



Clean Energy[®]

North America's leader in clean transportation



DALLAS CLEAN ENERGY McCOMMAS BLUFF

Clean Energy Renewable Fuels, LLC

Stephen B. Smith, P.E.

Senior Vice President – Operations

LMOP TEXAS LANDFILL GAS ENERGY WORKSHOP

July 16, 2013

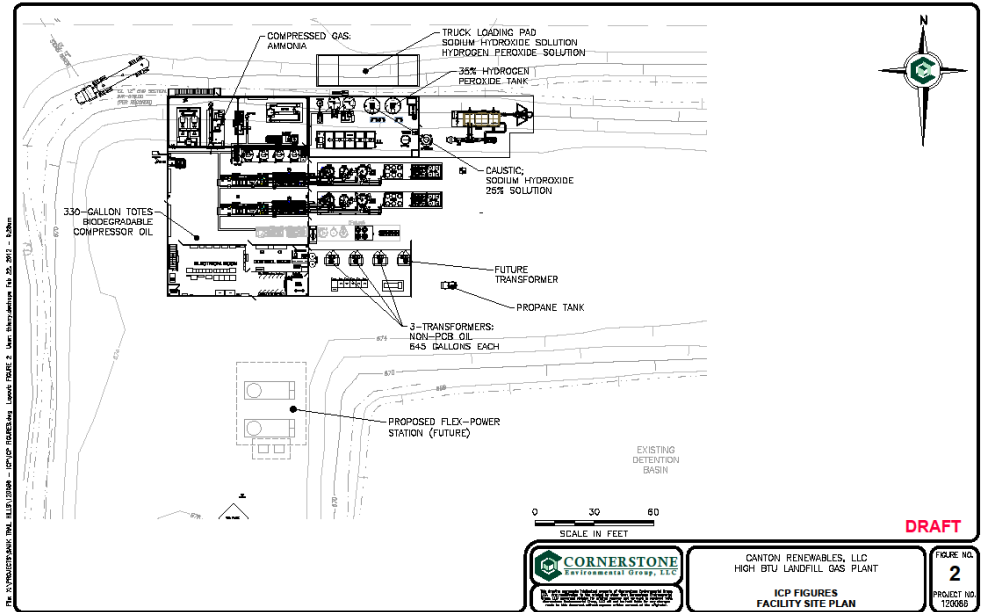
INTRODUCTION & OUTLINE

- PERMITTING
- LANDFILL GAS COLLECTION
- PLANT & PROCESS DESIGN
- PIPELINE INTERCONNECT
- OFF-TAKE AGREEMENT



PERMITTING

- Environmental
- Site Plan Approval
- Building Permits
- Utility Services
- Pipeline Interconnects



- Air Quality Permits (Title V, Oil and Gas Permit)
- Solid Waste Plan Amendment
- GCCS Plan Amendment
- Storm Water Pollution Prevention Plan (SWPPP)
- Spill Prevention, Control & Countermeasures (SPCC)
- Wetlands
- Drains



LANDFILL GAS COLLECTION

- Total of 448 collection points
- 347 Existing Vertical Wells
- 70 Vertical Wells in Expansion
- 26 Horizontal Wells
- 5 Leachate Collection Risers



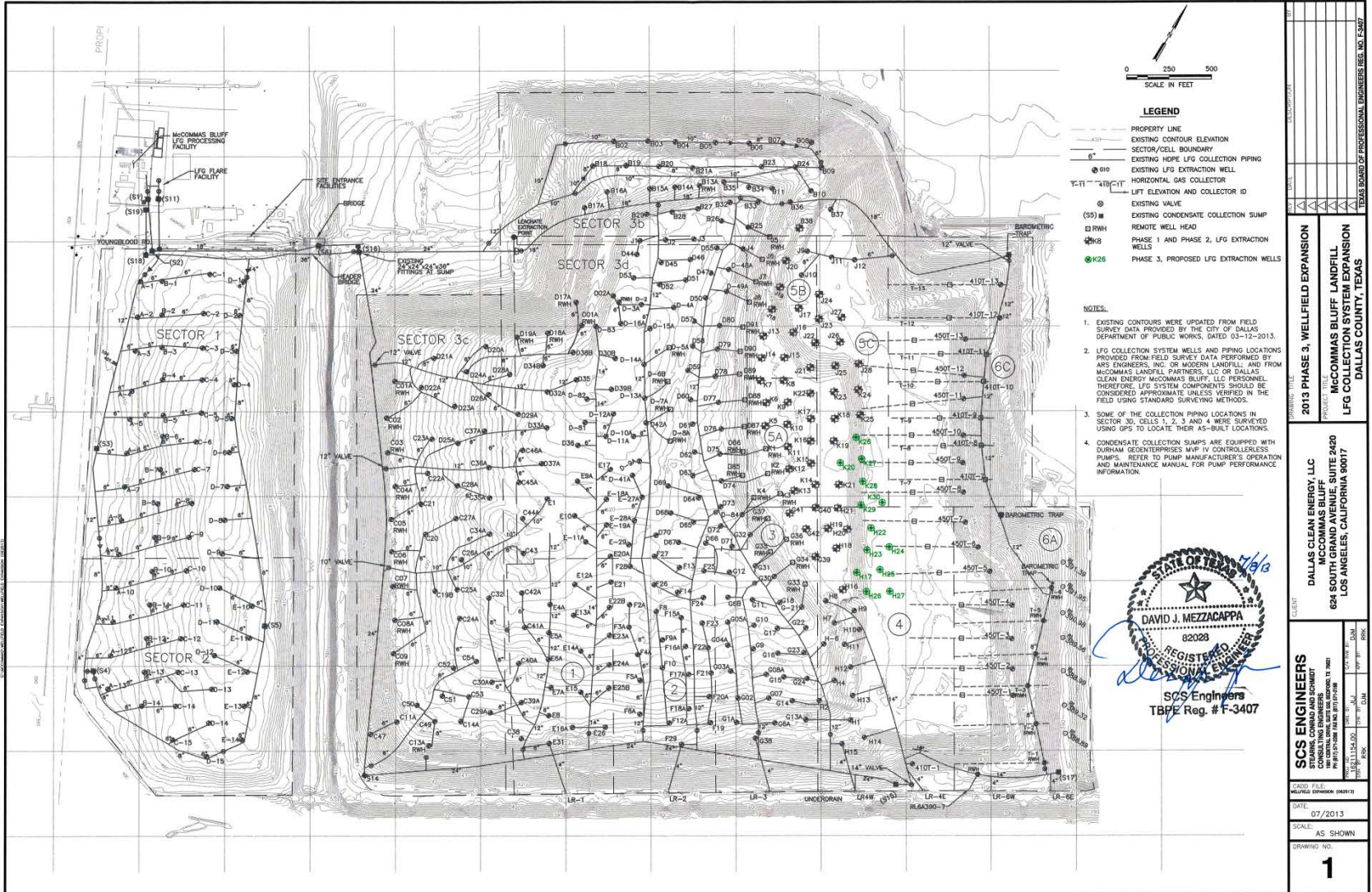
LANDFILL GAS COLLECTION



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<p>2013 PHASE 3, WELLFIELD EXPANSION</p> <p>DALLAS CLEAN ENERGY, LLC MCCOMAS BLUFF LANDFILL LFG COLLECTION SYSTEM EXPANSION DALLAS COUNTY, TEXAS</p>	
<p>DALLAS CLEAN ENERGY, LLC MCCOMAS BLUFF LANDFILL 624 SOUTH GRAND AVENUE, SUITE 2420 LOS ANGELES, CALIFORNIA 90017</p>	<p>DATE: 07/2013</p> <p>SCALE: AS SHOWN</p> <p>DRAWING NO. 1</p>



Well Field Operations



Well Field Operations



Well Field Operations



PLANT & PROCESS DESIGN

- INLET BLOWERS
- MOISTURE REMOVAL
- H₂S REMOVAL
- CHILLER
- TEMPERATURE SWING ADSORPTION
- PRESSURE SWING ADSORPTION
- FINAL COMPRESSION
- WASTE GAS
 - TOX
 - FLARE



PLANT & PROCESS DESIGN



PLANT & PROCESS DESIGN







PLANT & PROCESS DESIGN



PLANT & PROCESS DESIGN



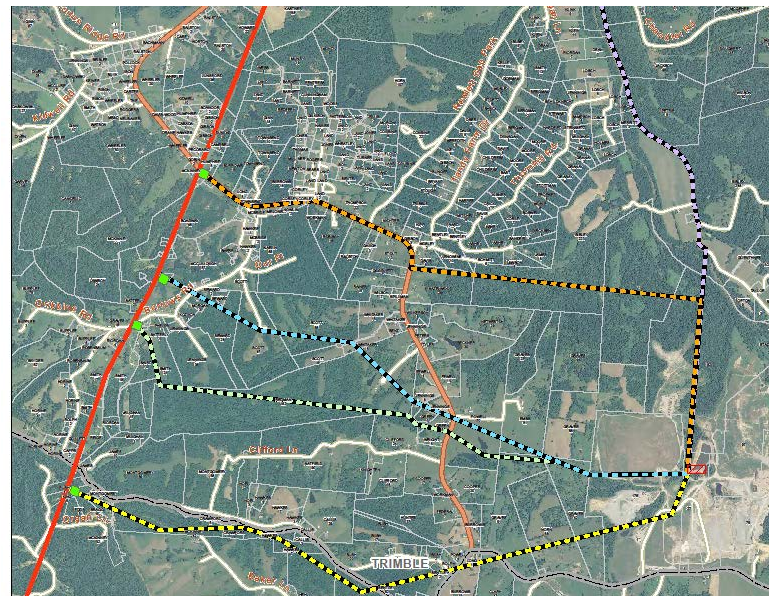


PLANT & PROCESS DESIGN



PIPELINE INTERCONNECT

- Identify Local and Interstate Pipelines
- Utility Typically Requires a LFG Sample (Product Liability)
- Location, Location, Location
- Additional Permits May Be Required
- Operational Issues (Off-Spec Gas – Shut In)



PIPELINE INTERCONNECT



OFF-TAKE AGREEMENT

- On April 3, 2009, DCEMB entered into a contract with Shell for the long-term supply of renewable natural gas; this contract was extended on March 27, 2012 to cover additional volumes
- The contract accounts for ~95% of DCE production over next 10 years and extends through 2034
- The Renewable Natural Gas is delivered to the Sacramento Municipal Utilities District for use in a combined cycle power plant generating Renewable Energy Credits
- This contract is grandfathered under the revised California Renewable Portfolio Standards ("RPS") mandate
- DCEMB is a registered Renewable Fuel Standards – Program 2 site and can sell its RNG and create RINs

SUMMARY

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