

# C2.06 – Raptor Refinery Environmental Remediation



Contributors: Baylee Hartman (PM), Erika Cruz, Anita Natufe, Rafael Jaimes  
Sponsor: Leo Dielmann, TRC Environmental

## Project Overview

Aiming to protect nearby communities and ecosystems by addressing soil and groundwater contamination through environmental remediation.



## Sustainability

Credit Category	Applicable	Submitted	Percentage
Quality of Life	152	59	39%
Resource Allocation	182	84	46%
Natural World	128	64	50%
Climate and Risk	91	44	48%
Total Points (%)	553	251	45%

Envision Award Level: Gold

## Clean-up Criteria

Constituents	Soil	Groundwater
Benzene	MAXIMUM CONTAMINANT LEVEL = 300 mg/L	MAXIMUM CONTAMINANT LEVEL = 0.05 mg/L
Ethyl Benzene	MAXIMUM CONTAMINANT LEVEL = 1500 mg/L	MAXIMUM CONTAMINANT LEVEL = 1.0 mg/L
Toluene	MAXIMUM CONTAMINANT LEVEL = 2000 mg/L	MAXIMUM CONTAMINANT LEVEL = 0.5 mg/L
TPH (Total Petroleum Hydrocarbon)	NO SPECIFIC MAXIMUM CONTAMINANT LEVEL	NO SPECIFIC MAXIMUM CONTAMINANT LEVEL

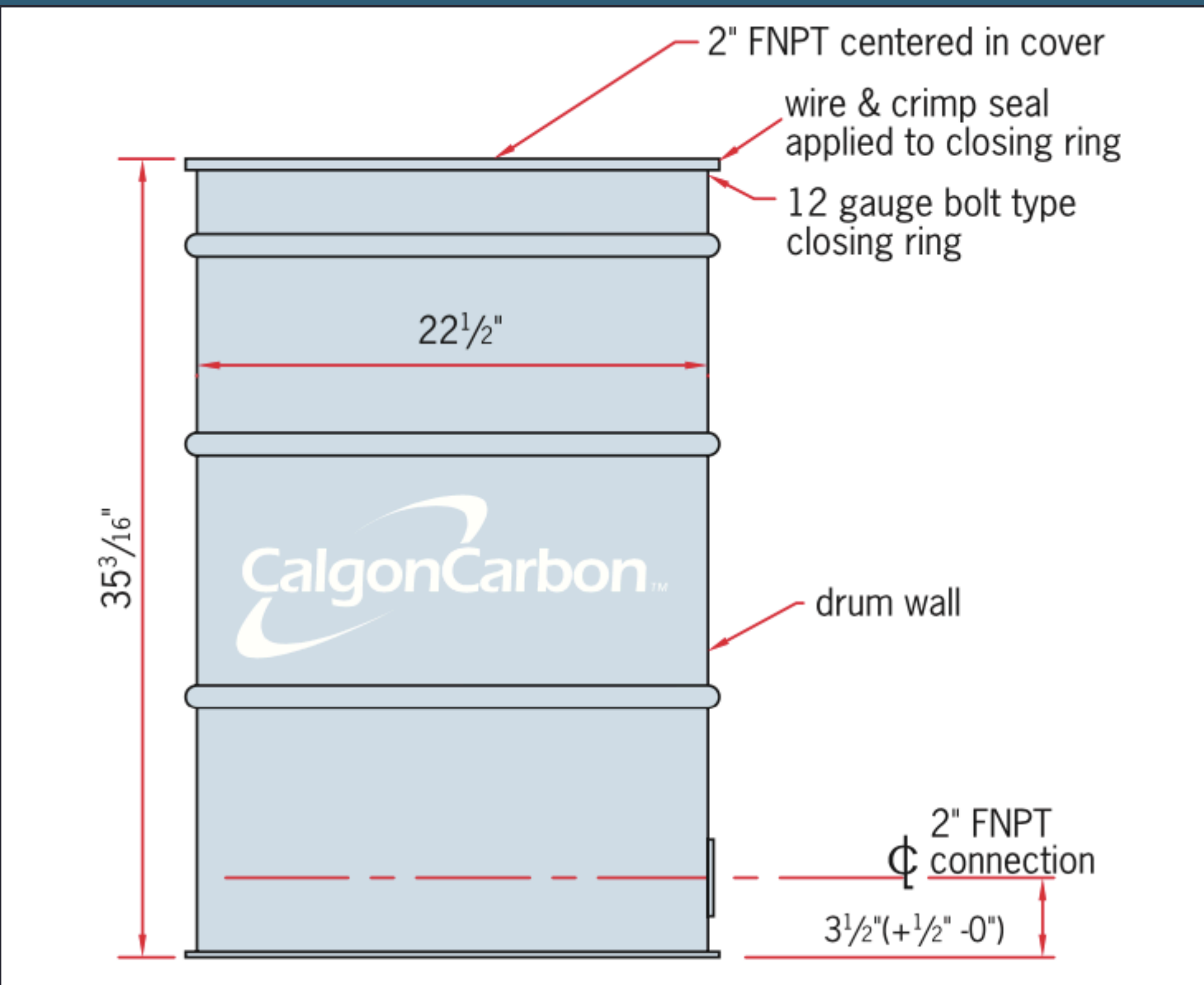
## System Design

### SVE & Air Sparging Wells



SVE & Air Sparging Wells  
Radius of Influence

### Carbon Treatment Unit



Activated Carbon Canister:  
AP4-60

## Element Design

### SVE & Air Sparging Pipelines



### Regulated by: TCEQ

### Permits Required:

- Injection Well Permit – 30 TAC § 331.10
- Air Emissions Permit – 30 TAC § 106
- PBR (Permit by Rule)

### Hydraulic Summary

	Trunk	Length (ft)	Diameter (ft)	Pipe Area (ft <sup>2</sup> )	Flow (scfm)	Velocity (ft/s)	Pressure Drop (psi)
Air Sparging	1	345	0.21	0.034	9.78	4.78	0.36
	2	278	0.17	0.034	5.22	3.98	0.25
Soil Vapor Extraction	1	315	0.17	0.022	0.055	0.042	1.9×10 <sup>-5</sup>
	2	281	0.17	0.022	0.055	0.042	1.7×10 <sup>-5</sup>

## Cost Analysis

### Life-Cycle Cost

Capital Costs	\$1,850,000
Annual O&M (First 2 Years)	\$225,000
Annual Monitoring (12 Years)	\$581,000
LCC	\$9,272,000
NPV	\$7,116,000

## Constraints and Standards

Envision Framework

EPA

PBR

Pressure and Flow Design

Radius of Influence

Soil Permeability

TCEQ

TRRP– 30 TAC CHAPTER 350

## Team Members

