Aerosolization of Leachate Presented to ERC

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The Problem(s)

- Leachate generation ranges from 4M to 30M gallons annually;
- POTW's enacting stricter requirements;
- Pre-treatment systems are expensive ($1.7M + $80k/yr);
- Traditional evaporation systems are expensive ($2M+$30k/month) and max out at 30k gpd;
- Total leachate management and disposal costs average $0.25 per gallon;
- Dewatering of landfill gas systems adding to quantities at stronger levels;
- Site soils lacking in nutrients and moisture to support vegetative growth;
- Reliance on offsite facilities for compliance.

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Aerosolization

- Aerosolization is a process by which larger particles (50-2,000 microns) are formed into droplets and then dispersed over a relatively small area (100’ x 300’);
- The surface area of the droplets allows for faster heating of the water portion, which then becomes clean water vapor;
- The remaining portion quickly falls to the surface and can be captured and re-run or allowed to irrigate and fertilize the vegetation.

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Integrated Mobile Aerosolization System (IMAS)

- Pump at the Site's leachate tanks used to move liquids to the spray field;
- Booster pump on the IMAS increases the pressure and forces the liquid through a set of sized nozzles;
- The nozzles release the liquid into an air flow path, created by the fan, for liquid dispersion and separation;
- Water molecules are evaporated by reaching the Latent Heat of Vaporization temperature;
- Solid particles (contaminants) are left behind and fall to the surface along with any liquid that does not evaporate;
- Amount of evaporation varies depending on climatic conditions (temperature, humidity, wind speed, solar radiation).

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IMAS – Configured to Site Conditions

- System can be configured to pump 60 to 600 gpm or 30,000 to 300,000 gpd;
- Spray pattern can be adjusted in any direction with or without oscillation;
- Spray distance and height can be controlled;
- Simple netting system can control the mist ($60k);
- Nozzle sizes can be adjusted for handling larger suspended solids;
- Units are mobile and contain blowers, pumps and generators;
- $120k-$180k per unit;
- Designed and manufactured in North Carolina.

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Republic Demonstration Project

Dual IMAS Unit – 12,000 gals/1.5 hrs

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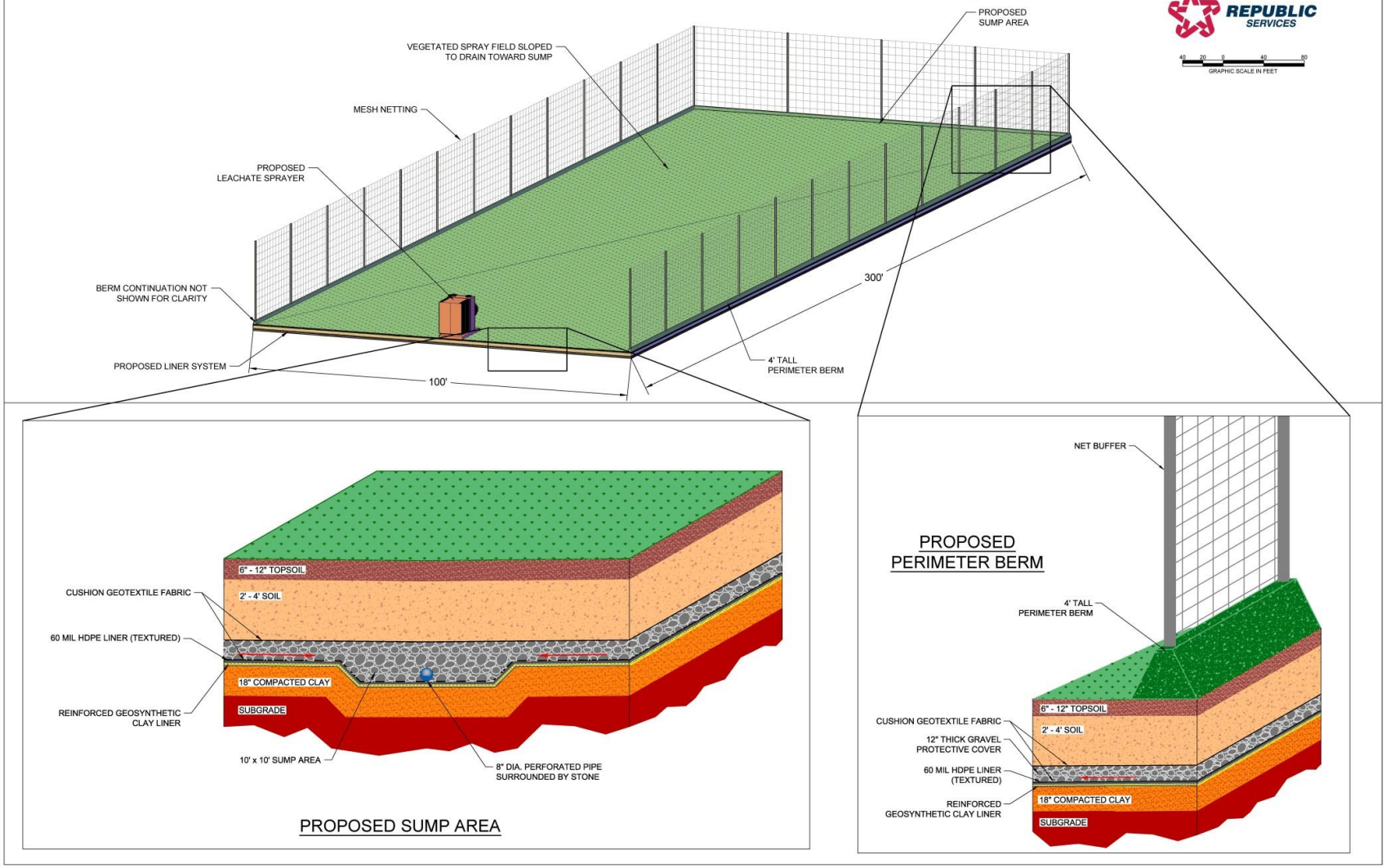
CONCEPTUAL LEACHATE SPRAY FIELD PLAN



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Benefits of the IMAS

- Complete removal of liquid from the landfill;
- Large volumes handled at a controlled pace;
- Irrigation and fertilization for vegetation;
- Lower cost than traditional leachate management methods;
- No pretreatment required;
- Ease of permitting;
- Portable system that can be relocated on site;
- On-site control of all risks;
- Eliminates offsite impacts.

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Historical

- NCDENR demonstration of LES approval April, 2012;
- Aerosolization system tested in 2013;
- Air sampling recorded in May, 2013…all detects below VOC or TAP standards;
- NCDENR permit issued May 21, 2014 and included in Operations Plan.

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Summary

- NC HB 97 Section 14.21.(b)…"The ERC shall study the use of new technologies and strategies, including the use of integrated and mobile aerosolization systems, to dewater leachate and other forms of wastewater for the purpose of reducing the burden and cost of disposal at the site where it is generated.";

- NC HB 765 – 19 pages dedicated to on-site wastewater disposal;

- VA and NC both have established, permitting programs for the land application of industrial wastewaters…both states have also permitted the use of aerosolization of leachate at landfills;

- The solid waste industry should manage leachate on-site, in an environmentally protective manner, while lowering both cost and risks associated with traditional off-site options.

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