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DANIEL C. MIRABILE
COMMISSIONER

TO: M. PETER
CC: D. MIRABILE
FROM: J. GIEBELHAUS
DATE: 5/27/14
RE: PROJECTED CLOSURE COSTS & MITIGATION REQUIREMENTS

FINAL CLOSURE

The current estimated closure date for the Rapp Road Waste Management Facility is mid-2021. At that point, the facility will have achieved the highest elevation permitted and can no longer accept waste. Given that projection, the final cap construction is anticipated to begin in the spring of 2022. The costs associated with this project are:

Final Cap Construction (includes engineering):	\$8,257,729
Post Closure Monitoring (30 yrs):	<u>\$3,534,000</u>
Total Estimate:	\$11,791,729

These estimates are based on known construction and regulatory requirements and therefore should be considered to be an accurate projection of future expenses. The scope of this project encompasses areas of active landfill that have been in operation since 1991.

RESTORATION PROJECT SCOPE

The permit authorizing the final expansion of the facility has a mitigation project with significant fiscal implications for the City. The intent of the project is to restore ecological connectivity between two half's of the Preserve that had been segmented by the landfill & former Fox Run Trailer Park. The Restoration Project is to be completed in two principle phases. The first phase was to restore approximately 200 acres of non-landfill lands back to Pine Bush Habitat. The lands were either purchased by the City for the State, already owned by the City with a conservation easement in place or were owned by the State prior to the issuance of the permit. All of the various acquisitions/easements were made to satisfy various permit requirements as far back as 1991. The major components of this

phase included relocating residents out of the trailer park, removal of trailer park infrastructure, clear cutting, grubbing, and the construction of ponds, wetlands, a nursery and test plots. The majority of this work has been completed.

The second phase involves covering the landfill (approx. 100 acres) with native Pine Bush sand and vegetation for the purposes of establishing a Pine Bush habitat. The actual depth of sand for the second phase is not known at this time; test plots have been established to determine the depth of sand required that will prohibit the establishment of invasive plants & promote native species. This metric will dictate actual cost; 2' of sand is assumed here.

RESTORATION PROJECT COSTS

Based on the estimates, approximately 36% of the expenses will be earth work; the remaining 64% represents fees paid to consultants for restoration, observation, seed collection, removal of invasive plants, permit reporting & ecological monitoring. The monitoring/correction period continues on for 10 years after the major earth work has been completed (estimated 2033).

The consultants estimated a cost of \$7.3m for Phase I (2009 – 2013); the actual costs were \$8.2m. Based on this observation it is safe to assume that the remainder of the project will exceed the anticipated cost by 11% or \$974,777.

The known and estimated costs are:

Phase I (Observed 2009 – 2013):	\$8,202,348.20
Phase I (2014 Encumbered):	\$856,100.00
Phase II (Estimate 2015 - 2030):	\$9,747,775.00
Projected Additional Expenses:	<u>\$974,777.00</u>
Total Cost	\$19,871,000.20

RESTORATION PROJECT LIABILITIES

Phase II of the project has a significant risk of failure or alternatively, a significant risk of accumulating expenses far in excess of those detailed above. This risk is due to a significant shift away from standard landfill closure engineering practices, unknown performance data and the possibility of making decisions based on erroneous data collected.

Phase I work was conducted on areas with flat, rolling topography with relatively minimal changes in elevation. The work was conducted on topography similar to that found in the Preserve. As such, soil disturbance was at a minimum with little damage from erosion. In contrast, Phase II is to be conducted on the steep side slopes of the landfill; no such topography or elevation changes exist in either Phase I or the Preserve. As such, significant erosion is of great concern for Phase II.

Typical construction of landfill closure slopes involves a topsoil material with a fast growing (i.e., germination within weeks), dense vegetation. In addition, multiple stone terraces are incorporated into

the design. These steps are taken specifically to slow the velocity of surface water in order to minimize erosion. The installation proposed in Phase II is exactly the opposite of standard practices; Phase II involves Pine Bush sands (similar to beach sand with no organic/fertilizer components) and sparse vegetation that can take a year to germinate. In a normal cap, these materials would be rejected by the project engineer due to performance issues.

At the inception of the project, the ability to construct this habitat on a capped landfill was unknown. The test plots were constructed on capped landfill in order to gather performance data. Unfortunately, the location of the test plots is not in an area that represents the 'worst case' scenario. Approximately 60% of the site has significantly steeper and longer slopes than those of the test plots. The net elevation in the area of the test plots is approximately 80' (390' ASL to 310'ASL); the net elevation on the landfill is approximately 150' (460'ASL to 310'ASL). Relying on data collected in the test plots may lead to erroneous conclusions and therefore erroneous decisions moving forward.

In summary, the topography of the Preserve and the topography of landfill differ greatly. As such, in order to mitigate future liabilities for the City, the materials selected for placement on the landfill topography must have the ability to remain stable on the side slopes.