

# C2.01 – Airport Futurity

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## Project Overview

The project aims to increase the bearing capacity of Runway 13/31 of the San Marcos Regional Airport (SMRA) by adding a concrete overlay. This involved a detailed analysis of existing pavement structure/conditions.

The overlay will be designed to distribute the weight of aircraft more effectively, ultimately increasing the air traffic capabilities to further support the growing mission of the respective airport.

### Background

Increasing the bearing capacity of a runway is an important aspect of airport infrastructure management. Runways with inadequate bearing capacity can compromise the safety of air travel and result in costly repairs and maintenance.

After reviewing the SMRA master plan, Runway 13/31 was identified as only having a bearing capacity of 23,000 lbs. Therefore, we chose to address this runway for our Senior Design II project.

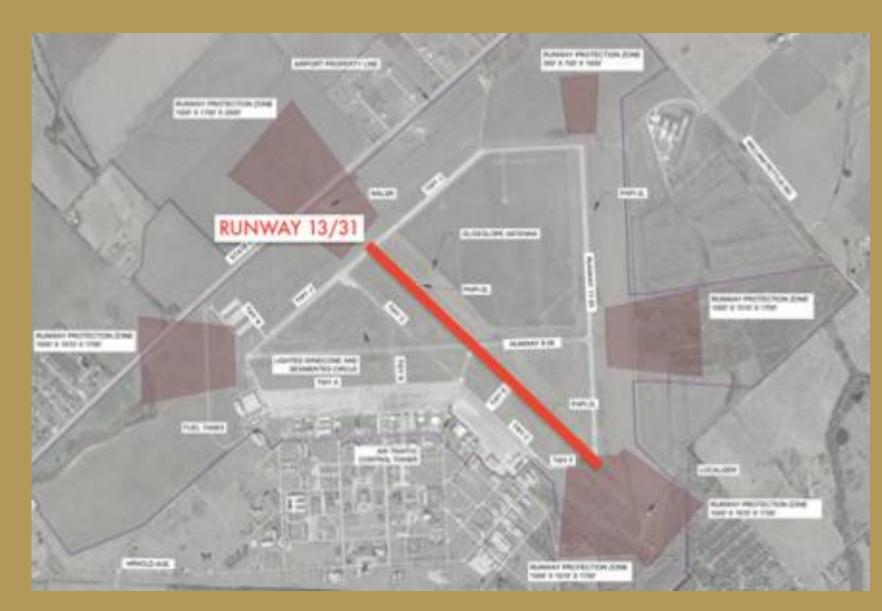
## Design Considerations

- Current Runway Conditions
- Annual Traffic Data
- Design Materials
- Bearing Capacity
- Sustainability
- Life Cycle Costs
- Construction



### Site Selection

The SMRA is the only Federal Aviation Administration (FAA) designated reliever airport for both the Austin-Bergstrom and San Antonio International Airports. Due to the rapid growth of Hay's County and the proximity to the University, our team chose this airport for our project.





## PCC Pavement System Design

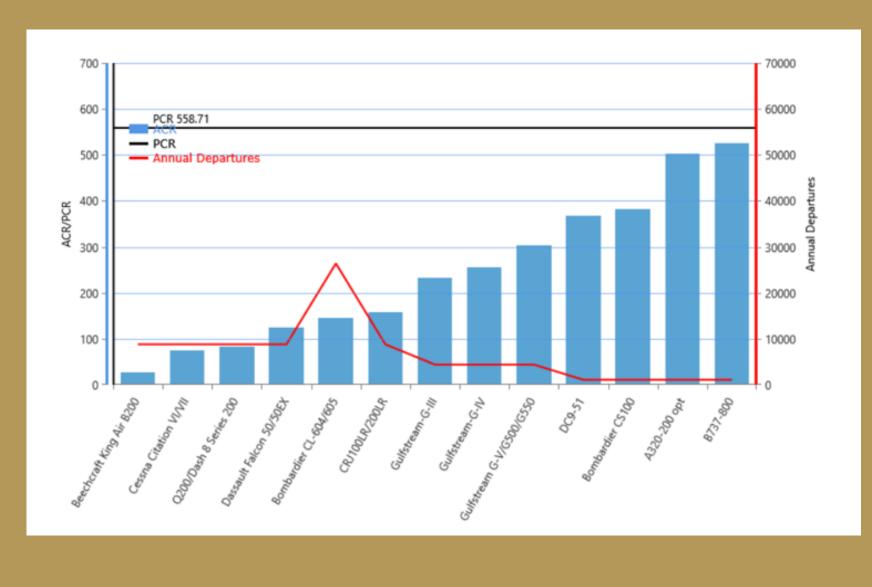
### FAARFIELD 2.0 Design

Thickness: 15"

Bearing Capacity: 184,472 lbs.

CDF: 0.49 PCR: 558.70

Design Aircraft: B737-800



### Design Parameters:

Strength

- Compressive: 4500 psi
- Flexural: 650 psi
- Assumed 6" thickness for existing structure

### PCC Overlay Mix Design

### PCC Mix Design

Cement: 36.66 lbs.

Coarse Aggregate: 144.07 lbs. Fine Aggregate: 89.81 lbs.

Water: 21.20 lbs.

### 7-day Results

w/c: 0.46
Slump: 3"
Strength:

- Compressive: 3998 psi
- Flexural: 478 psi







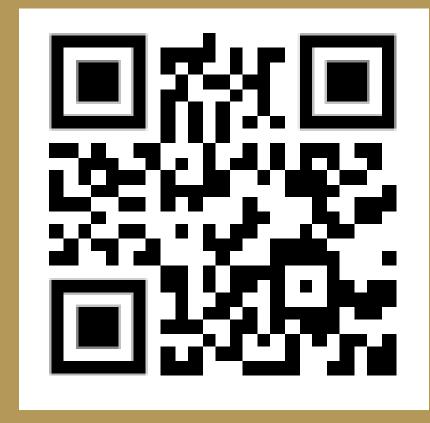
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## Cost & Sustainability

- \$3.8M Capital Cost
- \$673K Maintenance & Rehab
- \$40.3M NPV
- 75-year Analysis Period

### Envision

• Silver – 38%



### Acknowledgements

- Vice President, TAP Cassidy Berenato
- ISoE Faculty Dr. Shi & Dr. Pratik
- SMRA Master Plan
- Federal Aviation Administration
  - FAARFIELD 2.0 Software
  - Advisory Circulars (AC)
- LEED & Envision Frameworks
- RS Means