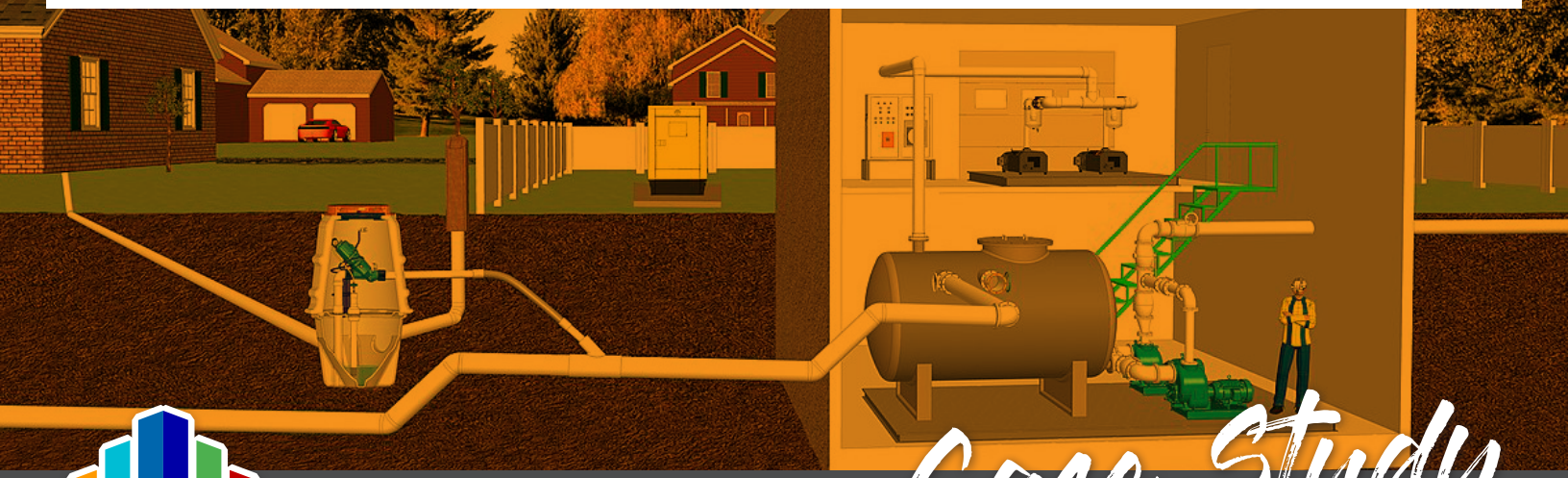
VACUUM SEWER SYSTEM EXPANSION ON THE TEXAS GULF COAST



LYNN ENGINEERING

Case Study

OVERVIEW:
The community of Port O'Connor, Texas, south of Victoria on West Matagorda Bay, has experienced growth in recent years. The vacuum or pneumatic sewer system installed in 2000 has been underperforming of late. The Port O'Connor Improvement District contracted Lynn Engineering to design a more robust vacuum sewer system with additional capacity to handle the recent expansion and projected growth in the future.

PRACTICE: Civil Engineering,
SERVICES: Vacuum Sewer System Design
EQUIPMENT:
LOCATION: Port O'Connor, Texas

GOALS:
- Design a two-mile vacuum sewer system with five different feed lines to replace old system in growing community.
- Understand the design of the existing system and build new system alongside it to prevent rerouting of tie-ins and feed lines as much as possible.
- Ensure that the new system is functional not only for the needs of today, but that it will not soon become obsolete.

THE CHALLENGE:
Vacuum/Pneumatic Sewer Systems are not widely used in Texas. They are typically reserved for flat areas with sandy soil and high groundwater tables, such as the coast. Many contractors are not intimately familiar with the system and its design.

Records of the existing system were incomplete, yet the new system needed to run parallel to the old system. This presented a design challenge as the system passes through alleyways and alongside existing infrastructure and utilities such as gas a telephone lines.

The community does not have a building code. There are buildings protruding into easements and rights-of-way, as well as decks built over alleys.

THE SOLUTION:
This project required an extensive amount of research. Records of the existing pneumatic system were incomplete. The engineer was able to locate the original construction plans for the system installed in 2020. Unfortunately, many changes were made in the field during construction, rendering the original construction plans almost unusable. The engineer then spent several days in the field during the design phase, walking down the lines and manually probing for the depth of the lines and documenting obstructions both above and below the ground. The engineer also noted where lots without homes or structures are along the route and where homes may have rainwater run-off routed to the wastewater system.

THE RESULTS:
The final design includes considerations for the empty lots along the two-mile system and will allow for future development or expansion. It is built to handle increased capacity, but not overbuilt so as to hinder the pressure requirements of the vacuum system. During the construction phase, the engineer is on-site at least one full day each week to check progress, walk down the lines and answer any questions of the contractors as this pneumatic design is not typical for the region.

HIGHLIGHTS:
- Extensive research and in-field discovery of existing system
- Engineer in field frequently to understand the needs of system
- Considerations for increased capacity and new development