

Alternative Analysis Burton Station Project

1.0 INTRODUCTION

The Burton Station Project (Project) proposed by Lone Star NGL Mont Belvieu LP (Lone Star) involves the construction of new hydrocarbon processing units (HPUs) and underground storage cavern support infrastructure within the Barbers Hill Salt Dome approximately 1.50 miles northwest of Mont Belvieu in Chambers County, Texas (**Appendix 1**).

Lone Star purchased a 613-acre parcel with the intentions of increasing the capacity of its existing underground salt dome storage system and to increase its capabilities of processing unrefined hydrocarbons. The location, size, and shape of proposed facilities are dependent on several limiting factors. A large utility right of way (ROW) consisting of overhead and buried utilities divides the property. Additionally, other existing pipeline ROWs, industrial facilities (sub-station and well pads), and proposed infrastructure not associated with the Project are located on the property. These factors present constructability constraints and were taken into consideration when designing the location and shape of the facilities.

Pursuant to Section 404(b)(1) of the *Clean Water Act*, the U.S. Army Corps of Engineers defines practicable alternatives as those which are "...available and capable of being done after taking into consideration cost, existing technology, and logistics in light of the overall project purpose." Lone Star evaluated a no action alternative, as well as three site alternatives to determine the most environmentally preferable design that would still meet the required production and storage capacity needs of the proposed Project. The no-action alternative as well as the site alternatives are discussed below along with justification for the selection of the Preferred Alternative.

2.0 NO-ACTION ALTERNATIVE

Under the no-action alternative, Lone Star would not construct the proposed Project. If the proposed Project is not constructed, Lone Star would not be able to increase the capacity of its existing underground salt dome storage facility or increase capabilities of processing unrefined hydrocarbons. Brine ponds are a crucial aspect of operating the salt dome, and they make it possible to safely extract and fill the underground storage facility with a variety of end-use products. The no-action alternative would not meet the objective of the Project, which is to support the operation of the underground salt dome storage facility and increase production of unrefined hydrocarbons to end-products to meet market demands. Therefore, this alternative was dismissed from further consideration.

3.0 FACILITY SITE ALTERNATIVES

In addition to the no-action alternative, Lone Star evaluated a total of four site layouts for the proposed facilities: The Preferred Alternative, Alternative 1, Alternative 2, and Alternative 3. The location of each of the site alternatives evaluated are presented in **Appendix 1**.

Note that each of the site alternatives are located on properties currently owned by Lone Star. Lone Star's land acquisition group vetted properties of sufficient size to support the Project needs within the immediate vicinity of Lone Star's salt dome system during the preliminary design phase of the facilities. With exception of the 618-acre parcel of land purchased by Lone Star, land acreages of sufficient size are not currently available for purchase from the respective private landowners in the surrounding area.

The four site alternatives were evaluated and compared utilizing desktop analysis tools including topographic maps, National Wetlands Inventory (NWI) maps, National Hydrography Dataset (NHD) maps, and aerial imagery. While field survey data is available for the Preferred Alternative, Alternative 1, and Alternative 2; NWI data was used for all four sites in this analysis to maintain consistency for comparison. A quantitative comparison of the site alternatives is presented in **Table 1**.

Category	Preferred Alternative	Alternative 1	Alternative 2	Alternative 3
State Lands within 0.25 mile	0	0	0	0
Waterbody Crossings ^a	0	0	0	0
Land Use Impact (Acres)^b				
Forested	94.07	101.11	102.52	83.35
Scrub Shrub	62.26	63.10	63.07	70.87
NWI Wetland ^c	30.01	30.01	47.14	54.30
Open Land ^d	148.78	125.70	144.54	114.43
Industrial ^e	0.02	0.02	0.02	0.02
Open Water ^f	0.61	0.94	0.94	0.61
Total Workspace Size (Acres)	335.75	320.88	358.23	323.58
Additional Infrastructure Required Beyond Lone Star Owned Properties	No	No	No	Yes

Table 1				
Burton Station Project Site Alternatives Comparison				
Category	Preferred Alternative	Alternative 1	Alternative 2	Alternative 3
Facilities/Access Roads Outside of Lone Star's Property	No	No	No	No
<p>^a Includes only streams, canals, and waterbodies recognized in NHD that are impacted by the footprint of the ponds and roads.</p> <p>^b Inclusive of acreages associated with access roads.</p> <p>^c Includes only wetlands recognized in the NWI dataset that are impacted by the footprint of the ponds and roads. No data from the wetland delineation of the site is included in this data.</p> <p>^d Consists of fallow pastureland, utility line ROW, and two-track field access roads.</p> <p>^e Consists of electrical substations and well pad sites.</p> <p>^f Open water features consist of manmade ponds.</p> <p>^g Examples of additional infrastructure consists of piping and roads necessary to transport products and access facility locations.</p>				

Preferred Alternative

The Preferred Alternative would result in the permanent fill of approximately 30.01 acres of NWI wetlands during construction of the Project facilities and associated access roads. The majority of the footprint is characterized as open land (148.78 acres), while upland forest comprises approximately 94.07 acres of the overall Project extent. Lone Star designed the Preferred Alternative to seat approximately 63% of facilities and associated access roads within non-forested upland areas. Areas containing open land were utilized to the greatest extent practicable, only excluding portions with existing infrastructure or areas of proposed development not associated with the Project. In addition, the Preferred Alternative is limited to a single property currently owned by Lone Star, thereby eliminating the need to construct additional infrastructure (i.e. piping/access roads) across privately owned tracts of land and potential “Waters of the United States” to meet the demands of the Project.

When compared to Alternatives 2 and 3, the Preferred Alternative would result in less impacts to wetlands. Additionally, the overall construction footprint for the Preferred Alternative would result in less land disturbance than Alternatives 2 and 3. When compared to Alternative 1, the construction footprint for the Preferred Alternative would be slightly larger in size; however, impacts to NWI wetlands would remain the same while impacts to forested areas would slightly decrease. The Preferred Alternative is also the most desirable from an engineering standpoint in that it allows brine to be stored across multiple ponds at smaller volumes. This would provide Lone Star the ability to continue operational processes in the event maintenance/repair events occur requiring temporary removal of brine from a given storage pond.

Therefore, this alternative is considered to be the most preferable from both an environmental and operational standpoint.

Alternative 1

Similar to the Preferred Alternative, Alternative 1 would result in the permanent fill of approximately 30.01 acres of NWI wetlands during construction of the Project facilities and associated access roads. The majority of the footprint is characterized as open land (125.70 acres), while upland forest comprises approximately 101.11 acres. Approximately 59% of facilities and associated access roads are seated within non-forested upland areas. Alternative 1 is also limited to the same property as the Preferred Alternative; however, impacts to forested habitats would increase by approximately 7.04 acres.

Alternative 1 includes the construction of a single large brine pond containing a storage capacity of approximately 20.7 million barrels (MMbbl). Construction of a single brine pond would increase Lone Star's overall storage capacity by approximately 0.8 MMbbl when compared to the Preferred Alternative; however, operational processes would cease for up to one year during each required maintenance activity due to the complexity of draining and maintaining a pond of this size. Additionally, large brine ponds are more difficult to maintain due to the amount of surface area present and the bank slope requirements necessary per the holding volume. As such, Alternative 1 is not preferable from an environmental and operational standpoint and was not considered further.

Alternative 2

Alternative 2 would result in the permanent fill of approximately 47.14 acres of NWI wetlands during construction of the Project facilities and associated access roads. The majority of the footprint is characterized as open land (144.54 acres), while upland forest comprises approximately 102.52 acres. Approximately 58% of facilities and associated access roads are seated within non-forested upland areas. Alternative 2 is also limited to the same property as the Preferred Alternative; however, the overall workspace size would increase by approximately 22.48 acres to achieve the Project purpose, and impacts to forested/wetland habitats would increase by approximately 8.45 acres and 17.13 acres, respectively.

Alternative 2 consists of the replacement of Brine Pond 9 and Detention Pond 2 with HPU 1 and HPU 2. As a result, two brine ponds with smaller holding volumes would be constructed in the location where HPU 1 and 2 are seated in the Preferred Alternative. The smaller brine ponds would each contain a storage volume of approximately 2.3 MMbbl (4.6 MMbbl total), which would increase Lone Star's overall storage capacity by approximately 1.6 MMbbl. Additionally, Alternative 2 would consist of a single detention pond with a storage volume of 32 million cubic feet (MMCF), which would increase stormwater detention

by 2.8 MMCF across the Project site. The additional detention volume would be required due to an increase of impervious materials associated with the HPUs within the 100-year floodplain of Cedar Bayou.

Alternative 2 is not environmentally preferable due to the increase in workspace size and additional impacts to forested/wetland habitats and was not considered further.

Alternative 3

Alternative 3 would result in the permanent fill of approximately 54.30 acres of NWI wetlands during construction of the Project facilities and associated access roads. The majority of the footprint is characterized as open land (114.43 acres), while upland forest comprises approximately 83.35 acres. Approximately 57% of facilities and associated access roads are seated within non-forested upland areas. As described below, Alternative 3 utilizes a combination of properties owned by Lone Star to seat the required facilities necessary for the Project. When compared to the Preferred Alternative, the overall workspace size would decrease by approximately 12.17 acres to achieve the Project purpose; however, impacts to wetland habitats would increase by approximately 24.29 acres.

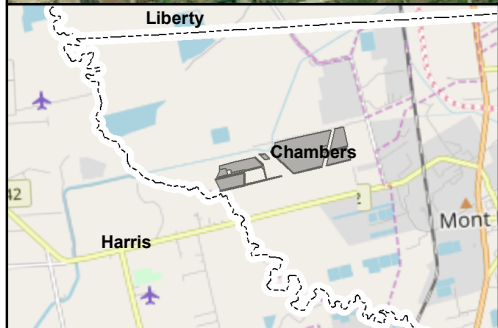
Alternative 3 consists of the relocation of Brine Pond 9 and HPU 2 to an approximate 116-acre tract of land located to the south of the Preferred Alternative that is currently owned by Lone Star. Relocation of the aforementioned facilities would allow for the removal of Detention Pond 1 from the current scope of the Project; however, an additional detention pond would have to be constructed on the 116-acre tract of land to mitigate for fills within the 100-year floodplain and overall site drainage. Additionally, buried and overhead utilities would have to be constructed across privately owned tracts of land and potential "Waters of the United States" to transport both brine and product, and provide power to the offsite pond and HPU, respectively.

Alternative 3 is not environmentally preferable due to the increase in additional impacts to wetland habitats and was not considered further.

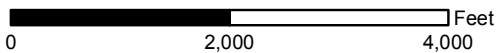
4.0 CONCLUSION

After reviewing the four site alternatives and the no-action alternative for the proposed Project, Lone Star concluded that the Preferred Alternative would result in the least environmental impacts while still meeting the Project's purpose and need.

Appendix 1
Alternative Site Maps

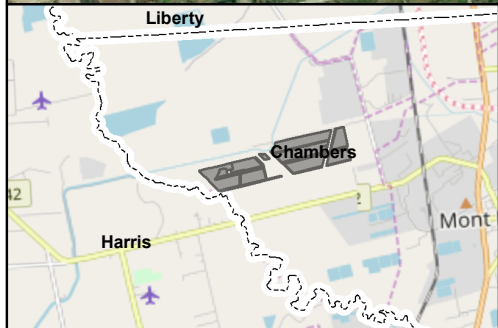


- Brine Pond Infrastructure
- Drainage Pond
- Access Road
- Brine Disposal Area
- Brine Pond
- Hydrocarbon Processing Unit
- CWA Lift Station
- NWI Wetland

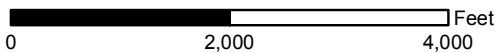


**Alternative 1
Burton Station Project
Lone Star NGL Mont Belvieu LP
Chambers County, Texas**

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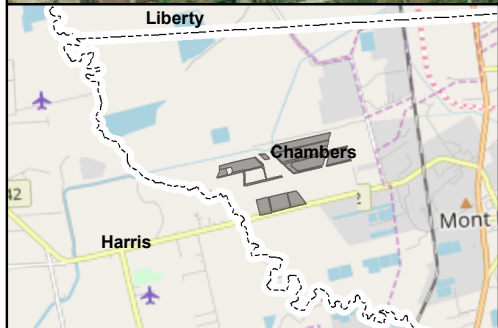


- Brine Pond Infrastructure
- Drainage Pond
- Access Road
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- CWA Lift Station
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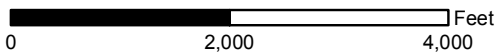


**Alternative 2
Burton Station Project
Lone Star NGL Mont Belvieu LP
Chambers County, Texas**

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- Brine Pond Infrastructure
- Drainage Pond
- Access Road
- Disposal Well
- Brine Pond
- Hydrocarbon Processing Units
- CWA Lift Station
- NWI Wetland



**Alternative 3
Burton Station Project
Lone Star NGL Mont Belvieu LP
Chambers County, Texas**

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