

# Duncan Sand Pit Traffic Impact Analysis League City, Texas

Submitted to:

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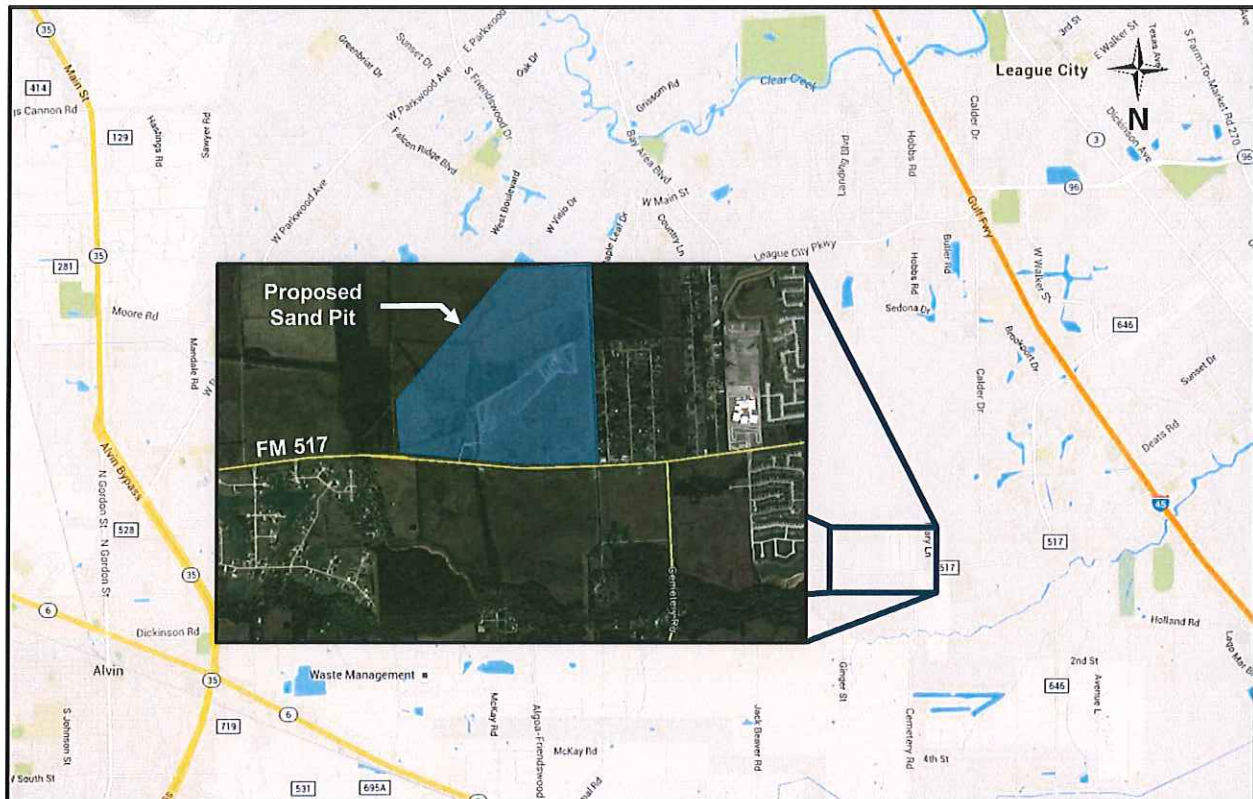
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## **I. Introduction**

### **Project Description**

Dannenbaum Engineering Corporation was retained by LPI Property Management to perform a Traffic Impact Analysis for the proposed Duncan Sand Pit located in League City, Texas (Galveston County). The Duncan Sand Pit is located on a 500 acre property where 1.25 million cubic yards of soil will be excavated from the pit over a 5 year period. The proposed development location can be seen below in Figure 1.



*Figure 1 – Project Location Map*

### **Project Timeline**

For this study the Duncan Sand Pit is expected to complete excavation in 2021. Upon completion, the sand pit will be abandoned which will terminate all traffic generation and impacts.

### **Study Area**

The study area will encompass one driveway that intersects with the north side of FM 517 approximately 3.2 miles west of Interstate 45. Figure 2 shows the project study area and Figure 3 shows the project site layout.



Figure 2 – Project Study Area

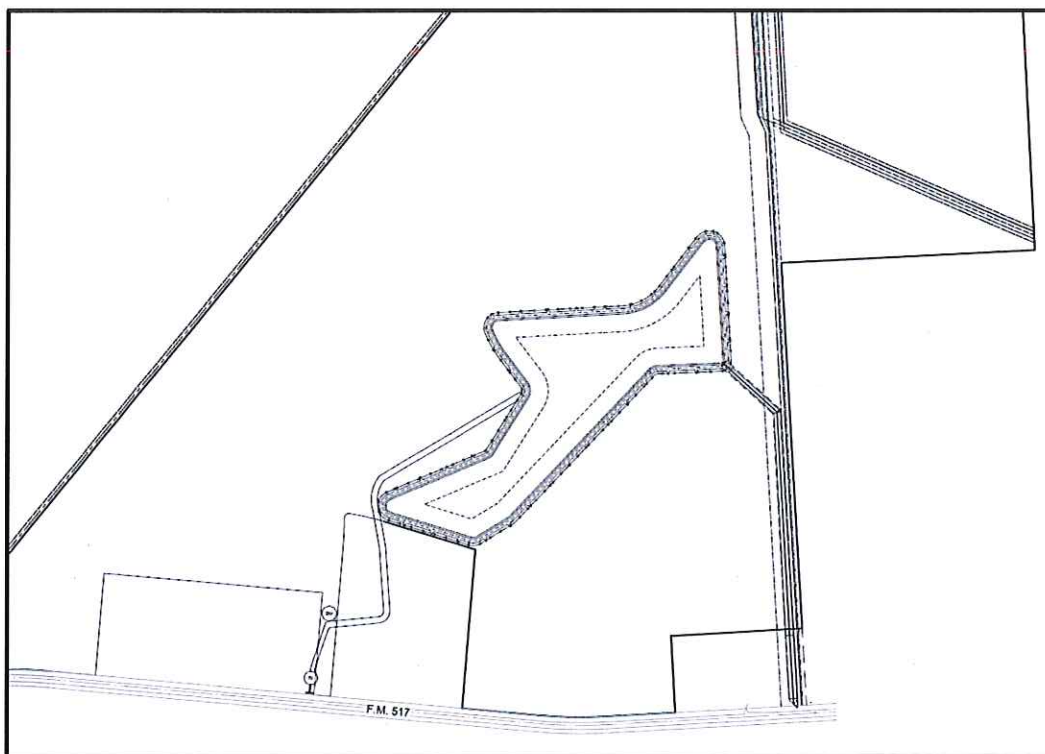


Figure 3 – Project Site Layout

**II. Study Methodology**

Key factors and assumptions made for the purposes of this study include:

- ✓ Estimating the trips generated by the proposed development
- ✓ Distributing traffic generated by the development
- ✓ Determining the AM/PM Peak Hour Trips, and Average Daily Traffic (ADT)

**III. Street Network**

The only roadway expected to be impacted by the development is FM 517. This roadway, which connects League City and Alvin, is a 44 foot wide roadway with one 12 foot lane in each direction of travel with 10 foot shoulders. The property where the sand pit is located includes an existing driveway which intersects with FM 517. This driveway will be utilized by all trucks entering and exiting the site.



**Photographs**



*Photograph 1 – FM 517 Facing East Adjacent to Duncan Sand Pit*



*Photograph 2 – FM 517 Facing West Adjacent to Duncan Sand Pit*

## Traffic Data

ADT Counts were obtained from the Texas Department of Transportation's 2014 District Traffic Map. The ADT along FM 517 west of the Duncan Sand Pit was 12,524.

## **V. Traffic Analysis**

### **Trip Generation**

Since the ITE Trip Generation Handbook does not include a category for a sand pit, the trip generation was determined based on information gathered regarding the Duncan Sand Pit Project. This included work week scheduling and the size of trucks used to transport material. Considering that:

$1,250,000 \text{ cubic yards of material} / 5 \text{ years} = 250,000 \text{ cubic yards per year}$

$250,000 \text{ cubic yards} / 260 \text{ days per year (5 days a week)} = 961 \text{ cubic yards per day}$

2 types of trucks, 36 cubic yard capacity and 8 cubic yard capacity, will be utilized to transport the material with half of the material being delivered in each type of truck.

$961 / 2 = 481 \text{ cubic yards} / 36 \text{ cubic yards} = 14 \text{ trucks per day}$

$480 \text{ cubic yards} / 8 \text{ cubic yards} = 60 \text{ trucks per day}$

$14 + 60 = 74 \text{ trucks per day}$

Assuming that most of the work will be conducted in the morning, a 20% AM Peak hour factor will be utilized.

$74 * 0.20 = \underline{\mathbf{15 \text{ trucks entering and exiting the property during the AM Peak hour}}}$

Assuming that very little work will be conducted in the evening, a 5% PM Peak hour factor will be utilized.

$74 * 0.05 = \underline{\mathbf{4 \text{ trucks entering and exiting the property during the PM Peak hour}}}$



### **Trip Distribution**

Based upon expected travel patterns and traffic engineering judgment, a 50 / 50 directional split was determined as the global distribution as seen in Figure 4.



Figure 4 – Global Trip Distribution Percentages

Figure 5 shows the volumes calculated for the global distribution. Considering that 15 and 4 trucks enter/exit the property in the AM and PM Peak Hours, respectively, the following can be deduced:

**15 \* 0.50 = 8 entering / exiting eastbound trucks and 7 entering / exiting westbound trucks in the AM Peak Hour.**

**4 \* 0.50 = 2 entering / exiting eastbound trucks and 2 entering / exiting westbound trucks in the PM Peak Hour.**





Figure 5 – Global Trip Distribution Volumes

## VI. Turn Lane Analysis

Table 2-3 of the TxDOT Access Management Manual states that a left or right-turn lane should be considered when turn volumes exceed 50 vehicles per hour when the speed limit is greater than 45 miles per hour, and 60 vehicles per hour when the speed limit is 45 miles per hour or less.

The existing driveway for the Duncan Sand Pit will have projected right and left turn volumes that do not exceed 8 vehicles per hour in either peak hour. Therefore, neither left nor right turn lanes are recommended for the sand pit.

## VII. Conclusion & Recommendation

Based on this traffic analysis, the Duncan Sand Pit is expected to create minimal impacts on the surrounding roadway network through the 2021 project termination. With peak hour volumes not exceeding 8 vehicles per direction, FM 517 will experience very little impacts to operations and no roadway or driveway improvements are recommended at this time.



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