



Newland Roadway Restoration

City of Fountain
Valley

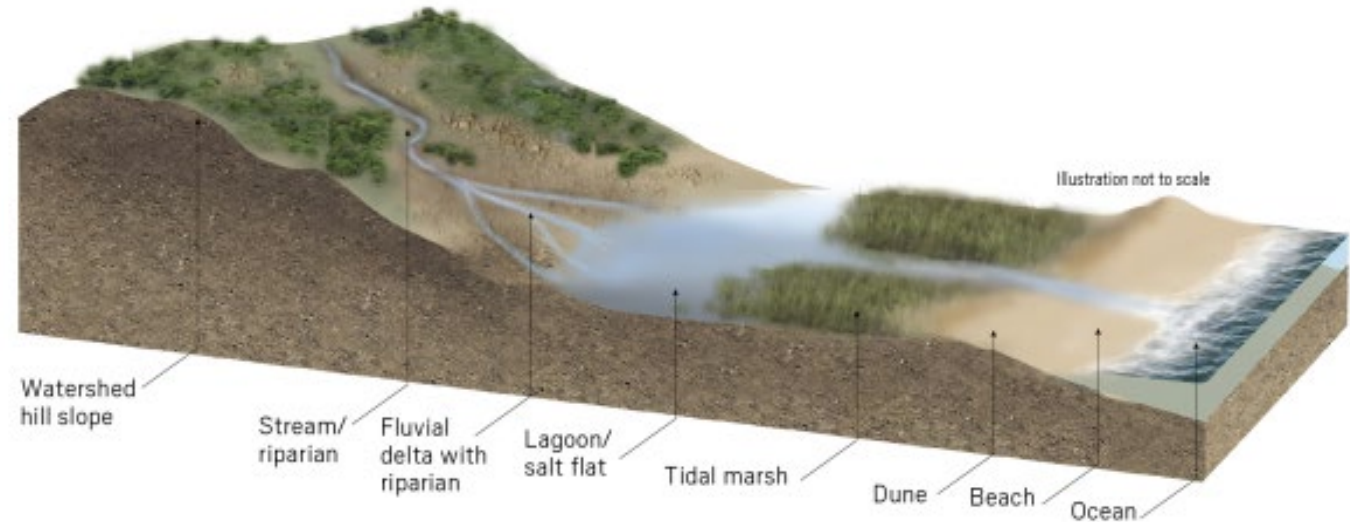
2023 California Rainstorms

- 2023 California Rainstorms resulted in widespread damage to public facilities
- In March 2023, City Staff discovered 300 feet of Newland Street, south of Ellis Avenue, developed subgrade failure causing settlement of the street, curb, gutter and sidewalk
- As a preventative safety measure, long-term traffic control was placed, and the lane was closed to the motoring public



Fountain Valley Soil Conditions

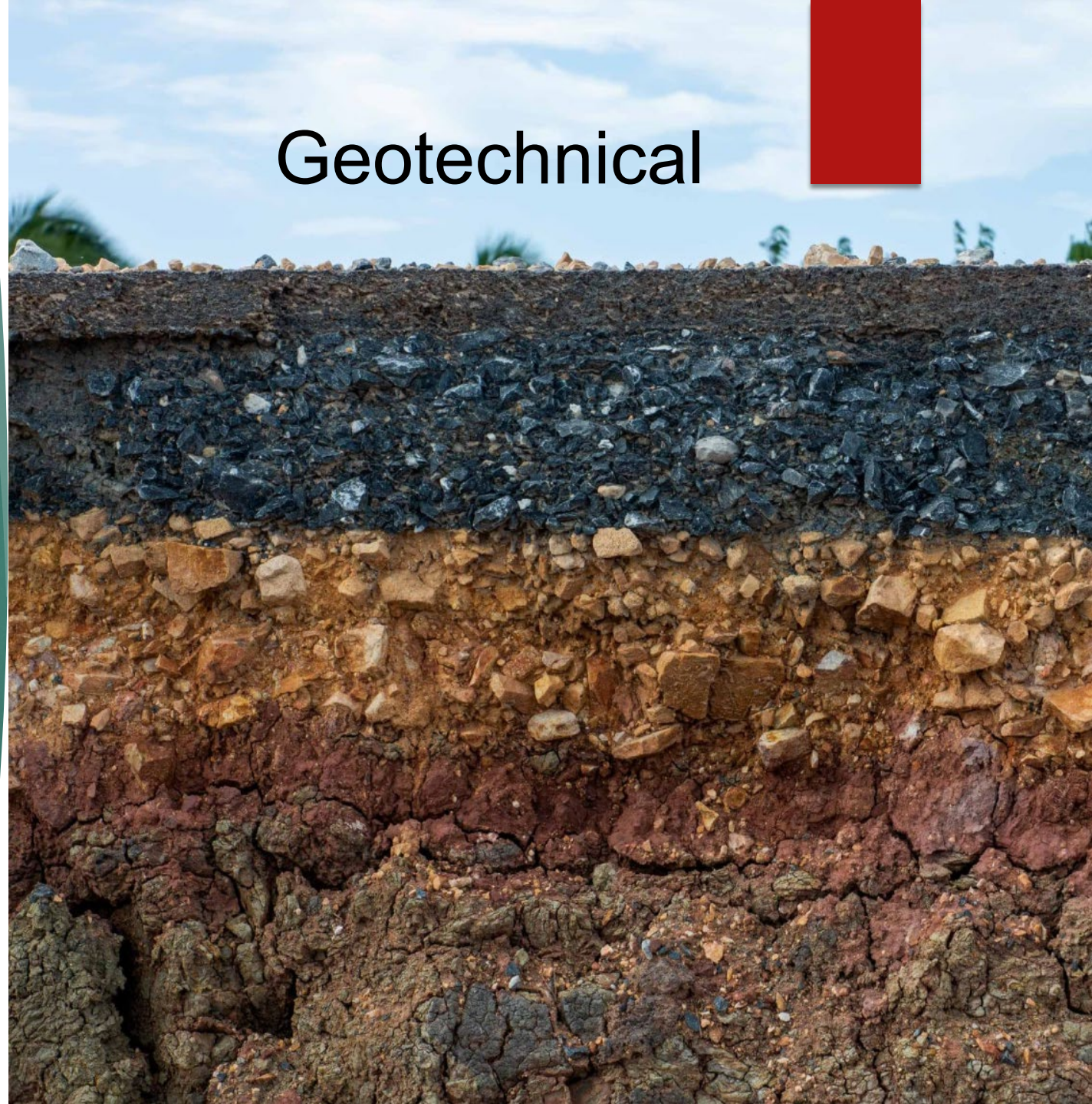
- Fountain Valley was previously called Gospel Swamps due to the high ground water table
- Geotechnical Report was conducted in 2023 and determined the underlying soil consisted of organic materials including peat deposits, with very high moisture content, located between 2-8' feet below the pavement surface.



Geotechnical Report Recommendations

- Geotechnical Report provided two separate restoration recommendations.
 - Alternative No. 1 (\$2M)
 - Alternative No. 2 (\$1.2M)

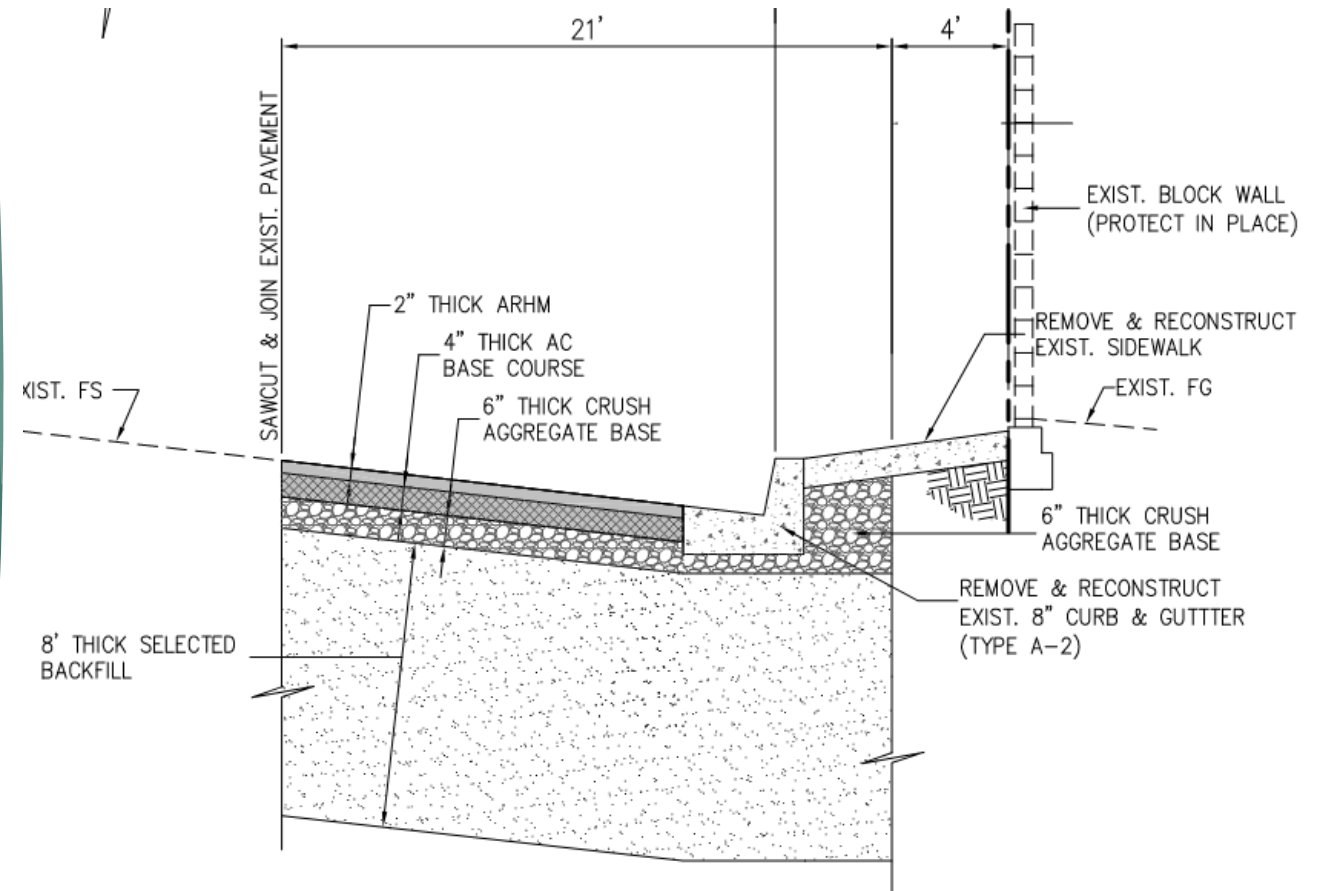
Geotechnical



Alternative #1

Cost (\$2M)

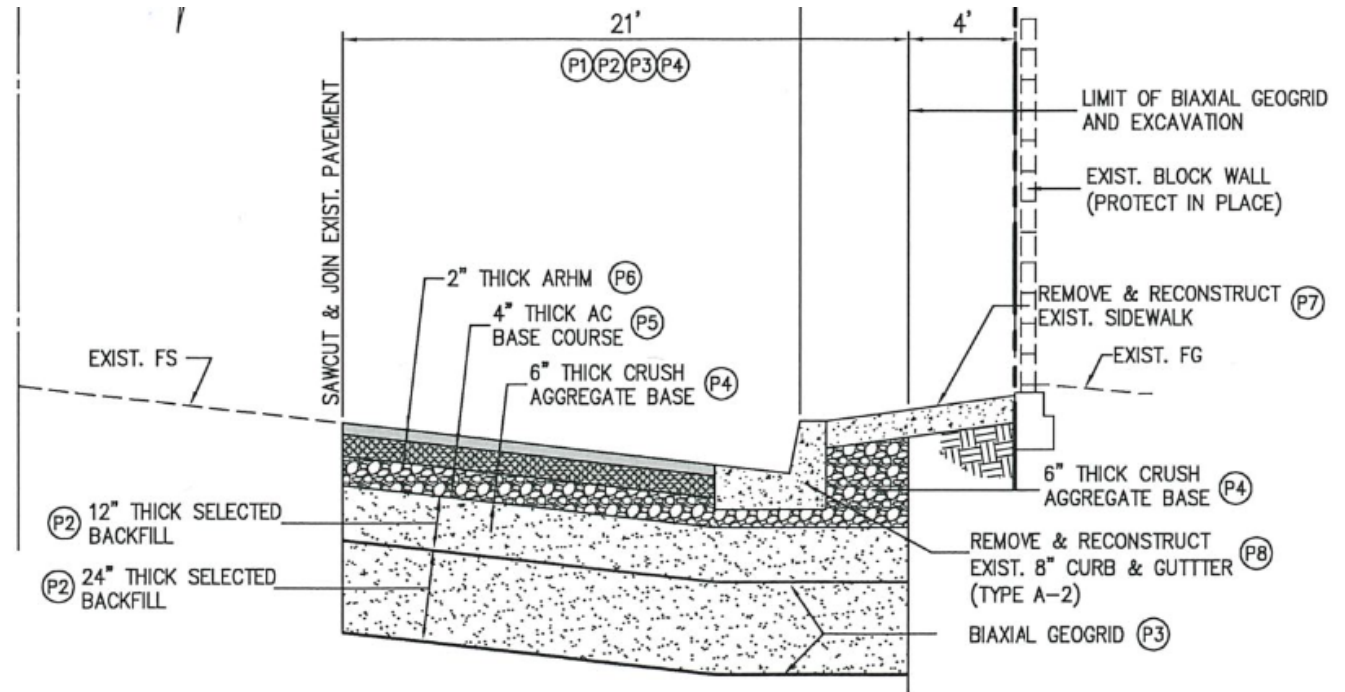
- Remove existing soil to a depth of 8' below pavement
- Replace with structural backfill material
- Replacement of full depth pavement section, curb and gutter and sidewalk panels
- Estimated cost of **\$2M**



Alternative #2

Cost (\$1.2M)

- Remove existing soil to a depth of 4' below pavement
- Install biaxial Geogrid
- Place structural backfill material on top of Geogrid layer
- Replacement of full depth pavement section, curb and gutter and sidewalk panels
- Estimated cost of **\$1.2M**



Exploring Funding Sources

- City Staff worked with FEMA to assess damage
- City Staff also Explored Federal Funding Opportunities with FEMA
- FEMA determined the estimated damage cost did not qualify for Federal Funding



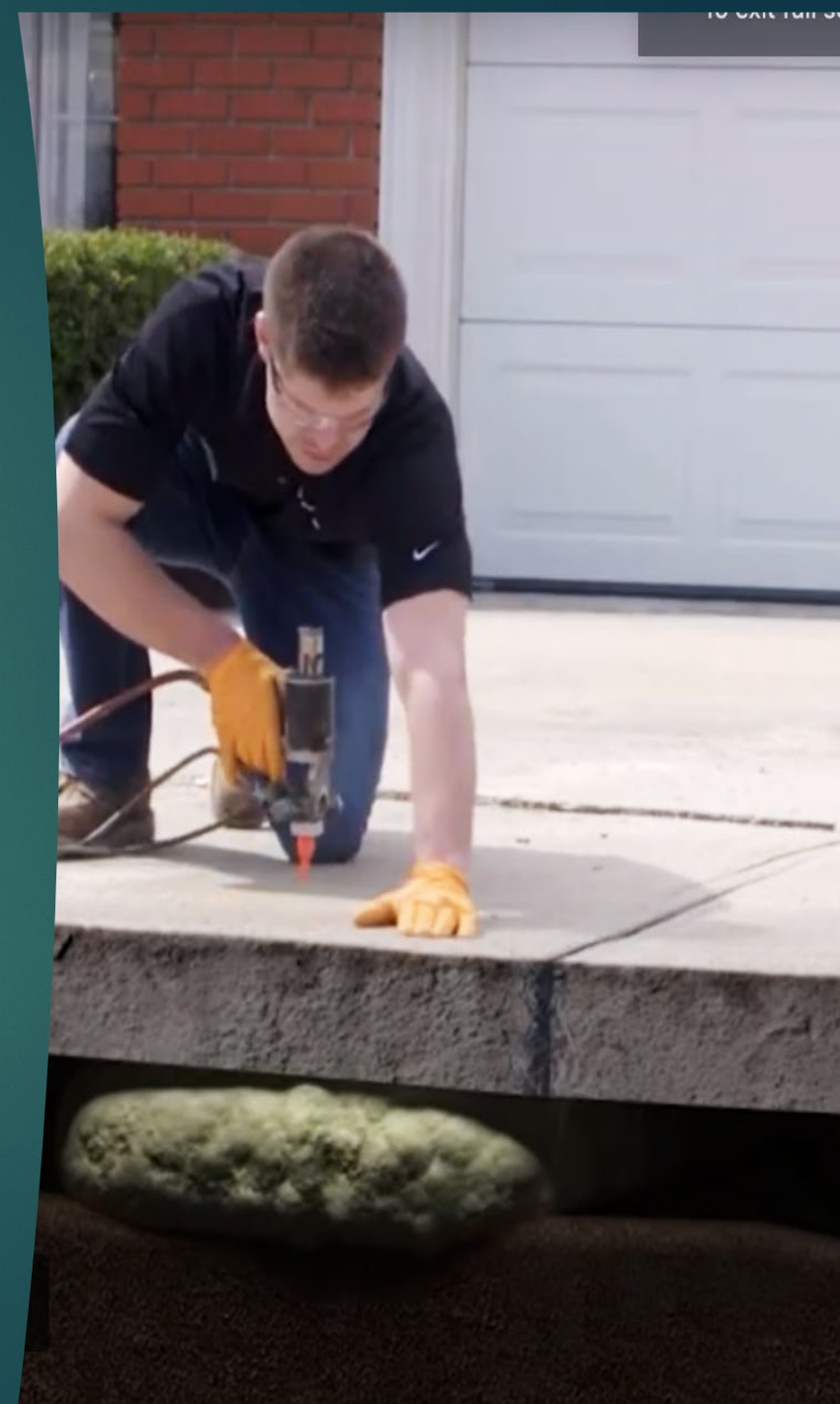
Explore Cost Saving Alternatives

- Cost of the recommended repair alternatives were found to be cost prohibitive
- Staff was tasked with finding a cost saving restoration alternative



Polyurethane Expanding Foam

- Polyurethane expanding foam (foam) has been used as a trenchless repair of settled concrete foundations and airport runways for over 35 years
- Foam is injected into the settled subgrade and fills air voids, lifting the settled subgrade and adjoining concrete
- Foam is mostly used as an application for lifting settled concrete as concrete provides a uniform level surface



Saber Foundation Repair

- City Staff worked with Saber Foundation Repair (Saber) where Saber confirmed the foam could be a viable solution for lifting the street
- Saber has more than 30 years of experience in injecting foam into the subgrade of settled concrete



Pilot Project Opportunity

- Injecting foam into the public asphalt street was new to Saber and the City
- Saber was confident the street would slowly rise over a 24-hour period with the potential of the existing pavement not returning to a smooth surface
- As the City is likely to have more streets with subgrade failure in the future, this situation provided the City with a great opportunity for a pilot project



Foam Injection Strategy

- 64 different injection port locations were identified within the street, flowline of the gutter and sidewalk panels
- Injection port depths varied between 3', 5' and 8' based on Geotechnical Report data and observed settlement



Injection Day

- On January 8th, 2024, Saber commenced with deep injections into the settled subgrade, followed by more shallow injections as the foam expanded into the subgrade
- In total 5,500 pounds of foam was injected over the course of 4 days



Rise and Shine

- Following the foam injections, the street, gutter and sidewalk visibly lifted
- Soil density testing was taken before and after injections
- Before injections, 100 blows resulted in a depth of 2,000 mm
- After injections, 100 blows resulted in a depth of 500 mm
- The street lifted in a uniform manner due to the skill of the Saber team



Pavement Restoration

- Understanding that the asphalt pavement would not be lifted to a uniform manner like cement, City Staff had a paving contractor grind and overlay the existing asphalt pavement to provide a new uniform street surface
- Curb and gutter was replaced in kind as the curb and gutter did not lift-up to the same extent as the street and sidewalk



Photo Finish

- The following week, concrete was poured, and fresh asphalt was paved
- The total cost of the pilot project was \$200,000
- Saving the City roughly \$1M
- Provides Staff with a cost saving restoration method for future soil settlements





Jabba the Foam