

**Indian River County, Florida  
Solid Waste Disposal District  
Board Memorandum**

**Date:** May 11, 2021

**To:** Jason E. Brown, County Administrator

**From:** Vincent Burke, PE, Director of Utility Services

**Prepared By:** Himanshu H. Mehta, PE, Managing Director, Solid Waste Disposal District

**Subject:** Request for Approval of a Leachate Treatment Project at the IRC Landfill

**Descriptions and Conditions:**

The Indian River County (IRC) Solid Waste Disposal District (SWDD) operates the Class 1 Landfill, which generates “leachate”, a liquid that passes through the waste in the landfill and is collected by the leachate collection system at the bottom of the landfill. The IRC Department of Utility Services (IRCDUS) also operates a Residual Dewatering Facility (RDF) that generates “centrate”, which is liquid generated through the dewatering of biosolids. Both the leachate and the centrate are combined and transmitted via a force main to the West Regional Wastewater Treatment Facility (WRWWTF) for treatment and disposal. Based on the review of historical flows, the landfill generates an estimated leachate flow of 16,000 gallons per day (gpd) and a peak daily flow of 20,000 gpd based on substantial fluctuation on the leachate generated due to varying climatic and operational conditions at the landfill.

The WRWWTF has stringent permit conditions set forth by the Florida Department of Environmental Protection (FDEP) for both the influent and the effluent managed by the facility. The IRCDUS also has industrial pretreatment standards, referenced in Section 201.68 of the Code of Indian River County, that are not being met by the leachate. Historical data show that arsenic (As), total nitrogen (TN) and total dissolved solids (TDS) exceed the specified local limits. The discharge of concentrated leachate from the landfill gas wells has caused concerns with meeting the FDEP permit conditions at the WRWWTF, and therefore, the IRCDUS has not allowed this material to be sent to the WRWWTF. This concentrated leachate has been allowed to remain in the landfill since October 2020, which is reducing the quantity of landfill gas removed and potentially creating a condition for seepage of leachate from the landfill.

Both SWDD and IRCDUS have been exploring alternative treatment options for leachate for the past few years. In July 2019, the SWDD Board approved staff recommendation to further evaluate thermal evaporation technology as a potential solution for leachate treatment via a pilot study. In January 2020, a five-day pilot study was performed by the Indian River Eco-District, LLC (IREDD) using the 1,000 gpd Heartland Concentrator™ unit provided by Heartland Water Technology, Inc (Heartland). The pilot was successful in demonstrating that a volume reduction of 98% was achieved and the laboratory analytical results indicated that the mulch-stabilized residuals passed both the paint filter liquids test as well as the toxicity characteristics leachate procedure (TCLP) criteria to be classified as non-hazardous and could potentially be landfilled in a Class I solid waste landfill in Florida. On May 19, 2020, the SWDD Board waived the bid

requirements and directed staff to negotiate with IRED and Heartland for a short-term and long-term leachate treatment solution, and bring back both choices with a clear recommendation for a path forward.

The purpose of this agenda item is to direct staff to negotiate with IRED/Heartland in good faith the terms and conditions of a service agreement to design, build, install and operate a 30,000 gpd leachate evaporation plant featuring a Heartland Concentrator™ system to be located at the IRC Landfill, that will be used to treat all of IRC's Class I landfill leachate during a period of at least twenty (20) years under the terms of a service agreement with SWDD. Staff has a separate agenda item for the approval of engineering and permitting services to Geosyntec that are associated with the leachate treatment project.

**Analysis:**

Per SWDD Board direction, staff held several meetings with IRED/Heartland to discuss both short- and long-term solutions for leachate treatment, including providing more updated flow records and updated laboratory sampling results. On February 15, 2021, IRED/Heartland presented a short-term solution (six to nine months) entailing the temporary installation and operation of a 12,000 gpd leachate treatment system, which would be powered by natural gas rather than landfill gas. This proposal was priced at an initial setup cost of \$60,000, mobilization cost of \$17,600, and a monthly operations fee of \$55,000. This proposal did not include engineering/permitting, natural gas consumption, electric/water usage, disposal, and miscellaneous costs. Staff estimated that this short-term project had a monthly cost of \$100,000, or an annual cost of \$1.2 million. IRED/Heartland did provide an option to purchase a separate flare, which would utilize landfill gas and save on natural gas costs; however, this was a one-time cost of \$168,000 and would require additional costs to bring the landfill gas to the location of the system on-site. Based on the high treatment cost of approximately \$0.27 cents per gallon, staff requested another proposal from IRED/Heartland.

On March 2, 2021, and then again with an updated version on March 23, 2021 and May 5, 2021, followed by a final version on May 11, 2021, Heartland and its partners, Proximo Energy and IRED (collectively "Developers"), submitted a proposal to design, build, install, and operate a 30,000 gpd leachate evaporation plant featuring a Heartland Concentrator™ system to be located at the IRC Landfill, that will be used to treat all of IRC's Class I landfill leachate during a period of at least twenty (20) years under the terms of a service agreement with SWDD. This was a turnkey proposal wherein the Developers would also construct the piping required to move the landfill gas to the evaporation plant.

The following summarizes the key elements of the Leachate Treatment proposal by the Developers:

- Term: The term for this project is 20 years from the start of the commercial operations with the ownership of the evaporator facility and all related equipment to be transferred to SWDD for \$1.
  
- Treatment: Minimum of 18,000 gpd to a maximum of 30,000 gpd. Using the minimum capacity, the Developers have guaranteed the treatment of at least 6.57 million gallons of leachate per year. The Heartland Concentrator™ system can treat up to 95%, however, both parties to set desired leachate evaporation rates, i.e. 92%-98%.
  
- Schedule: To be installed by end of 2021.

## SWDD Item

- Fuel Source:** Initially use landfill gas until the IRED renewable natural gas (RNG) facility is on-line, wherein the first 1,150 standard cubic feet per minute (scfm) of landfill gas will be directed to the RNG facility. During this time, SWDD is required to provide natural gas unless additional gas can be produced from the landfill. A possible source of methane gas to evaluate in the future is the biogas that is currently being treated by an odor control system for the RDF.
- Location:** The leachate treatment system will be located near the Residual Dewatering Facility due to the central receiving of leachate and the proximity to natural gas along 74<sup>th</sup> Avenue SW. In addition, based on confirmatory due diligence, the Developers have requested to use the empty 500,000-gallon liquid storage tank at the RDF to provide volume buffer for leachate evaporation.
- Permitting:** SWDD would be responsible to obtain permits for the leachate project and the approval to recirculate the residual back into the landfill. The Developers would be responsible for operating the system in compliance with the required permits.
- Inputs:** SWDD is responsible for leasing and providing access to the site to the Developers. SWDD is also to provide for the costs associated with natural gas, electricity, water, and residue disposal. Without natural gas, staff has estimated this cost to be in the range of \$6,400 to \$13,200 per month. The natural gas cost is estimated to be in the range of \$38,000 to \$63,000 per month.
- Payment:** The Developers have presented a one-time payment of \$300,000 for the initial setup and commission fee, and then either a fixed minimum monthly payment of \$75,000 or a normal volumetric processing fee based on a tiered rate proposal as follows:

Tiers	Capacity <sup>(a, b)</sup>	Pricing <sup>(c)</sup> (per gallon)	Landfill Gas <sup>(d)</sup> (scfm)	Natural Gas (scfm)	Electricity <sup>(e)</sup> (mWhr/yr)
1	Up to 18,000 gpd	\$0.1390	346	149	415
2	18,001 gpd to 24,000 gpd	\$0.1321	461	199	553
3	24,001 gpd to 30,000 gpd	\$0.1250	579	249	691

(a) The proposal provides these volume requirements on a quarterly basis to allow for variability in daily flows; however, they are presented in gallons per day in this table for simplicity.

(b) The base minimum capacity of 18,000 gpd is used to establish a minimum monthly fee of \$75,000. In the case whereby the volumes of leachate generated by the landfill are substantially lower than usual, the minimal monthly fee will be charged instead of the normal processing fees resulting from the number of gallons processed. During normal operating months when the normal processing fees exceed the minimum monthly fee, solely the normal processing fees will apply. The proposal provides for quarterly and annual “true-up” credit such that price paid is adjusted to account for total volumes treated.

(c) The lower pricing of Tiers 2 and 3 do not apply to lower volumes. For example, for a treatment of 20,000 gpd, the first 18,000 gpd is charged at \$0.1390 per gallon, and the remaining 2,000 gpd is charged at a rate of \$0.1321 per gallon.

(d) At a methane content of 45%.

(e) mWhr/yr is megawatts per hour per year.

Annual Adjustment: The annual pricing will be adjusted based on annual inflation adjustments tied to an industrial or consumer price index to be agreed upon by SWDD and Developers.

**Financial Analysis:**

The turnkey proposal to treat leachate by the Developers has an overall cost of \$26 million with an average of \$0.14 cents per gallon over the 20 year period.

Based on making certain assumptions on the generation of leachate over the next 20 years, including achieving the minimum of 18,000 gpd leachate volume and based on estimated costs for natural gas, electricity, water, residual disposal, permitting, emissions monitoring, etc., staff estimates that the total project has a cost range of \$991,000 per year to start and a high of \$2.38 million per year with a present day 20-year project cost of \$40.8 million. If this were a standalone project wherein we were to utilize landfill gas for the duration of the project, the total average price per gallon for leachate treatment is \$0.15 cents per gallon; however, factoring in the cost for natural gas results in the total average price of \$0.22 cents per gallon.

IRED-P-H (Using Landfill Gas and Natural Gas)												
Date	Average Daily Gallons	Total Quarterly Gallons	Total Quarterly IRED-P-H Costs	Total Monthly IRED-P-H Cost (1)	Total Annual Costs from IRED-P-H	Total Annual IRED-P-H Price per Gallon	Monthly Utilities Cost (2)	Monthly Natural Gas Cost	Total Other Annual Cost	Total Other Price per Gallon	Total Annual Costs	Total Annual Price per Gallon
Initial Setup & Commissioning Fee					\$ 300,000						\$ 300,000	
2022 (a)	18,000	1,642,500	\$ 228,308	\$ 76,103	\$ 913,230	\$ 0.14	\$ 6,421	\$ -	\$ 77,046	\$ 0.01	\$ 990,276	\$ 0.15
2023 (b)	18,000	1,642,500	\$ 228,308	\$ 76,103	\$ 456,615	\$ 0.14	\$ 6,421	\$ -	\$ 38,523	\$ 0.01	\$ 495,138	\$ 0.15
2023 (c)	18,000	1,642,500	\$ 228,308	\$ 76,103	\$ 456,615	\$ 0.14	\$ 6,421	\$ 38,367	\$ 268,725	\$ 0.08	\$ 725,340	\$ 0.22
2024	20,000	1,825,000	\$ 252,416	\$ 84,139	\$ 1,009,663	\$ 0.14	\$ 8,301	\$ 42,630	\$ 611,167	\$ 0.08	\$ 1,620,830	\$ 0.22
2025	20,000	1,825,000	\$ 252,416	\$ 84,139	\$ 1,009,663	\$ 0.14	\$ 8,301	\$ 42,630	\$ 611,167	\$ 0.08	\$ 1,620,830	\$ 0.22
2026	20,000	1,825,000	\$ 252,416	\$ 84,139	\$ 1,009,663	\$ 0.14	\$ 8,301	\$ 42,630	\$ 611,167	\$ 0.08	\$ 1,620,830	\$ 0.22
2027	20,000	1,825,000	\$ 252,416	\$ 84,139	\$ 1,009,663	\$ 0.14	\$ 8,301	\$ 42,630	\$ 611,167	\$ 0.08	\$ 1,620,830	\$ 0.22
2028	25,000	2,281,250	\$ 312,039	\$ 104,013	\$ 1,248,154	\$ 0.14	\$ 10,751	\$ 51,793	\$ 750,525	\$ 0.08	\$ 1,998,679	\$ 0.22
2029	25,000	2,281,250	\$ 312,039	\$ 104,013	\$ 1,248,154	\$ 0.14	\$ 10,751	\$ 51,793	\$ 750,525	\$ 0.08	\$ 1,998,679	\$ 0.22
2030	25,000	2,281,250	\$ 312,039	\$ 104,013	\$ 1,248,154	\$ 0.14	\$ 10,751	\$ 51,793	\$ 750,525	\$ 0.08	\$ 1,998,679	\$ 0.22
2031	25,000	2,281,250	\$ 312,039	\$ 104,013	\$ 1,248,154	\$ 0.14	\$ 10,751	\$ 51,793	\$ 750,525	\$ 0.08	\$ 1,998,679	\$ 0.22
2032	30,000	2,737,500	\$ 369,070	\$ 123,023	\$ 1,476,279	\$ 0.13	\$ 13,201	\$ 62,152	\$ 904,230	\$ 0.08	\$ 2,380,509	\$ 0.22
2033	30,000	2,737,500	\$ 369,070	\$ 123,023	\$ 1,476,279	\$ 0.13	\$ 13,201	\$ 62,152	\$ 904,230	\$ 0.08	\$ 2,380,509	\$ 0.22
2034	30,000	2,737,500	\$ 369,070	\$ 123,023	\$ 1,476,279	\$ 0.13	\$ 13,201	\$ 62,152	\$ 904,230	\$ 0.08	\$ 2,380,509	\$ 0.22
2035	30,000	2,737,500	\$ 369,070	\$ 123,023	\$ 1,476,279	\$ 0.13	\$ 13,201	\$ 62,152	\$ 904,230	\$ 0.08	\$ 2,380,509	\$ 0.22
2036	30,000	2,737,500	\$ 369,070	\$ 123,023	\$ 1,476,279	\$ 0.13	\$ 13,201	\$ 62,152	\$ 904,230	\$ 0.08	\$ 2,380,509	\$ 0.22
2037	30,000	2,737,500	\$ 369,070	\$ 123,023	\$ 1,476,279	\$ 0.13	\$ 13,201	\$ 62,152	\$ 904,230	\$ 0.08	\$ 2,380,509	\$ 0.22
2038	30,000	2,737,500	\$ 369,070	\$ 123,023	\$ 1,476,279	\$ 0.13	\$ 13,201	\$ 62,152	\$ 904,230	\$ 0.08	\$ 2,380,509	\$ 0.22
2039	30,000	2,737,500	\$ 369,070	\$ 123,023	\$ 1,476,279	\$ 0.13	\$ 13,201	\$ 62,152	\$ 904,230	\$ 0.08	\$ 2,380,509	\$ 0.22
2040	30,000	2,737,500	\$ 369,070	\$ 123,023	\$ 1,476,279	\$ 0.13	\$ 13,201	\$ 62,152	\$ 904,230	\$ 0.08	\$ 2,380,509	\$ 0.22
2041	30,000	2,737,500	\$ 369,070	\$ 123,023	\$ 1,476,279	\$ 0.13	\$ 13,201	\$ 62,152	\$ 904,230	\$ 0.08	\$ 2,380,509	\$ 0.22
					\$ 25,920,518	\$ 0.14			\$ 14,873,358	\$ 0.08	\$ 40,793,876	\$ 0.21

(1) - Costs for gallon of leachate treated have been calculated on a quarterly basis based on a proposal prepared by Heartland Water Technology, Inc. and its partners dated 11 May 2021.

(2) - Cost of utilities are assumed to include: cost of fuel, electricity, water and disposal costs. For the first 18 months, costs of fuel are assumed to be covered by landfill gas at no cost. Afterwards, it is assumed that natural gas will be purchased.

(a) - 12 months of treatment using Landfill Gas.

(b) - 6 months of treatment using Landfill Gas.

(c) - 6 months of treatment using Natural Gas.

Although, there are less expensive alternatives available such as disposing the leachate in a nearby injection well as is the practice in several other counties (examples: St. Lucie, Brevard, Palm Beach, and Okeechobee), the SWDD Board denied staff recommendation, on January 22, 2019, to pursue research into deep well alternatives. If the SWDD Board were to reconsider this option, the closest injection well to the IRC landfill resides at IRED, approximately 1/2 mile from our site. Based on an estimate from IRED, if SWDD were to pre-treat the leachate to remove the solids and then send the leachate via a new force main to IRED, they could accept the leachate for disposal at a rate of \$0.12 cents per gallon, which may

be approximately \$200,000 per year lower than the equivalent cost for treating 18,000 gallons per day of leachate through an evaporation system. However, the costs for the removal of the solids and the leachate force main to IRED have not yet been determined.

Beyond disposing the leachate in an injection well, the IRC landfill has evaluated other viable alternatives and technologies, but believes the timeframe to deploy them and the complexity of adding multiple treatment options together would likely make them ineffective. These other options would only partially treat the leachate, and then it would subsequently still have to be sent to the WRWWTF for final treatment and disposal. The thermal treatment approach recommended by staff would eliminate the need to send any leachate (treated or untreated) to the WRWWTF.

The one long-term concern is the disposal of residual waste into the landfill, as Indian River County does not have direct prior experience with how this residual material (post thermal treatment) would go down and/or when it would show up back again in the leachate. That said, there are other counties in Florida as well as throughout the country that have been re-disposing their reduced residual waste back into their landfill for decades, and it has become a generally accepted practice. There may be options to encapsulate the residual waste; however, this is something that would have to be explored later to determine the efficacy and the costs for this approach.

Therefore, staff recommends that the SWDD Board approve this final long-term leachate treatment proposal from the Developers and direct staff to negotiate the terms and conditions of an agreement, which will be brought to the Board for approval at a future meeting. Staff recommends that if staff is not successful in negotiating a final agreement with the Developers that we proceed in issuing a Request for Proposal (RFP) for a leachate treatment project.

**Funding:**

This project is not expected to start until Fiscal Year 2021/22. Funding for the SWDD Leachate Treatment will be budgeted and available in the Landfill account in the SWDD Landfill Fund, which is funded from SWDD assessments and user fees, in the amount of \$1,100,000 in Fiscal Year 2021/22.

Description	Account Number	Amount
Other Contractual Services	41121734-033490	\$1,100,000

Although the RNG project by IRED is still in the design phase, it is expected to generate approximately \$21.5 million in revenue over in the same time-period as the leachate treatment project. If this is actualized, then potentially 53% of the leachate treatment costs could be covered by the RNG project.

**Recommendation:**

Solid Waste Disposal District (SWDD) staff recommends that its Board approve the following:

- a) Direct staff to reconsider obtaining firm pricing from the Indian River Eco District, LLC for a deep well injection option for the disposal of leachate; or
- b) Direct staff to finalize a contract for a leachate treatment project between Indian River County SWDD and the developers, consisting of Heartland Water Technology, Inc., Proximo Energy, and Indian River Eco District, LLC, to be approved by the SWDD Board at a future meeting.
- c) Staff recommends, if staff is not successful in negotiating a final agreement with the Developers within 60 days, that we proceed in issuing a Request for Proposal (RFP) for a leachate treatment project.

**Attachment (s):**

Leachate Treatment Proposal