ST JOHNS LANDFILL
COVER VEGETATION PLAN

SHRUB TEST PLOT ESTABLISHMENT REPORT: IRRIGATION

(FES Contract Amendment #3 Task 4)

Submitted By:

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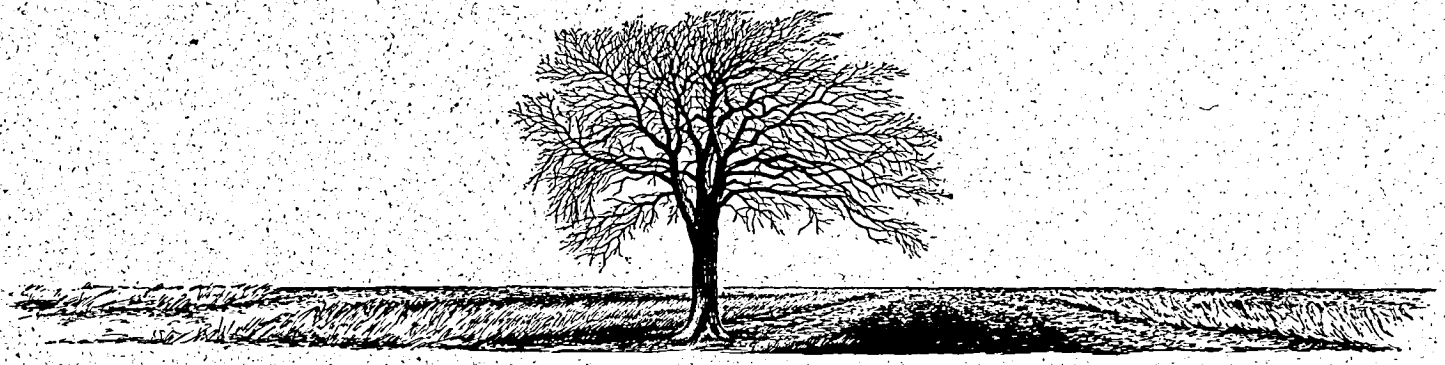

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ST JOHNS LANDFILL VEGETATION MANAGEMENT PLAN
SHRUB TEST PLOT ESTABLISHMENT REPORT: IRRIGATION
(FES Contract Amendment #3: Task 4)

WOODY PLANT MAINTENANCE OVERVIEW

Some maintenance of plantings will be necessary during the first two growing seasons. Recommended maintenance practices should include irrigation, mulching and fertilization or mychorrizal enrichment during the first growing season and additional mulching, fertilization or mychorrizal enrichment during the second growing season. These cultural practices will, if carried out in a timely fashion, allow for the collection of meaningful data concerning the ability of the six native woody species planted in the four test plots to survive in the harsh environment of the capped landfill.

In the short term, data collected from these test plots can answer questions about the particular cultural requirements of each of the selected six native species; each plant can then be matched to exact landscape positions (e.g. soil depth, available soil moisture). Also, the best site adapted species can be identified for planting in future closure areas and more explicit planting density recommendations can be made for all areas designated as lowland or upland shrub community on the site management plan. (see SJL Cover Vegetation Plan-Fishman Environmental Services/Mark G. Wilson, et all; August 1992). Plant survival data from the test plots will also identify the advantages of either locally collected cuttings or nursery container stock.

In the long term much more can be learned from the shrub test plots; the ability of the planted (and unplanted) shrubs and trees to colonize could be measured; the affect of both structural and species diversity on the landfills wildlife habitat could be studied; and more information can be acquired about the ability of the selected species to grow on shallow soil substrates, provide slope stabilization/ control erosion, and capture, treat and/or utilize surface water runoff.

WOODY PLANT TEST PLOT IRRIGATION DESIGN

A low cost, low technology drip system is recommended for the irrigation of the four shrub test plots located in Subarea 1. (See St. Johns Landfill Subarea 1 As-Built Drawing and Subarea 1 Shrub Test Plot Report; Mark G. Wilson; March 1993 for additional test plot location information) There are many manufacturers of drip irrigation products; three sample manufacturers product catalogs are attached to this report. In general, the proposed drip irrigation system would consist of four lateral lines connected to a water storage tank with a moveable supply line. Three of the lateral lines would be laid out in the shrub test plot transects (T-1, T-2, and T-3) and would consist of in-line emitters fitted with porting tubing to deliver water directly to the plants on either side of the transect line. The fourth lateral line would be laid out in the bioswale test plot (T-4) and would consist of in-line emitters fitted with porting tubing and low flow micro spray heads on 14' centers.

IRRIGATION SYSTEM COMPONENTS

The specific components of the proposed drip irrigation system would include:

1. 150-300 gallon plastic water tank fitted with a small pump and moveable supply line.
2. Water filter, pressure regulator, and assorted fittings.
3. Drip irrigation tubing, pressure compensating emitters, porting tubing or micro spray heads, and assorted fittings.
4. End flush caps for each lateral irrigation line.

A description and suggested specifications for each of these components follows: #1.) Water Tank - A hard plastic tank typically used for farm chemical applications. Tank should have a flat bottom and be rated for holding potable water. It should have a large fill hole on top and a smaller pipe threaded hole on the bottom for plumbing of pump. Tank should be mounted on a trailer which could then be moved with an ATV. Pump - A small gasoline powered pump sized to match with pressure regulator and drip tubing pressure requirements. #1.) Alternative - A water wagon with pump attached and rated for holding potable water could be used in place of tank, trailer, and ATV. #2) Water Filter - Use a "Y" (in-line) filter with 200 mesh screen. Filter should be cleaned frequently. Pressure Regulator - Install a low flow 25 p.s.i. regulator at the inlet of each of the four lateral lines. #3.) Lateral Tubing - The four lateral lines should consist of 1/2" (minimum) drip tubing and fittings necessary to connect to moveable supply line. Emitters - Use pressure compensating type rated for a discharge rate of between 10-40 p.s.i.. Porting Tubing - Use tubing sized for compression fit on emitters installed in lateral tubing (generally 1/8" diameter). Micro-Spray Heads (Use on Bioswale Test Plot T-4 only) - Mount 10 G.P.H. (gallon per hour) spinner spray heads on riser stakes. Connect to main lateral line emitters with tubing. #4.) End Flush Caps - Place on end of each lateral line; size cap to lateral tubing diameter.

IRRIGATION INSTALLATION, MAINTENANCE AND FREQUENCY

The proposed system should be set up by someone with plumbing skills; however, irrigation could be carried out by anyone familiar with the operation of small gas engines. Maintenance of the irrigation system should be performed as often as the system is used; in particular, the water filter should be cleaned and each lateral line should be flushed out before each usage.

Generally the summer irrigation season in Western Oregon extends from early June until early September but the amount of irrigation water needing to be applied during that time will be dependent on the soils water holding capacity and the weather. Because of the shallow soil substrates, weekly inspections of the plants should be made in order to determine the need for irrigation. Plants should be watered just before they begin to exhibit signs of stress such as leaf droop. The application of between four and six gallons of water through the drip system to each seedling every two weeks during the dry season should be adequate to insure good growth. Toward the end of the summer watering frequency should be diminished as much as possible in order to encourage the onset of dormancy.

ESTIMATED COSTS FOR IRRIGATION SYSTEM MATERIALS

The following materials costs are high estimates. All components are available from local distributors. All items specified are recyclable for future shrub irrigation needs.

ITEM	COST
150 gallon water tank	$100.00
or	or
300 gallon water tank	$250.00
1 - water filter w/ 200 mesh screen	$30.00
4 - pressure regulators	$30.00
1500 lineal feet - 1/2" irrigation tubing	$80.00
2000 lineal feet - 1/8" porting tubing	$30.00
500 - 1/2 GPH pressure compensating emitters	$150.00
assorted fittings & supplies	$100.00
TOTAL	$520.00-$670.00*

* plus pump, and optional ATV and trailer

DRIP IRRIGATION REFERENCES

SUPPLIERS:

Rainbird Distributor
United Pipe and Supply
14830 SW 72nd Ave.
Tigard, OR 97223
(503) 639 7473 FAX (503) 639 1271

Universal Sales Irrigation Corp.
1045 Arrowsmith
Eugene, OR 97402
(503) 344 4650 FAX (503 344 5699

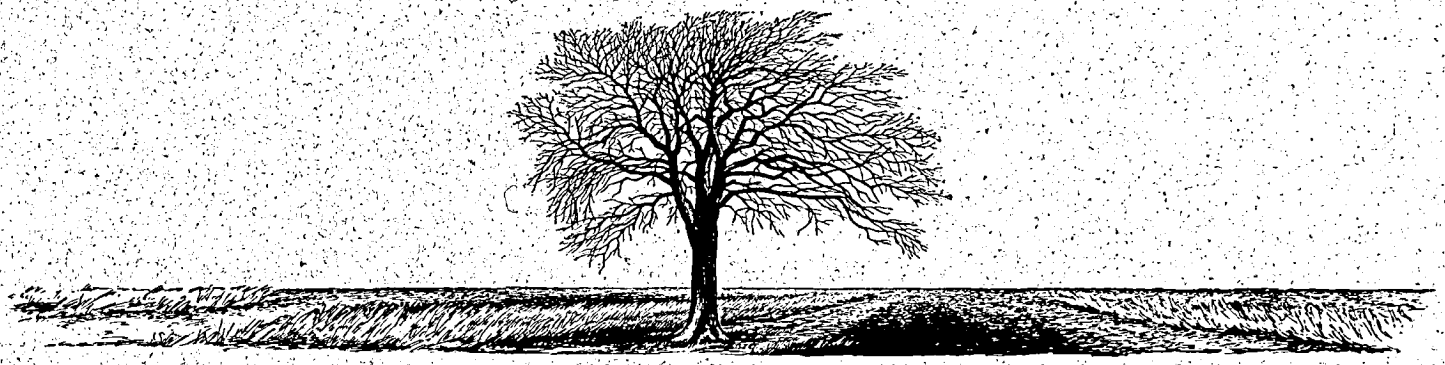
Wade Manufacturing Company
9995 SW Avery Street
Tualatin, OR 97281-3666
(503) 692 5353 FAX (503) 692 5358

CONSULTANTS

Irr-O-Kit Company
Richard Housman
PO Box 6557
Portland, OR 97228
(503) 646 5690

BOOKS

<u>Drip irrigation for every landscape and all climates</u>;
Robert Kourik;
Metamorphic Press, PO Box 1841, Santa Rosa, CA 95402
(707) 874 2606



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MEMORANDUM

May 10, 1993

TO: Dennis O'Neil
FROM: Mark G. Wilson
SUBJECT: Shrub Test Plot Irrigation

Dear Dennis,

Please find attached a report and specifications for the installation of a drip irrigation system for woody shrubs and trees in the test plot plantings of Subarea 1 of the landfill. I will send fertilizer/mychorrizal enrichment recommendations to you as soon as I am able to obtain firm costs for mychorrizae cultures. The one remaining component of Amendment #3 will then be the collection of percent survival data for the plantings in the shrub test plots. I plan to acquire this data while at the landfill site this summer assisting with Subarea 2 & 3 closure.

If you have any questions regarding the attached please call me.

cc: Paul Fishman/Fishman Environmental Services
Jim Morgan/METRO