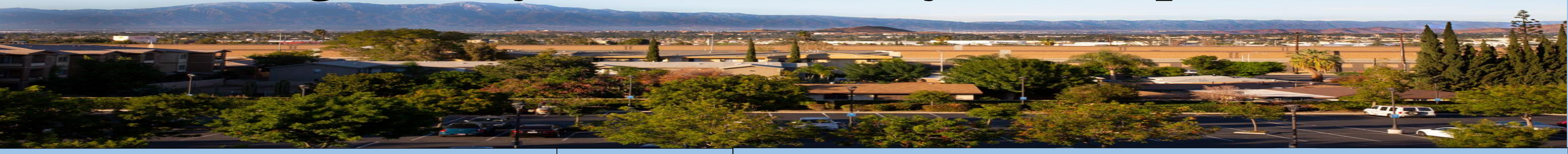
Eagle Canyon Community Development



Project Description:

The development of a new community will be constructed in Corona, California, utilizing the space of a vacant mining facility. Corona is a city located in Riverside County, home to about 159,000 residents. The objective is to design several elements within the community development, which includes single-family homes, a recreational area, and accessible roadways to enter the community.

Constraints:

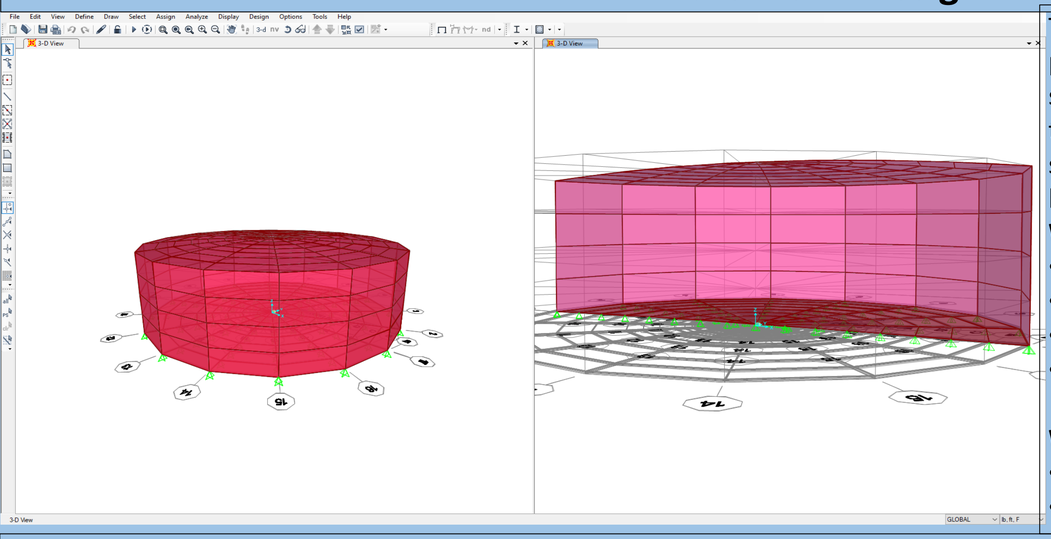
- CEQA Guidelines
- Design Constraints
  - Seismic analysis
  - Sustainable practices
- Community Support
- Cost Impact

Knowledge and Skills Gained

Technical Skills
- MATLAB, Elevation and Layout design
- MATLAB Civil 3D, Grading/Cut and Fill Calculations
- SAP 2000, Water Tank Development

Collaboration Skills
- Communication
- Task Distribution & Progress Monitoring
- Time Management and Organizational Skills
- Flexibility/Adaptability & Self-Management Skills
- Creative and Innovation Skills

Water Tank Design

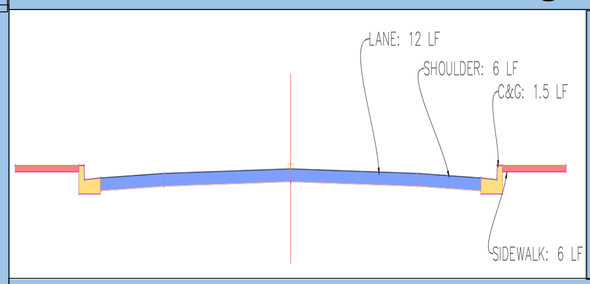


The water tank, which was designed by the program SAP 2000, will be developed using the standard of 200 gallons per person per day for the state of California and City of Corona standard of 4 people in a single-family household.

Water Tank Specifications:
- Thickness – 0.5”
- Diameter – 70’
- Height – 28’
- Total Storage Capacity – 558,783 gallons and 84,665 cubic feet

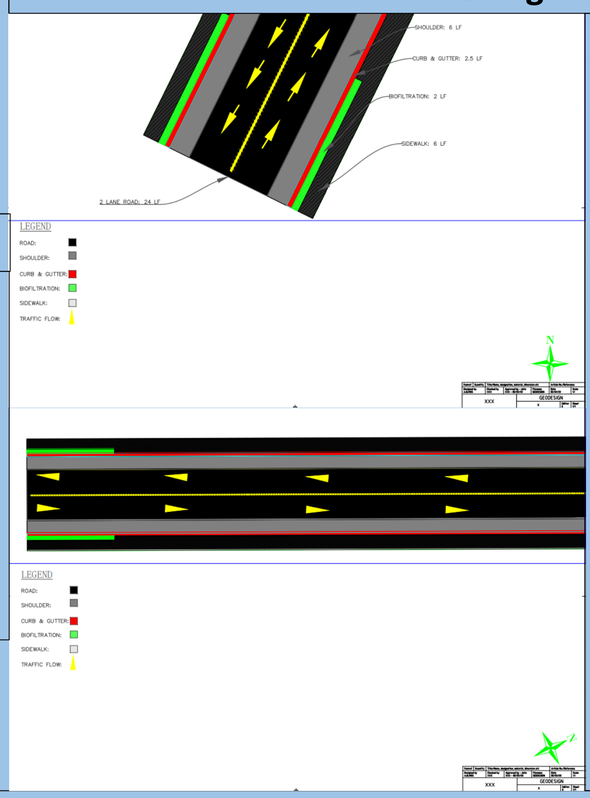
Water Tank Foundation
- Diameter – 80''
- Depth - 10ft

Road Design



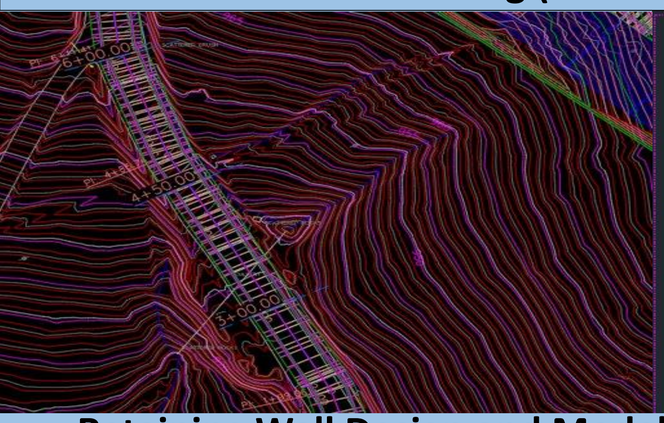
Road Design Specifications:
- Length per lane – 12’
- Slope Ratio – 1:1
- Cut Slope Ratio - 2:1
- Fill Slope – 4:1
- Shoulder Length – 6’

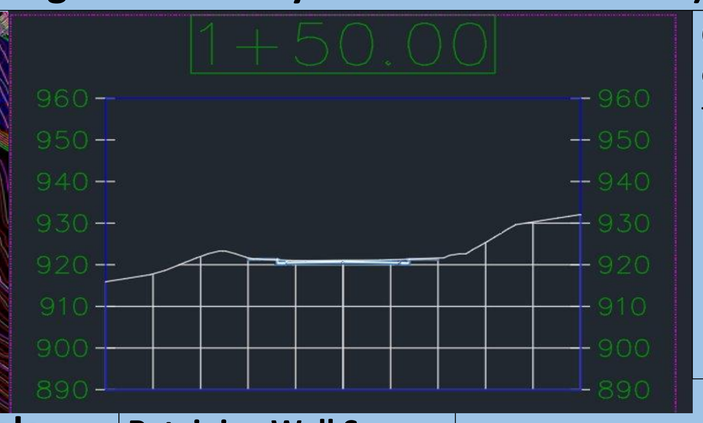
GeoDesign



Design Specifications:
- Streetlights are placed throughout design, in which EV Chargers will be placed in order to provide green alternatives
- Biofiltrations are placed throughout in order to reduce runoff on sidewalks and roads
- Shoulder widths are placed at a -4% slope to reduce runoff from the roads in order to improve safety
- Curbs and gutters are at a -6% slope in order to attract any runoff or water off of the roads and into the catch basins.
- Trip Generation and Trip Distribution help set and meet parameters in order to be able to justify stop signs at certain locations and count out signal lights.

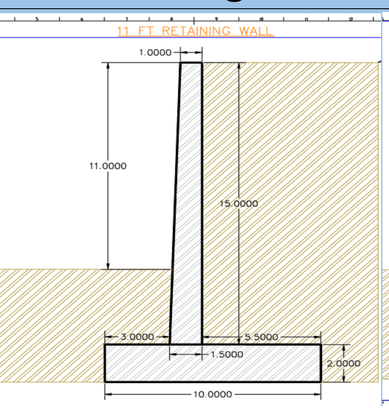
Road Grading (featuring AutoCAD Layout and Cross Section)

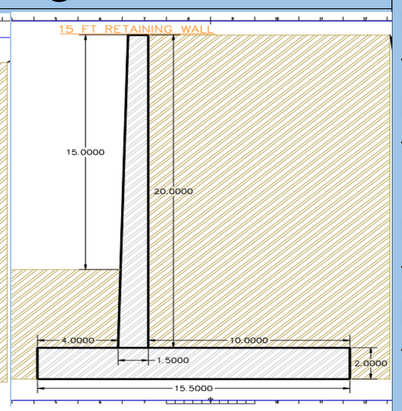


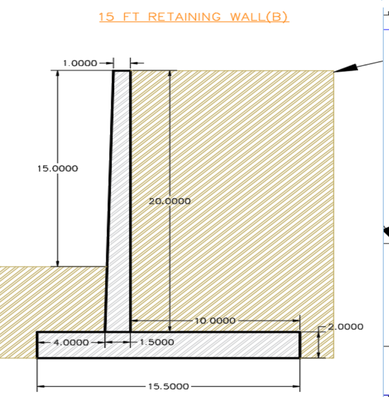


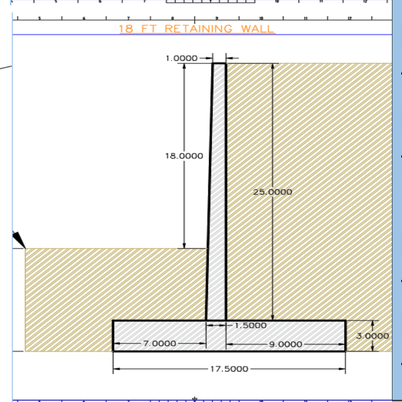
Cross Sections were obtained every 50 feet.

Retaining Wall Design and Models









Retaining Wall Specs:

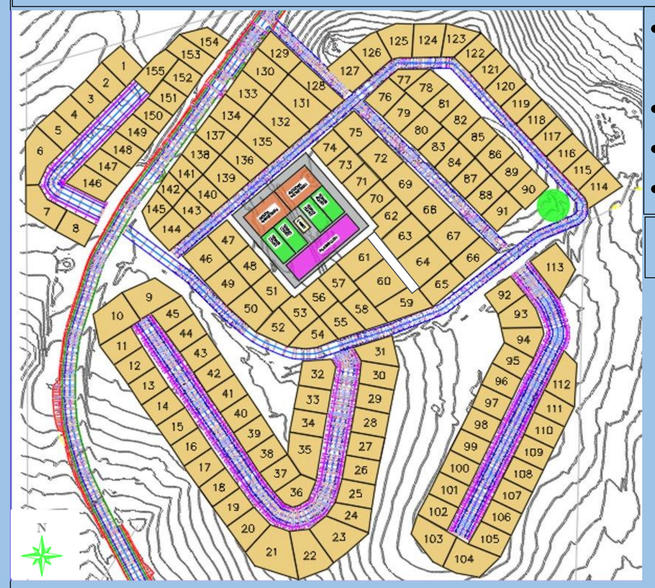
Model 1 Height: 11 feet
Model 1 Length: 246 feet

Model 2 Height: 15 feet
Model 2 Length: 153 feet

Model 3 Height: 15 feet
Model 3 Length: 375 feet

Model 4 Height: 18 feet
Model 4 Length: 72 feet

Community Features



- 155 single-family homes
  - 4,000 to 4,900 sq. ft. per single-family home
- Recreational Area
- New roads laid out
- Designated Water Tank

Conclusion

Sustainability
- Roads will consist of cooling pavement will reduce surface temperature
- EV charging station will be included within the community
- Sustainable materials will be used for home construction

Investment Returns
- Estimated Total Cost: $111,340,537
- Projected Profit: $20,626,463

Key Design Features
- GeoDesign promotes safety for the constituents
- Homes Dimensions – 45 feet by 55 feet
  3- 4 bedrooms, 2 bathrooms, and 2 cars garage
- Project duration will be roughly 4 years
- Water Tank will provide 3 days worth of storage for safety precautious
- Retaining walls provide support for the project’s roads and homes