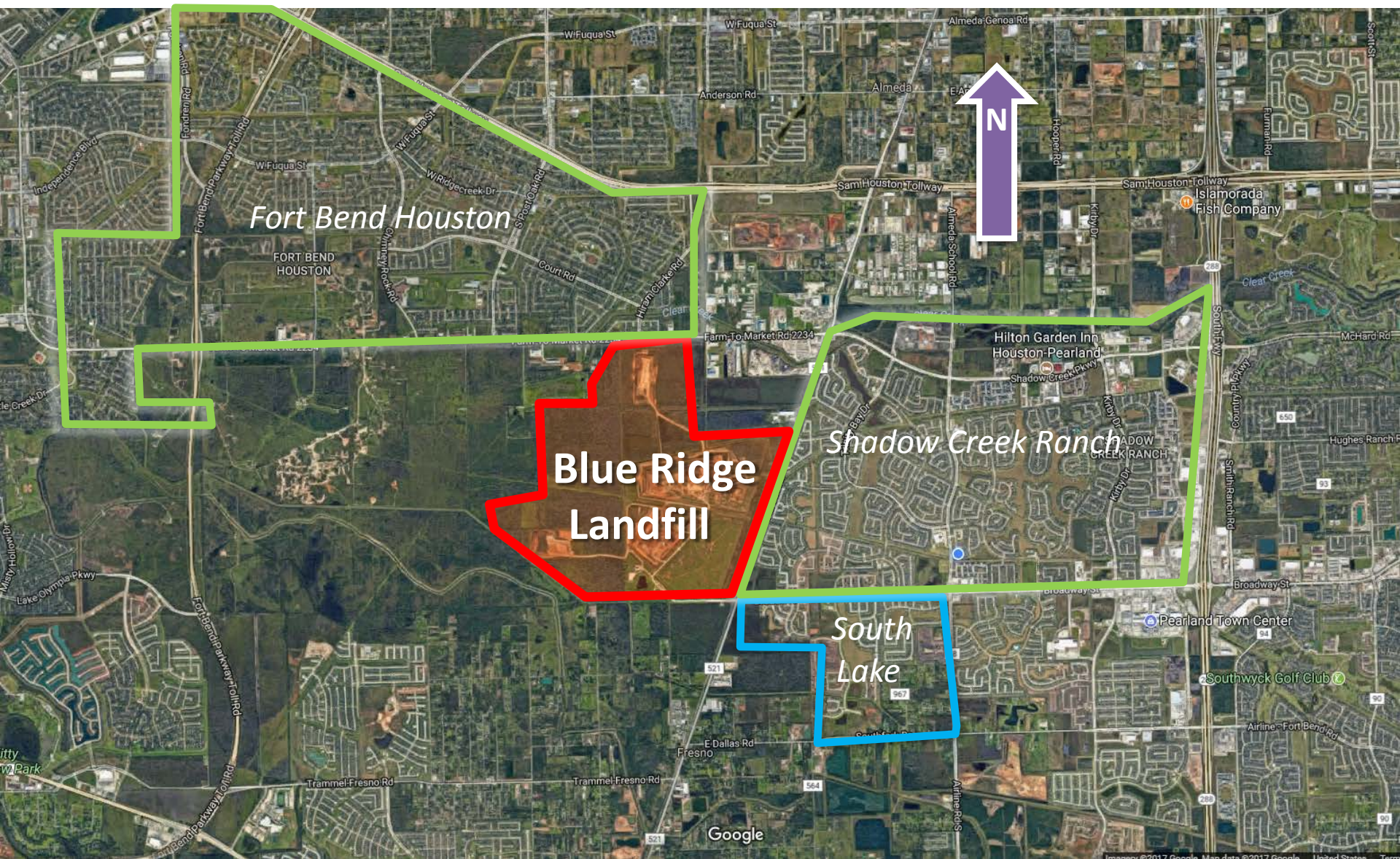
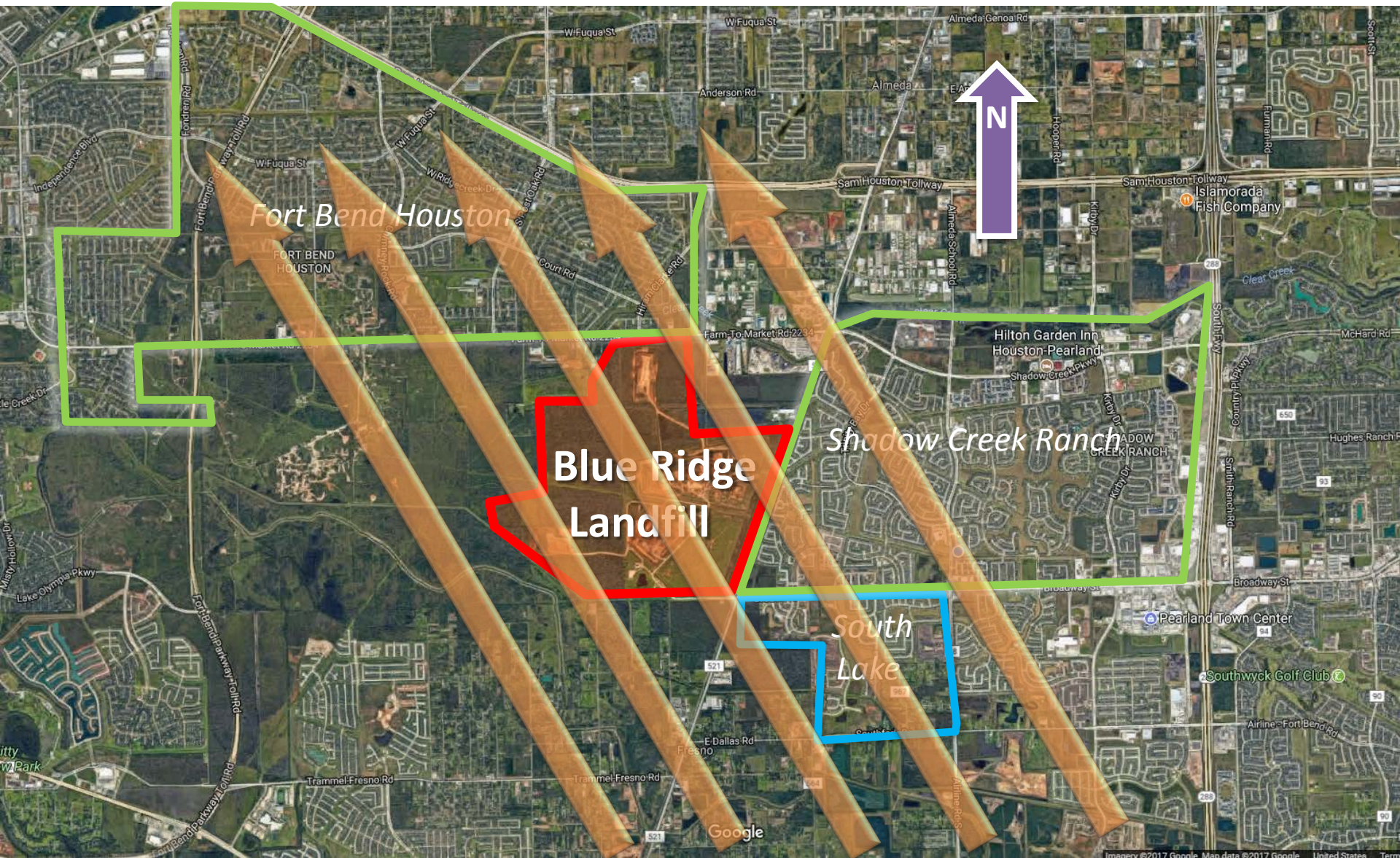
An aerial photograph of a large, arid landscape. The ground is a mix of light tan and reddish-brown soil, heavily cracked and eroded into a complex, maze-like pattern of channels and ridges. In the far distance, a dark, forested mountain range stretches across the horizon under a clear, bright sky. The overall scene suggests a dry, possibly contaminated, site.

**Suspected Cause of
Offensive Nuisance Odor
from Blue Ridge Landfill
Fort Bend County, Texas**

BRL and Surroundings



BRL and Surroundings



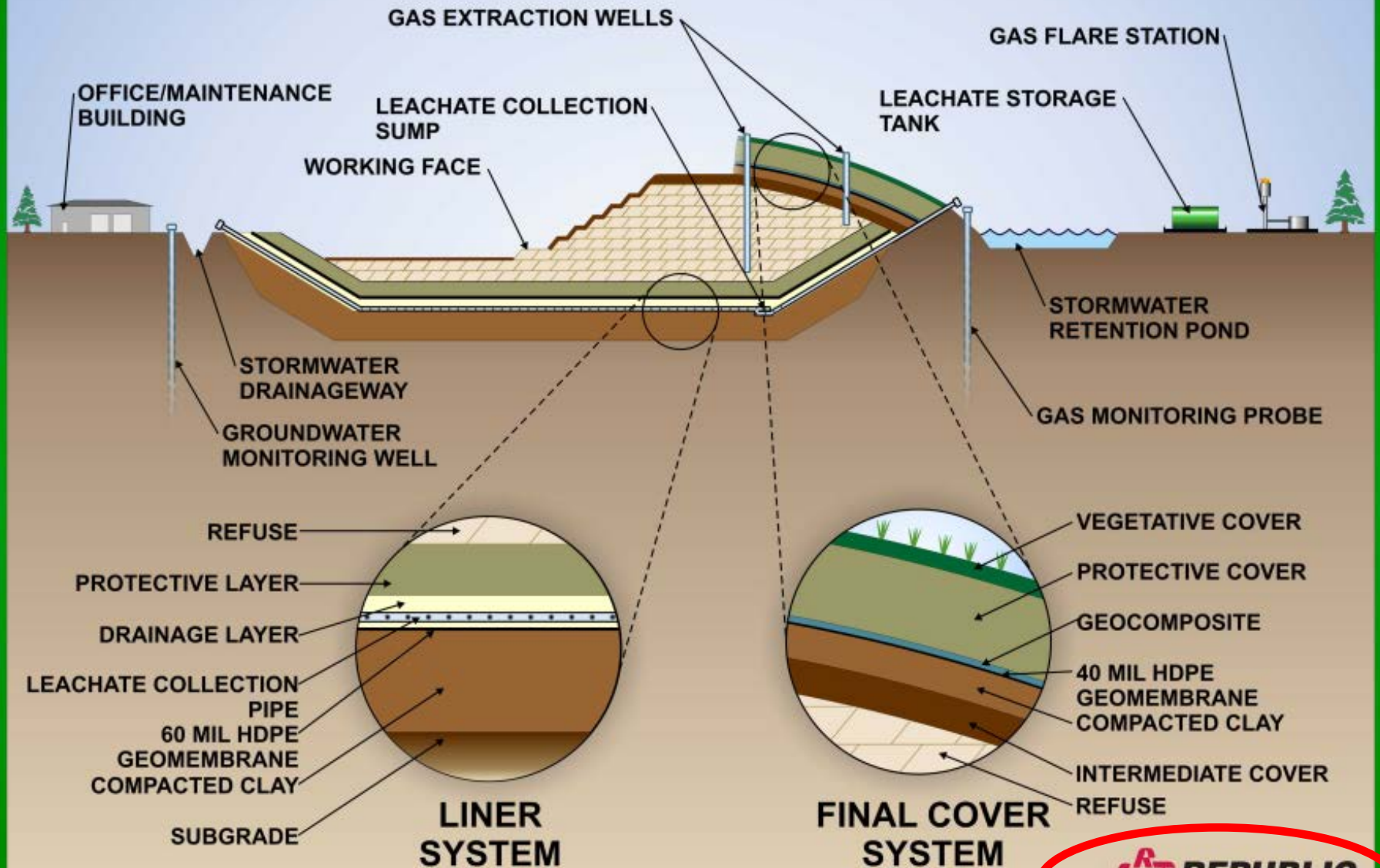
Prevailing winds typically from southeast; from Gulf Coast.

BRL and Surroundings



Occasionally, winds are from west, northwest, south west, etc.

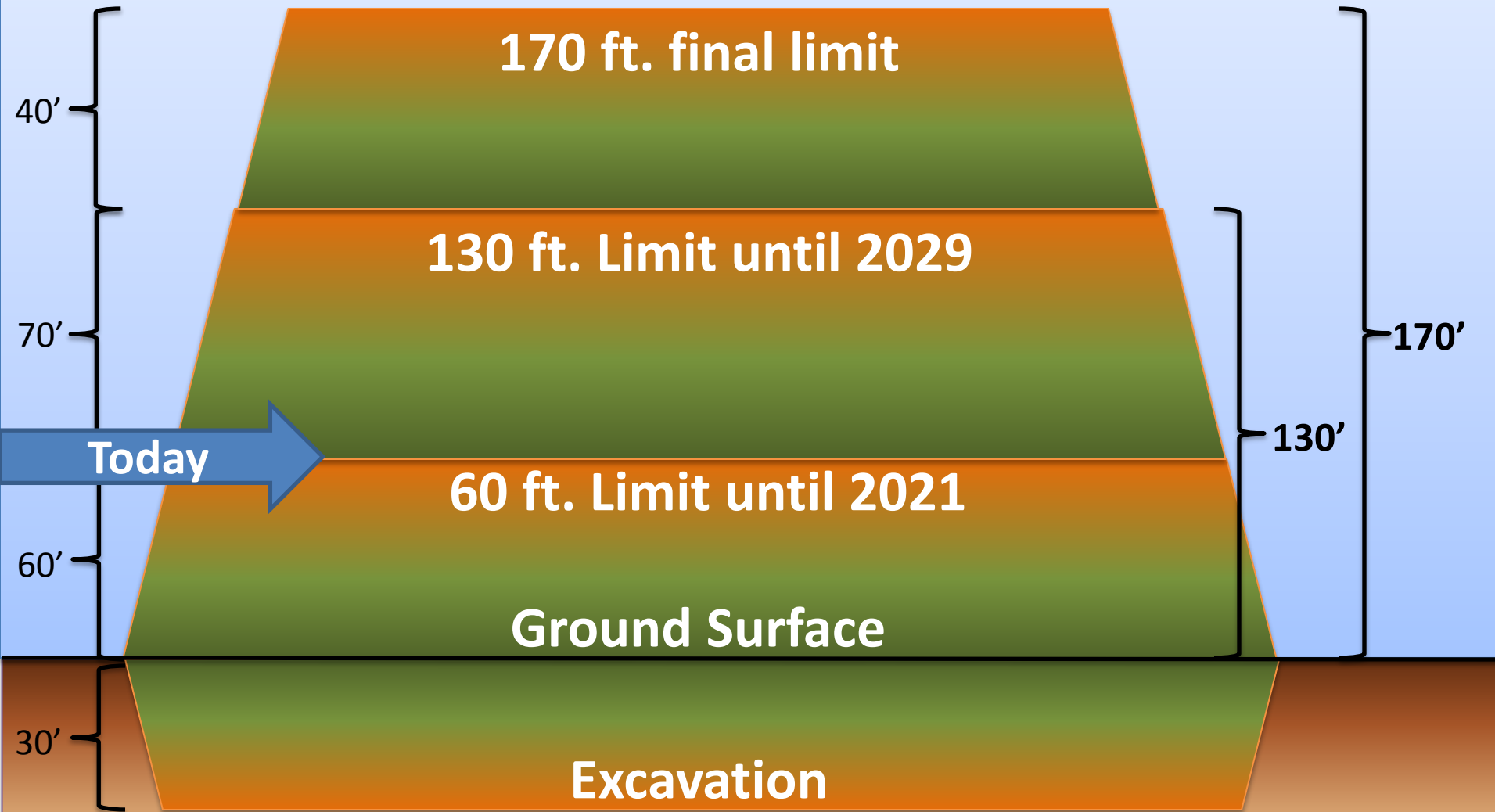
CONCEPTUAL LANDFILL DESIGN CROSS SECTION



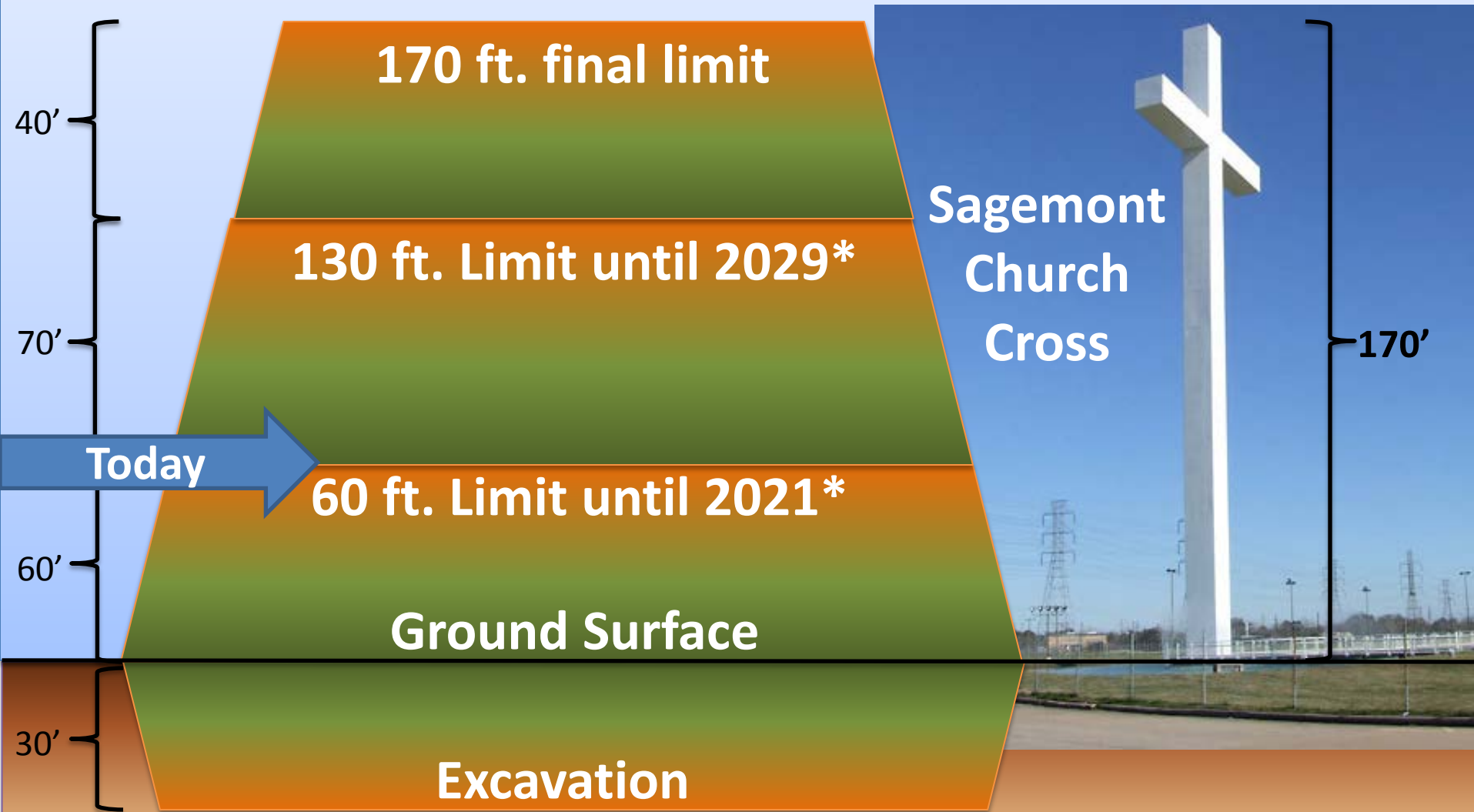
Blue Ridge Landfill – 2017 Municipal Solid Waste Phases



Permitted Blue Ridge Landfill growth

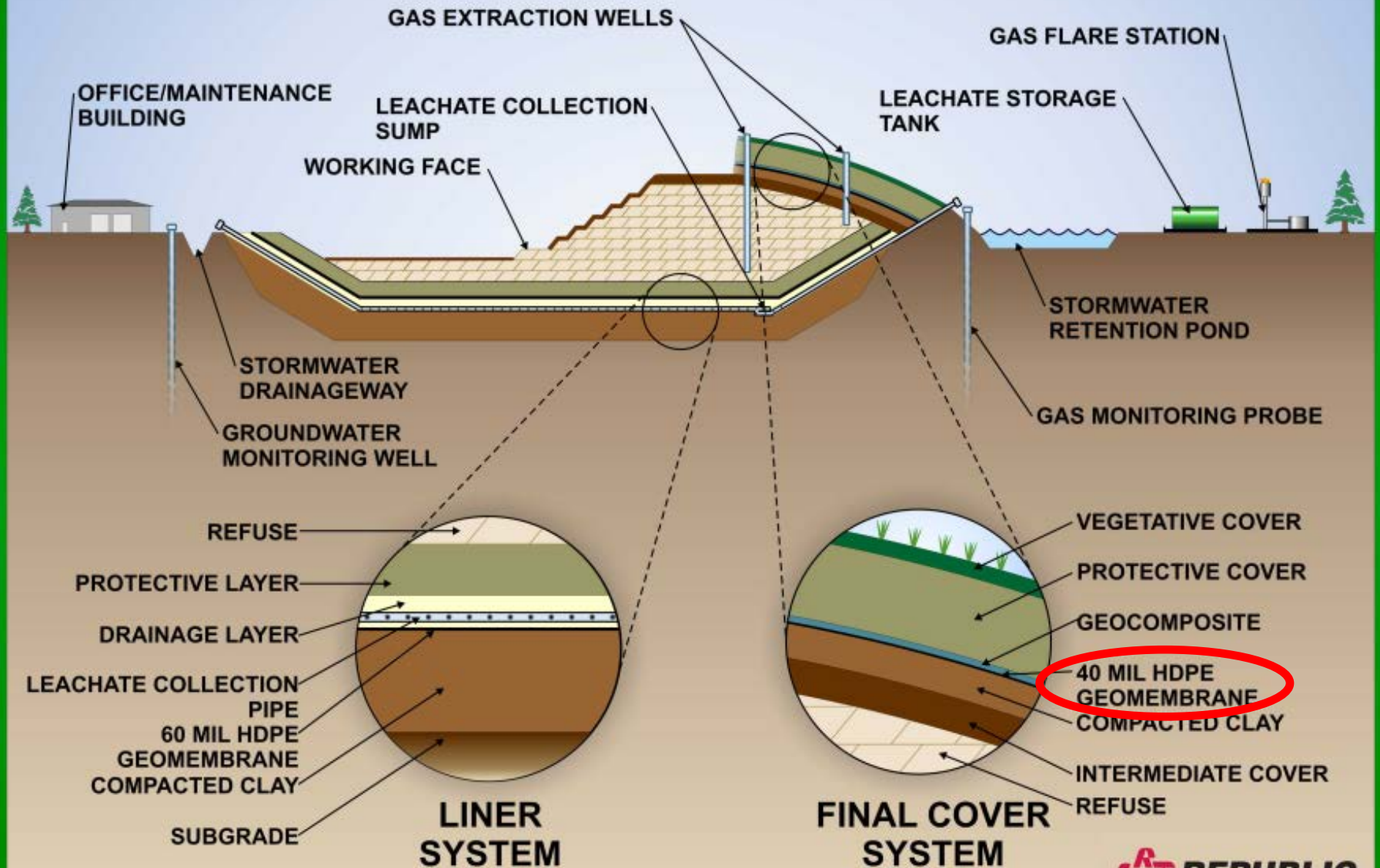


Blue Ridge Landfill growth



*City of Pearland restricts vertical expansion of landfill by 2009 Settlement Agreement with BRL.

CONCEPTUAL LANDFILL DESIGN CROSS SECTION





We Take Environmental Responsibility Seriously

We believe actions speak louder than words. We're hands-on when it comes to environmental responsibility and protecting our planet for future generations. We collect nearly 5 million tons of recyclable material annually while over 160 environmental Managers, Engineers and Scientists focus on monitoring operational excellence in our landfills. Our recycling investments transform recyclable materials into an environmental supply chain, and we use practical innovations to create renewable energy, reduce emissions, and lower our operating costs. We're also involved in sustainability projects across the country, including food waste, school recycling, community recycling rewards, renewable energy, landfill habitat projects and many more.

Building Landfills Responsibly



The Linear Systems Approach



Drainage And Liquids Management



Rainfall



Ground Water Monitoring



Working Face



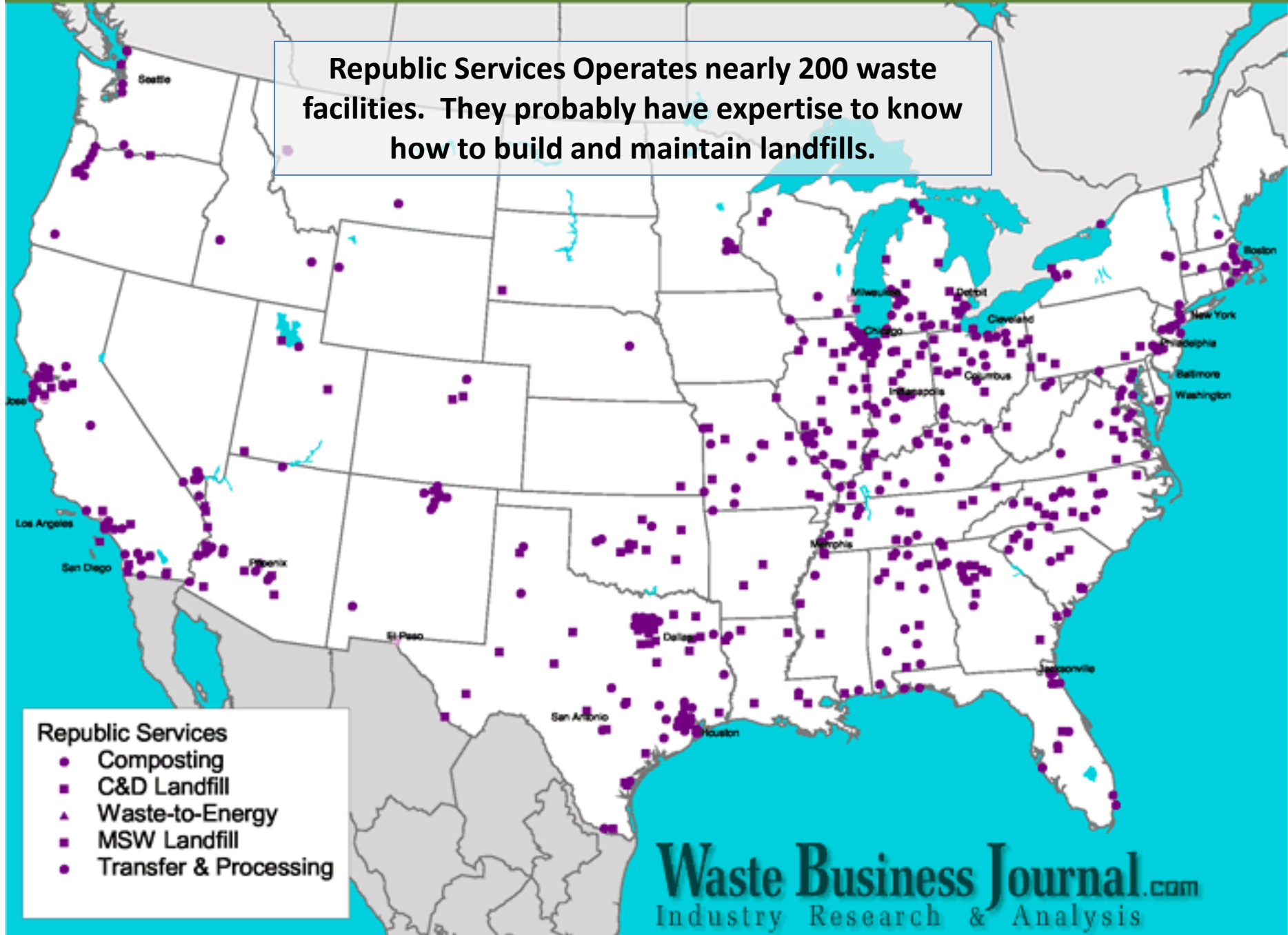
Final Cap

Final Cap

When a landfill section is full to capacity, it is capped with a final cover and monitored for at least 30 years. A typical cap consists of a synthetic plastic liner that is placed on top, entombing all that was put into the landfill. The liner is then topped with approximately 24 inches of soil and final vegetation.

Republic Services Facilities

Republic Services Operates nearly 200 waste facilities. They probably have expertise to know how to build and maintain landfills.



Typical geomembrane installation – final cover



Typical Construction Impervious Liner and Final Cover

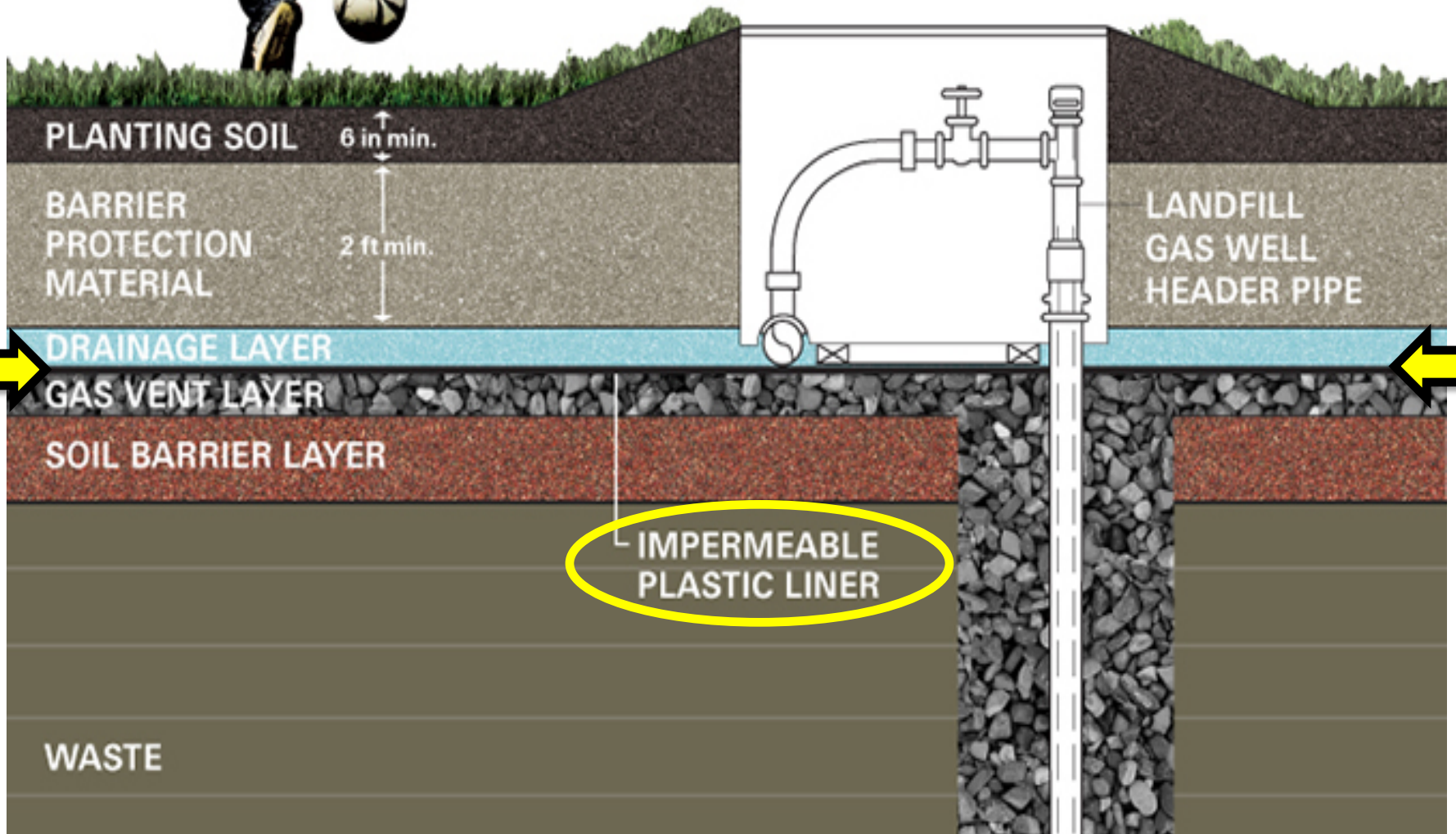


Bottom Liner



Final Cap with Wells

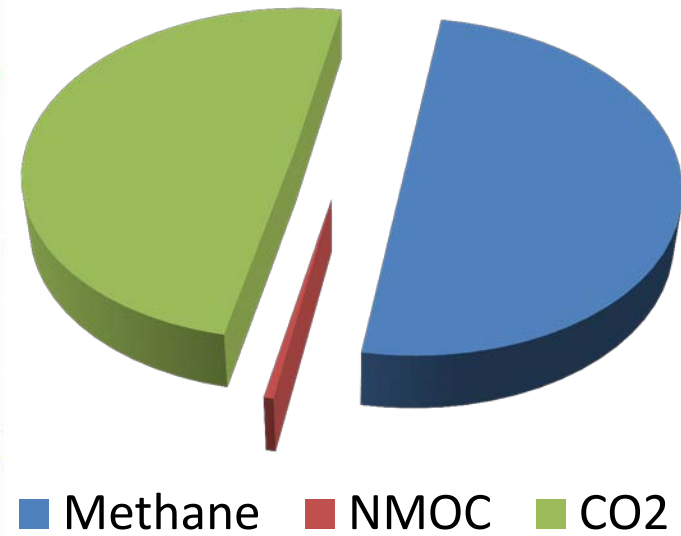
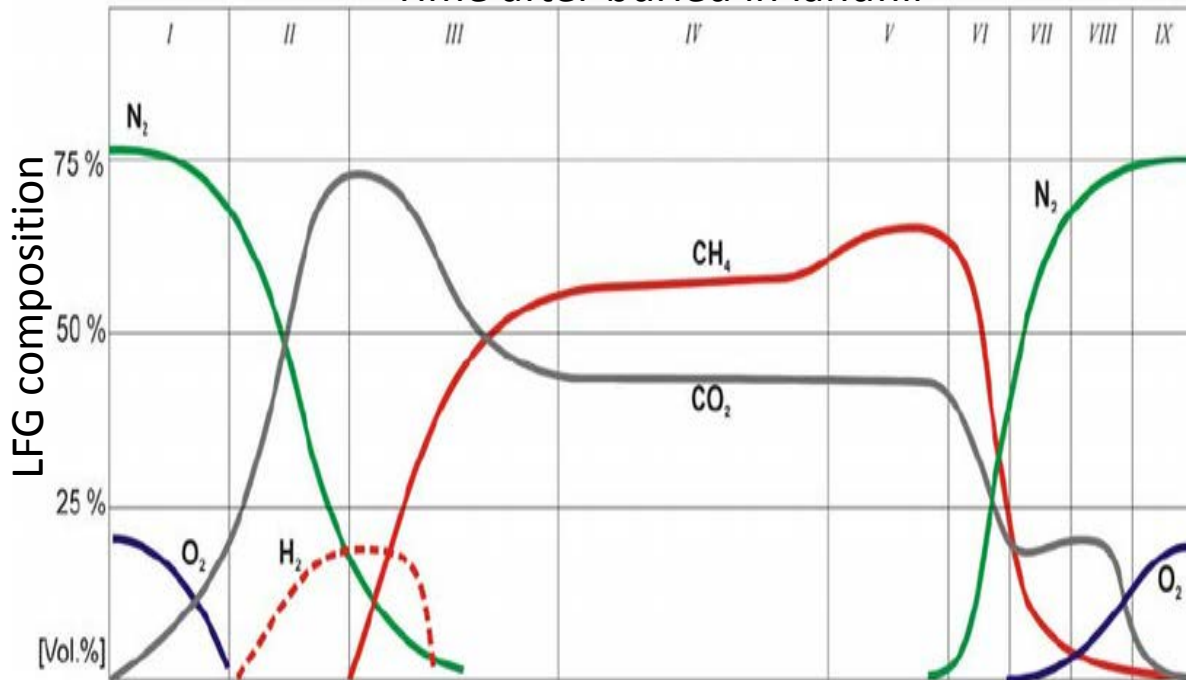
What is a landfill cap?



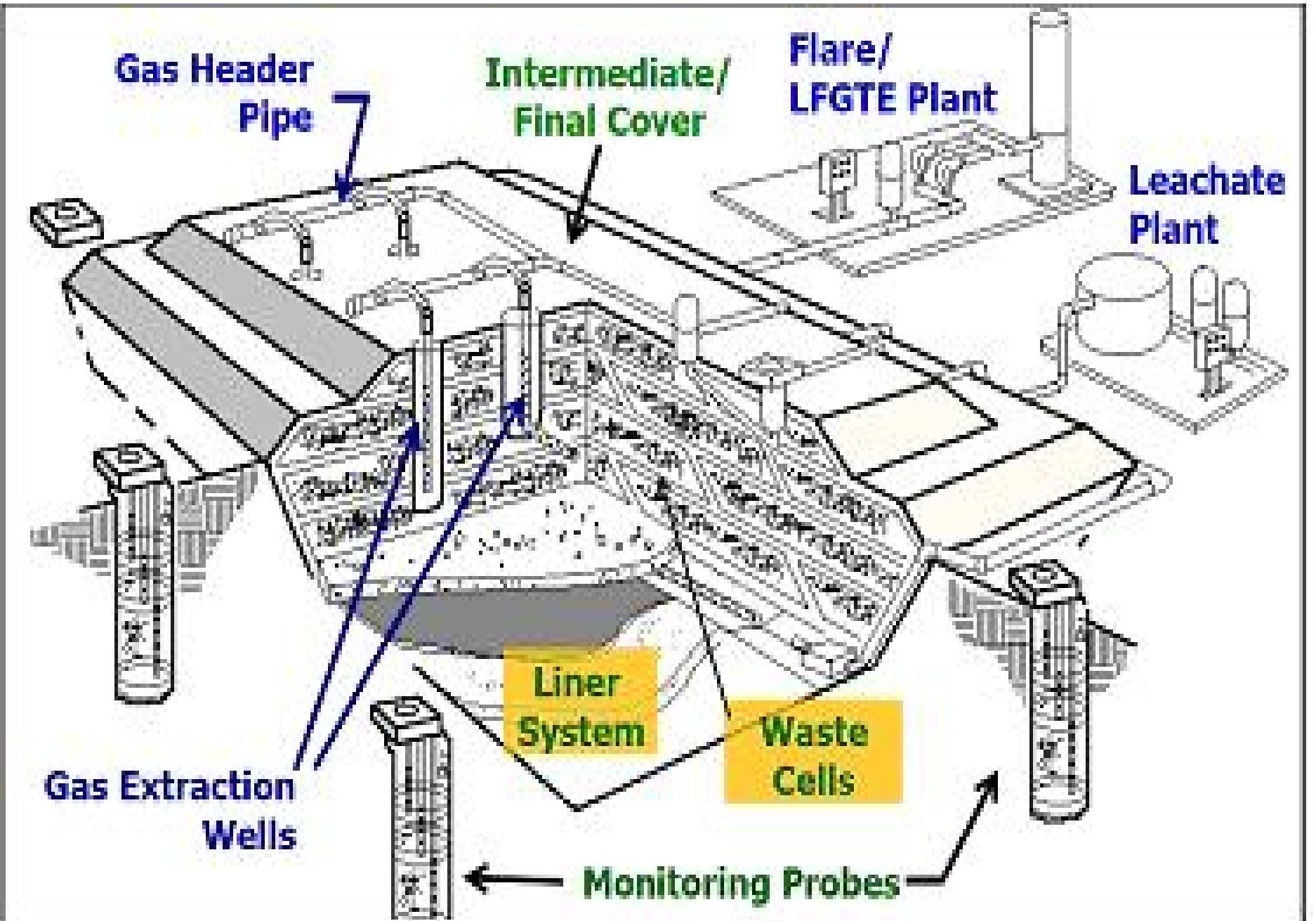
Landfill Gas (LFG)

- Naturally produced from waste decomposition
 - Carbon dioxide – CO_2 – soluble in water, discharge with leachate
 - Methane – CH_4 – component of natural gas
 - lighter than air, odorless
 - burned or used as a renewable energy source
 - Non-Methane Organic Compounds (NMOC) – odorous gas

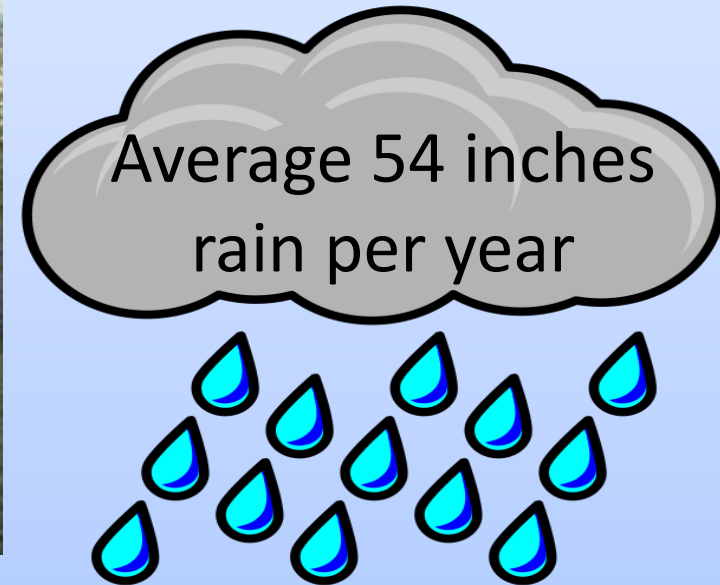
Time after buried in landfill



Typical Landfill Gas Collection and Control System (GCCS)



Typical BRL Intermediate Cover + Rain



Permeable
Surfaces

Existing Phases = ~375 Acres

**Water entering landfill accelerating
generation of Landfill Gas**

Average 54 inches of rain per year

X 375 acres

=

Over 550 million gallons of water each year.

How much is infiltrating?

**BRL reports approximately 6 million gallons
leachate removed from within buried waste/year.**

TCEQ conducted onsite investigations at BRL in November 2016. Documented numerous locations of leachate bubbling at surface of landfill. This is a clear indication landfill is saturated with water and it should not be.



TCEQ video:

<http://www.sfgate.com/news/media/TCEQ-Gas-and-liquid-bubbles-up-from-soil-cover-866592.php>



Source

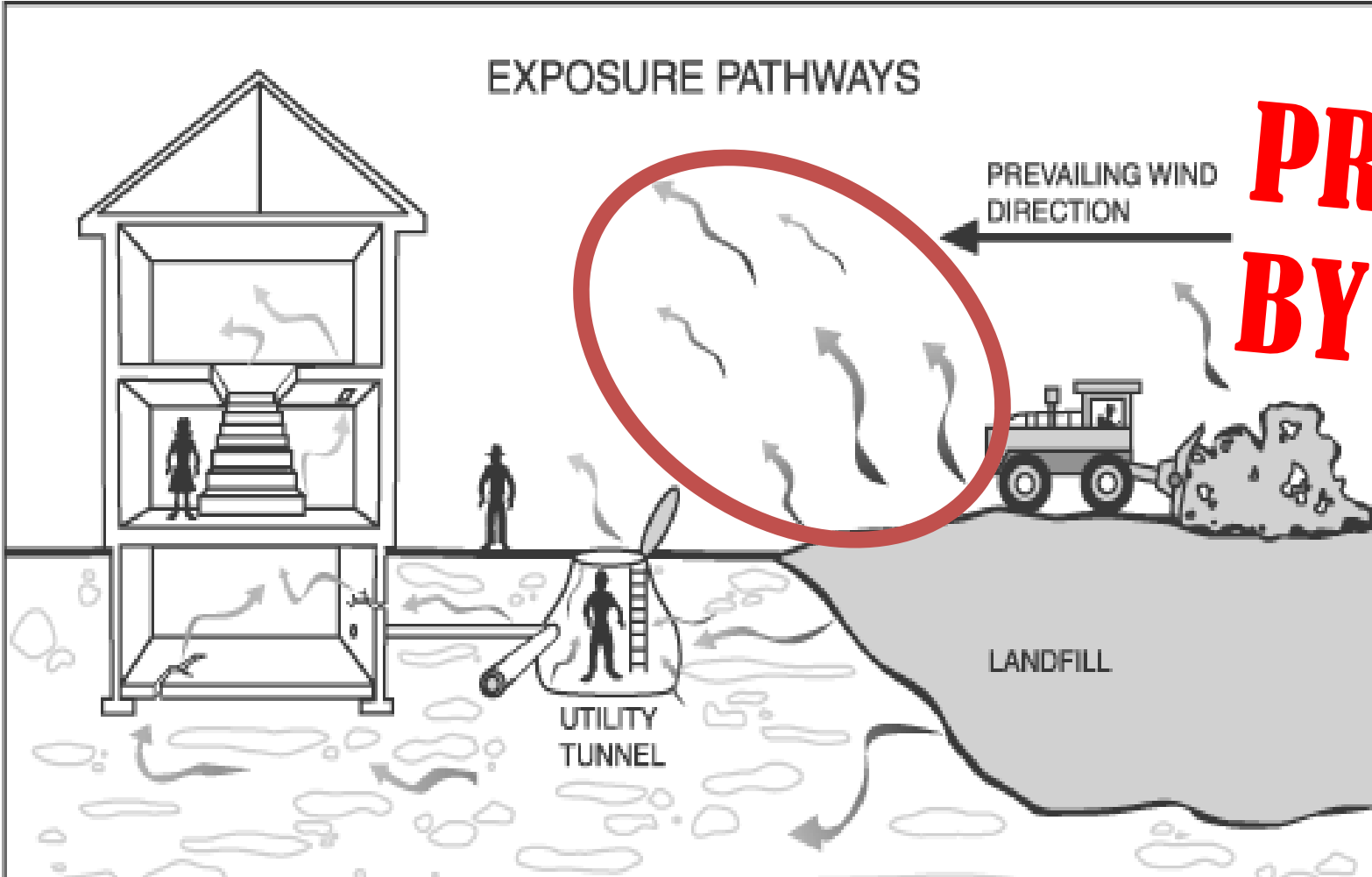
Emission

Transport

Receptor

Impact

EXPOSURE PATHWAYS

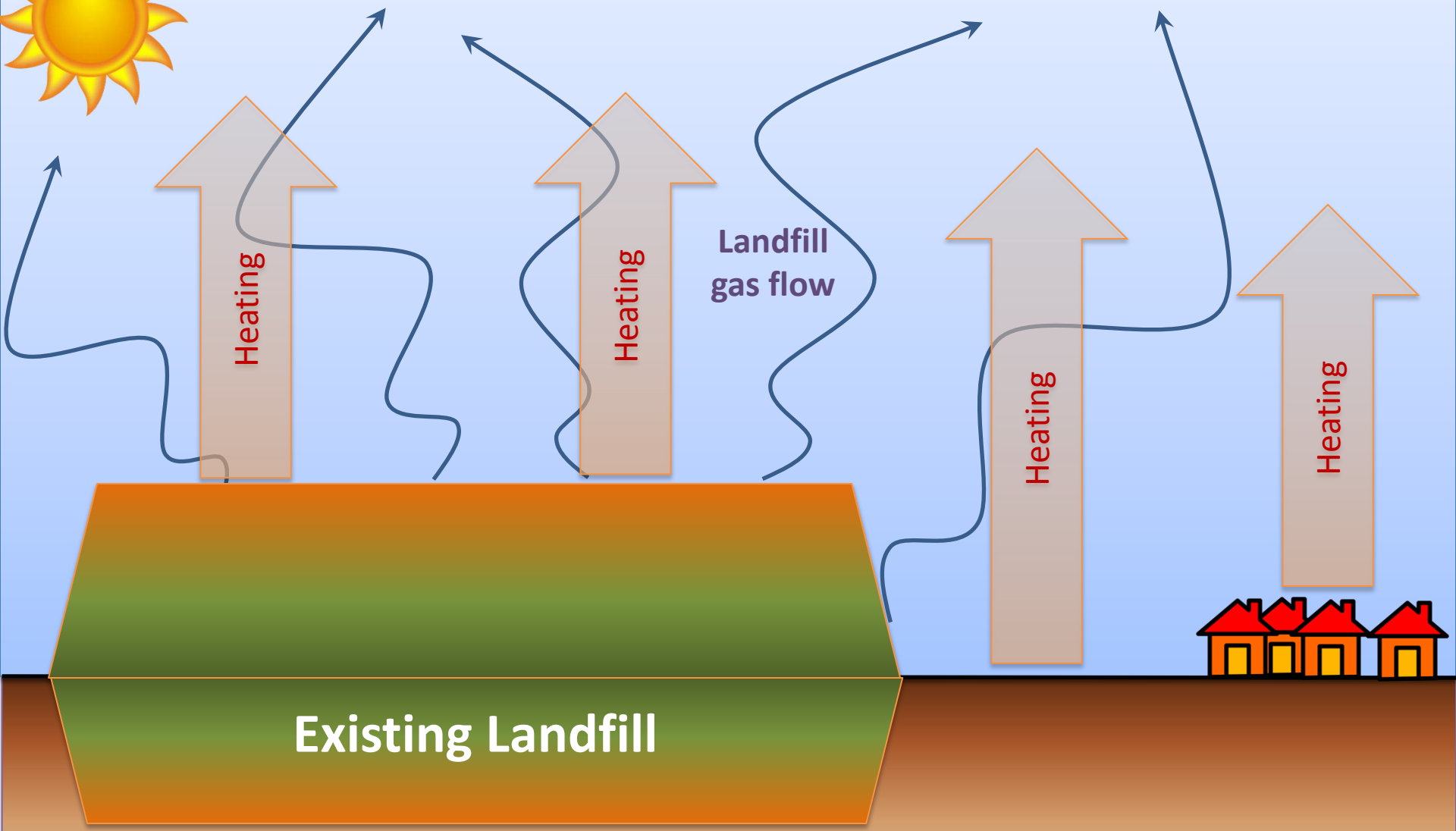
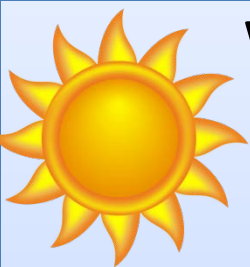


**PROVEN
BY TCEQ**

Why do I only smell odors at night and early morning?

- The sun causes atmosphere to heat up and expand, increasing winds and molecules move to lower pressure areas, which means up. So landfill gasses are dissipating upwards and diluting in the daytime winds.
- As the sun sets, atmosphere cools, causing air molecules to condense and fall back to earth. The landfill gasses then just settle around surface where they are escaping the landfill. If there is a breeze, the wind will carry the gasses in the direction of the breeze.
- The landfill is 60 feet higher than the foundation of surrounding homes.

Why do I rarely smell odors during day?



Existing Landfill

Landfill gas flow

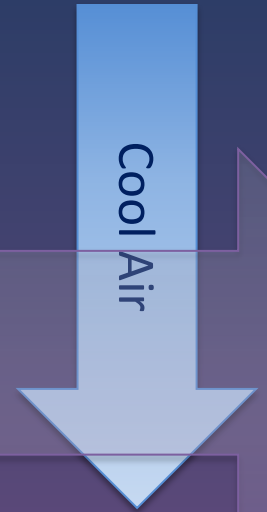
Heating

Heating

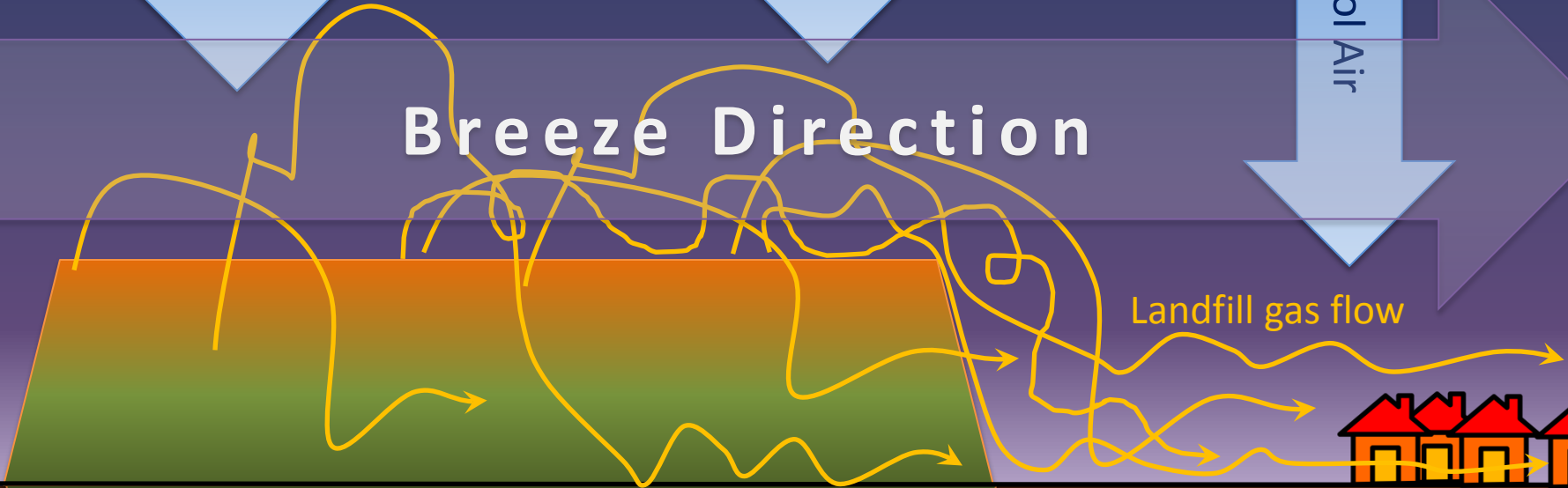
Heating

Heating

Why do I only smell the odors at night?



Breeze Direction



Landfill gas flow

Existing Landfill





There it is: they have the expertise to know what works and doesn't work.

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TCEQ Actions



- Notice of Enforcement
 - “Strongly Offensive Nuisance Odor” in Residential Neighborhood (SCR) – June 2016
 - Failure to conduct self monitoring for methane leaking across surface of landfill – November 2016
 - Effective July 2017...5 years or until Agreed Order corrective actions in place (whichever is later).

Other legal actions

- Private lawsuit by 8 land owners in Pearland. Filed in federal court 2016. Hearing late 2018. May become class action in Spring 2018.
- City of Pearland lawsuit. Filed in Travis County July 2017. Resulted in dissolution of the city-led, resident-supported odor task force.



Possible Solution

- BRL follow federal and state laws specified in its landfill operating permit issued July 2010 by TCEQ.
- TCEQ Must Enforce Federal and State laws:
 - BRL Prevent rainwater infiltration to buried waste.
 - Landfill gas extraction system recover minimum 85% LFG NMOCs.

Report all events!

[Org Chart](#) | [A to Z Index](#) |



TEXAS COMMISSION
ON ENVIRONMENTAL QUALITY

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La

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[Make an Environmental Complaint](#)

[Investigations and Compliance Assistance](#)

[Enforcement Process and Actions](#)

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Make an Environmental Complaint

We are available 24 hours every day to receive complaints under our jurisdiction.

To submit a complaint **under our jurisdiction** :

- [use our online form](#), OR
- call us toll-free at 1-888-777-3186

If you want to **report a smoking vehicle**, please use this TCEQ [online form](#).

Report all events!

- Pearland has widget in city services app for “Odor”
 - Over 3,000 complaints from the Pearland community
- TCEQ is complaint-driven agency. They will take their attention off BRL if few to no complaints.

Suspected Cause of Offensive Nuisance Odor from Blue Ridge Landfill

Ed Mears

Pearland, TX 77584

edtmears@gmail.com

BRL LFG System Requirements

EPA Rules: Maximum Achievable Control Technology (MACT) for Hazardous Air Pollutants (HAP).

Category 3:

- Largest MSWLF authorized by the Standard Permit
- Design capacity greater than 2.5 million megagrams (MMg) or 2.5 million cubic meters (M3)
- Calculated uncontrolled NMOC emission rate greater than or equal to 50 Mg/yr

* Applicability and control requirements of 40 CFR Part 60, Subpart WWW and 40 CFR Part 63, Subpart AAAA.

Summary: Suspected Cause of Offensive Nuisance Odors

- Irregular landfill construction
 - infiltration of stormwater
 - Average of 54 inches rainwater per year
 - million of tons buried municipal waste
- Water + buried waste =
 - saturated hydrolysis environment
 - natural decomposition - methanogenesis
 - Methane (~50%),
 - Carbon dioxide (~45%),
 - Nitrogen (~5%)
 - Non-methane organic compounds – NMOC (~1%)