activities may be necessary and the Oregon Department of Environmental Quality, the local fire district and perhaps the Portland planning Bureau should be consulted. MGW, the METRO consultant will identify local contractors willing qualified for herbicide application, field flammng and native grass drilling.

All quoted prices for materials are at cost to the METRO Consultant, MGW. Labor time estimates assume METRO staff support.

Estimated costs for pest plant control and seeding of the Demonstration Plots follow:

COST ESTIMATES FOR PEST PLANT CONTROL ON PLOTS NUMBER 1-4:

Demonstration Plot Number 1: 2 Acres Total Area

Proposed Pest Plant Control Methods- Herbicide/Till
Herbicide/No till

DESCRIPTION OF MATERIALS/LABOR	ESTIMATED COST
1. Two Applications of <u>Roundup</u> Herbicide (Negotiated Contract for Materials/Labor)	\$400.00
2. Field Discing Labor: (for <u>Herbicide/Till</u> subplot only)	
Initial (April)	2 hrs.
Once/Monthly (May through September)	5 hrs.
3. Two Soil Seedbank Tests/subplot (before and after treatment)	\$200.00
ESTIMATED PLOT NUMBER 1 COST	\$600.00
	(Plus METRO Labor)
ESTIMATED PER ACRE COST	\$300.00
	(Plus METRO Labor)

Demonstration Plot Number 2: .3 Acre Total Area

Proposed Pest Plant Control Method-Soil/Seedbank Solarization

DESCRIPTION OF MATERIALS/LABOR	ESTIMATED COST
1. 1 Roll 6 mil. poly 24 ft X 100 ft. (1 year lifetime)	\$107.00
2. Miscellaneous Supplies (plastic weights, etc)	\$25.00
3. Field Discing Labor: Initial (April)	2 hrs.
4. Plastic Installation Labor: (2 people)	8 hrs. (total)
5. Two Soil Seedbank Tests (before and after treatment)	\$100.00
ESTIMATED PLOT NUMBER 2 COST	\$232.00
	(Plus METRO Labor)
ESTIMATED PER ACRE COST	\$696.00
	(Plus METRO Labor)

Demonstration Plot Number 3: 2 Acres Total Area

Proposed Pest Plant Control Methods-Acid Ph Manipulation
Alkaline Ph Manipulation

DESCRIPTION OF MATERIAL/LABOR	ESTIMATED COST
1. Tons Calcium (Ca) carbonate (assumed SJL soil Ph= 6.1)	\$ 0
2. Ca/native soil mixture Ph tests mixture test labor	\$12.00 4 hrs.
3. 700 pounds of 90% elemental Sulphur (S) (assumed SJL soil Ph= 6.1)	\$105.00
4. Sulphur Delivery Labor:	2 hrs.
5. Field Discing Labor: Initial (April)	4 hrs.
Once/Monthly (May through September)	10 hrs.
6. Two Soil Seedbank & Ph Tests/subplot (Test before and after treatment)	\$220.00
ESTIMATED PLOT NUMBER 3 COST	\$337.00
	(Plus METRO Labor)
ESTIMATED PER ACRE COST	\$162.50
	(Plus METRO Labor)

Demonstration Plot Number 4: 4 Acres Total Area

Proposed Pest Plant Reduction Methods-Swathing (Side cutting)
Flail Mowing
Control Burning
No Manipulation
(no action)

DESCRIPTION OF MATERIAL/LABOR	ESTIMATED COST
1. 3-Point Sidecutter Rental	Not available
<u>OR</u>	
3-Point Sidecutter Purchase	\$3600.00
2. Sidecutting/Flail Mowing Labor Initial (April)	10 hrs.
Once Monthly (May through July)	20 hrs.
3. Field Flaming (negotiated contract for equipment/labor)	\$500.00
4. Two Soil Seedbank Tests for each subplot (before and after treatment)	\$400.00
ESTIMATED COST	\$4500.00
	(Plus METRO Labor)
PER ACRE COST	\$450.00
	(Plus METRO Labor)

pest plant subtotal: \$5669.00

COST ESTIMATE FOR SEEDING OF DEMONSTRATION PLOTS NUMBER 1-3:

Note: As METRO has a native grass seed credit with Granite Seed, Inc. (Utah) there is no anticipated seed cost; however, Granite may charge for preparing the seed for seeding in a no-till drill. Labor/Equipment charge for drilling seed could be shared with the anticipated cost of seeding a planned 10 Acre Subarea 3 test plot.

DESCRIPTION OF MATERIAL/LABOR	ESTIMATED COST
1. Seed Preparation and No-till drilling of native seed (negotiated contract for travel/equipment/labor)	\$1000.00

seeding subtotal: \$1,000.00

TOTAL ESTIMATED COST: \$6,669.00

PART II: PROPOSED 1995 WORK TASKS**AREA****TASK**

Subarea 1: Implement Year 1 Maintenance activities on Demonstration Plots 1-3 as required.
 Acreage: 4.5 Acres
 Estimated Labor Time: 1 hour/week
 (March through July) A

Prepare all remaining pipe-free areas for seeding with native grasses using site prep methods showing best result in Demonstration Plot 1-3 trials. Maintain farm equipment as needed.
 Estimated Acreage: 30
 Estimated Labor Time: 10 hours/week
 (May through September)

Maintain vegetation in remaining areas of steep slopes and/or piping using method showing best result in Demonstration Plot 4. Maintain farm equipment as needed.
 Estimated Acreage: 15
 Estimated Labor Time: 5 hours/week
 (March through July)

Subarea 2: Maintain vegetation throughout Subarea using method showing best result in Demonstration Plot 4. Maintain farm equipment as needed.
 Estimated Acreage: 60
 Estimated Labor Time: 20 hours/week
 (March through July)

Subarea 3: Maintain vegetation throughout Subarea using method showing best result in Demonstration Plot 4. Maintain farm equipment as needed.
 Estimated Acreage: 50
 Estimated Labor Time: 15 hours/week
 (March through July) A

SJL Site: Select a suitable site for SJL reveg. nursery. In the fall of 1994 prepare 1 Acre of ground for woody plant nursery production and construct a small unheated seasonal hoop house for woody and herbaceous plant seed production. In the late fall and winter collect seed and propagation wood of suitable species for planting in the hoop house and/or hedging in rows. See Appendix B for additional information.
 Estimated Acreage: 1.5
 Estimated Labor Time: 20 hours/week
 (October through March)

SJL Site:

The grazing of certain areas of Subarea 1 and 2 using sheep may be a feasible means of maintaining vegetation during the 1995 spring season.

Estimated Labor Time: as required



APPENDIX

- A: Herbicide Specifications and Pesticide Note
Solarization Specifications
Calcium Soil Mixture Specifications

- B: Sidecutter Brochure
Field Flammer flyer
Truax No-till drill brochure
Article: Soil Solarization for Restorationists
Perennial Ryegrass Fertilizer Guide
Native Plant Growing at SJL
(selected from Vegetation Management Plan for SJL)