INFORMATIONAL MEETING AGENDA

THURSDAY, MAY 11, 2017
CITY HALL (COUNCIL CHAMBERS)
6:30 P.M.

A. Items for discussion submitted by the City Council and/or the City Manager:

1. Augusta Trails TreadFest – June 24th & 25th – Bond Brook Recreation Area
2. Hatch Hill Methane Conversion Project – City Manager
3. Household Hazardous Waste and Old Paint, E-waste, Medication Take Back and Paper Shredding Event – City Manager

B. Persons wishing to address the City Council who have submitted a formal request in accordance with Section 2-61 of the Code of Ordinances:

1. Jacquelyn Cyr – Water Damage at 49 Windsor Avenue

C. Open comment period for any persons wishing to address the City Council.
TO: City Council  
Re: Augusta Trails - Treadfest Beer Tent Request  
From: Leif Dahlin  
Date: May 11, 2017

Augusta Trails will be hosting the annual mountain bike Treadfest on Saturday and Sunday June 24th and 25th. The City Council the past several years has authorized a Beer Tent for this event. Augusta Trails seeks the same authorization for this year’s Treadfest.

Event: Augusta Trails Treadfest  
Location: Bond Brook Recreation Area  
Days: Saturday & Sunday  
Dates: June 24th and June 25th  
Hours: Saturday – 3:00 – 7:00 P.M., Sunday – 2:00 – 4:00 P.M.

The request is that the City Council authorizes a Beer Tent to be held on Saturday & Sunday, June 24 & 25, 2017, or alternative inclement weather date, at the City’s Bond Brook Recreation Area during the Augusta Trails Fifth Annual Tread Fest. The Beer Tent will be managed and operated by a duly licensed vendor with all applicable licenses, permits and insurance in place prior to the event and that all servers will be properly TIPS trained and certified.
MEMORANDUM

TO: Ralph St. Pierre, Asst. City Manager

CC: Lesley Jones, P.E., Public Works Director

FROM: Randy Tome, P.E., Paul Porada, P.E.

DATE: May 8, 2017

RE: Hatch Hill Landfill Gas Project

Woodard & Curran has revisited the landfill gas (LFG) generation models to predict future LFG flows. We have also used those estimated flows, anticipated LFG quality, and manufacturers electrical generation equipment specifications to assess whether the City has a viable project. As Woodard & Curran understands it, a viable project equates to a project that can reliably produce 350 kW of electricity per year. The following assumptions were used to assess the 350 kW project viability.

The future gas to energy project at Hatch Hill Landfill in Augusta proposes to produce 350kW of electricity. Background received from the City suggest their economics were based on this 350kW figure with the power obtained by operating three (3) TTcogen Cento T150 biogas fueled combined heat and power generators.

Woodard & Curran has assessed the landfill gas availability which is expected to fuel the generators. The required flow of gas to produce 350kW will depend upon the methane content of the gas and the generation efficiency of the equipment. Calculation of this estimate is attached.

The Cento T150 generation units reportedly have a 30.9% to 32.4% electrical efficiency. Conservatively, we used 30% electrical efficiency in the calculation. Gas methane content from the landfill has been reasonably consistent at 45% methane. Applying this efficiency and methane content, it is derived that 152 scfm gas flow rate is necessary for 350kW generation. The gas collection system has been producing 130 scfm (Expansion II only) to 185 scfm (including Expansion III) with 45% methane in recent times, thus there presently appears to be sufficient gas available for 350kW generation assuming Expansion III continues to contribute methane.

The less certain part of generation is the future availability of gas. In October 2016, we provided the City gas generation estimates done using LandGEM, an EPA model for predicting landfill gas production. Six different combinations of input variables were applied in modeling to produce a range of results. The information can be used to help predict gas availability. Understand models are only estimates and it is impossible to accurately predict gas generation as future waste composition and operational practices will influence the gas production.
For practical purposes, we can assume only Expansion II and the Expansion III landfills will be sourced for generator fuel as they are secure landfills with the newest wastes. The gas production curves from LandGEM found that the two landfills together can produce 152 scfm for another 11 to 27 years depending on model variable combinations selected. Based on these curves I would believe adequate gas flow can be reliably attained the next 10-year period, and good probability that the flow will be available for 15 years. Important to achieving this flow rate is continued gas extraction from Expansion III, most likely in the form of gas extraction wells.

Even under the most conservative assumptions, the landfill will produce significantly more LFG than will be used for power generation. And since LFG cannot be stored to any appreciable degree, much of that extra gas will vent to the atmosphere. It would appear based on your net metering arrangement, that generating electricity above your internal net metering needs will only benefit CMP and not the City. If there is an opportunity for the City to take financial advantage of the additional available landfill gas in the early years, the City may want to further explore that potential.
Good sites for Combined Heat & Power have continuous demand for both electricity and hot water or heating.
- Hotels
- Condos, Co-ops & Apartments
- Hospitals & Nursing Homes
- Schools & Colleges
- Housing Authorities
- Swimming Pools
- Health Clubs & Fitness Centers
- Correctional Facilities
- Industrial Facilities
- Agricultural Operations
- Laundries

Key Features & Benefits
- **Total efficiency of 86% (LHV)** because you use the power and the heat. A remote and inefficient power plant can be only about 30% efficient.
- **“Plug and play”**. All in one design allows for very easy connection of the CHP unit into the building’s heating system.
- **Very compact footprint**, easy access design with removable covers and a flexible control panel placement allow for installation in very restricted areas.
- **Constant engine speed**. The reliable industrial engine provides outstanding service life by running at a constant speed.
- **Super-silent operation** allows the unit to be located in noise sensitive areas.
- **Low emissions** meet even strict local emissions requirements.
- **Advanced engineering** with industry leading technology.
- **Remote monitoring and fast maintenance and repair** service from Tecogen's local network of service technicians.
## Specifications

### Series

<table>
<thead>
<tr>
<th></th>
<th>Centro T100</th>
<th>Centro T150</th>
<th>Centro T200</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine</td>
<td>TB 100 G8V</td>
<td>TG 150 G8V</td>
<td>TB 200 G8V</td>
</tr>
<tr>
<td></td>
<td>NX 86</td>
<td>TX 86</td>
<td>TW 86</td>
</tr>
<tr>
<td></td>
<td>Lean Burn</td>
<td>Lean Burn</td>
<td>Lean Burn</td>
</tr>
</tbody>
</table>

Manufactured by Tedom

### Generator

|          | Leroy Somer LSA 44.3 L10/L12 | Leroy Somer LSA 46.2 L6 | Leroy Somer LSA 46.2 VL12 |

Manufactured by Mecc Alte

### Electrical Output

<table>
<thead>
<tr>
<th></th>
<th>94 kW</th>
<th>140 kW</th>
<th>191 kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>208 VAC</td>
<td>480 VAC</td>
<td>3PH, 60 Hz</td>
</tr>
</tbody>
</table>

### Maximum Heat Output

|          | 504,997 Btu/h | 731,745 Btu/h | 850,942 Btu/h |

### Electrical Efficiency

<table>
<thead>
<tr>
<th>(HHV)²</th>
<th>30.3%</th>
<th>30.9%</th>
<th>33.3%</th>
</tr>
</thead>
<tbody>
<tr>
<td>(LHV)³</td>
<td>33.5%</td>
<td>34.2%</td>
<td>36.8%</td>
</tr>
</tbody>
</table>

### Overall Efficiency

<table>
<thead>
<tr>
<th>(HHV)²</th>
<th>76.0%</th>
<th>78.1%</th>
<th>78.6%</th>
</tr>
</thead>
<tbody>
<tr>
<td>(LHV)³</td>
<td>86.3%</td>
<td>86.5%</td>
<td>87.2%</td>
</tr>
</tbody>
</table>

### Fuel Input

<table>
<thead>
<tr>
<th>(HHV)²</th>
<th>1,057,330 Btu/h</th>
<th>1,546,550 Btu/h</th>
<th>1,066,510 Btu/h</th>
</tr>
</thead>
<tbody>
<tr>
<td>(LHV)³</td>
<td>955,400 Btu/h</td>
<td>1,396,750 Btu/h</td>
<td>1,786,241 Btu/h</td>
</tr>
</tbody>
</table>

### Required Gas Pressure

|          | 20-40" wc |

### Hot Water Flow

|          | 27.9 gpm | 42.0 gpm | 46.8 gpm |

### Minimum Entering Water Temperature

|          | 104° F |

### Maximum Leaving Water Temperature

|          | 194° F |

### Emissions

<table>
<thead>
<tr>
<th></th>
<th>NOx 6 lb/MWh (3 lb/MWh)⁴</th>
<th>CO 15 lb/MWh (4.7 lb/MWh)⁴</th>
<th>VOC 3 lb/MWh</th>
</tr>
</thead>
</table>

### Enclosure Options

<table>
<thead>
<tr>
<th></th>
<th>Dimensions</th>
<th>Max. Weight</th>
<th>Operating Temp. Range</th>
<th>Acoustic Levels* - dBA @ 1M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Centro T100 &amp; T150 Sound Enclosure</td>
<td>174&quot; L x 59.1&quot; W x 87.6&quot; H</td>
<td>9,822 lbs</td>
<td>50°-95° F</td>
<td>77 / 84 / 84</td>
</tr>
<tr>
<td>Centro T100 &amp; T150 Container</td>
<td>212.6&quot; L x 98.4&quot; W x 267.7&quot; H</td>
<td>13,222 lbs</td>
<td>-68°-95° F</td>
<td>62 / 62 / 62</td>
</tr>
<tr>
<td>Centro T200 Sound Enclosure</td>
<td>174&quot; L x 59.1&quot; W x 87.6&quot; H</td>
<td>10,186 lbs</td>
<td>50°-95° F</td>
<td>76 / 89 / 84</td>
</tr>
<tr>
<td>Centro T200 Container (@ 10M)⁴</td>
<td>218.5&quot; L x 118.1&quot; W x 255.9&quot; H</td>
<td>20,030 lbs</td>
<td>-68°-95° F</td>
<td>63 / 63 / 63</td>
</tr>
</tbody>
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1 All specifications are +/- 5% and are subject to change without notice.
2 HHV of 695 Btu/scf (25.9 MJ/Nm³)
3 LHV of 628 Btu/scf (23.4 MJ/Nm³)
4 With lower emissions option

NYSIR Certified
NFPA-70 Certified
UL 2200 Certified
CSAC22.2 No 14 Certified, CSAC22.2 No 100 Certified
Lloyd's Register Quality Assurance - ISO9001 and ISO14001

For more information please visit www.TTcogen.com or call 781.466.6400

TTcogen is a joint venture of TEDOM & Tecogen

45 First Avenue, Waltham, MA 02451
Landfill Gas Flow Requirements

To generate 350 kW electricity,

\[ Q \text{ scfm} = \text{gas flow } \text{ft}^3/\text{min} \]

\[ M = \text{CH}_4 \text{ concentration vol/vol} \]

\[ E = \text{Generation Efficiency } \% \text{ as fraction} \]

\[ R = \text{Runtime } \% \text{ of time running} \]

\[ 960 \text{ Btu} = \text{Energy content of landfill gas} \]

\[ 56.87 \text{ Btu/min} = \text{kW, Unit Conversion} \]

\[ \text{kW} = Q \times M \times E \times R \times \frac{960}{56.87} = \frac{960}{56.87} \times 17 \]

Hatch Hill data & assumptions

\[ M = 0.45 \text{ Typical measure} \]

\[ E = 0.3 \text{ Trojan Center +150} \]

\[ R = 1.0 \text{ All units, on } \]

\[ kW = 350 \text{ Project Size} \]

\[ 350 = Q \times 0.45 \times 0.3 \times 1 \times 0.1 \times 17 \]

\[ Q = 152 \text{ scfm} \]