Legion Field:

Building a Greener Parking Lot.

Project Context:

Located in Rockdale County, Georgia, Legion Field is an active recreation park providing the community with a multitude of baseball fields There are a variety of fields on site, from regulation baseball and softball size to fields specifically designed for users with physical disabilities The park itself grew organically for decades as coaches, parents, booster clubs, and volunteers added fields where they could, when they could, creating a disjointed assortment of awkward, yet functional space.

The Landscape Architect was hired to help create a cohesive sense of space and a well organized ingress/ egress point to Legion Field Park. By working with members of the community, park administrators, school officials, and the local government, a plan was developed to better integrate the distinct and disconnected elements of the park to create a more legible space for users. This is, in part, illustrated on the master plan to the right.

Legion Park Master Plan.
Not to Scale

Scope of Project and Design Adversity:

Apart from creating an overall master plan, the landscape architect was hired to design a new parking lot to replace an existing, dilapidated lot located at the park's south entrance. The new design was to increase the existing lot's capacity, provide organization, increase pedestrian and automotive safety, improve improve the overall aesthetic, and meet local requirements for control of stormwater quantity and quality. There where, however, some unique problems associated with this location:

1. To the west of the parking lot lies a Rockdale County School System bus maintenance and storage facility that had a severe storm drainage system failure. This erosion problem was caused by massive storm flows from impervious areas adjacent to the site, including the existing Legion Field lot. As a result, a deep ravine had formed and several trees had collapsed into it.

2. The western edge of the property was heavily wooded and severely sloped. The preservation of this area was entirely necessary to help ensure that no further degradation of the downstream basin occurred.

3. Numerous other existing drainage problems existed downstream of this project, including undersized culverts under existing roads. As a result of the massive flows through this drainage basin, severe flooding had occurred that in some cases damaged parked cars and personal property.

As a result of these issues, it became clear to the Landscape Architect that in order to best protect the health, safety, and welfare of the public downstream, that a traditional design approach to the project would not be sufficient. A new parking lot would need to be designed that would meet parking load and aesthetic requirements, be shared with adjacent land uses, stay within budget, and help reduce the rate and level of pollutants in the site's runoff over existing conditions. Another point became clear as well: that a unique design solution would be needed, but that solution could also provide the County with a model for progressive stormwater management.

These views of the adjacent property to the west illustrate the level of erosion downstream from the new parking lot site.

Design Elements and Stormwater Solutions:

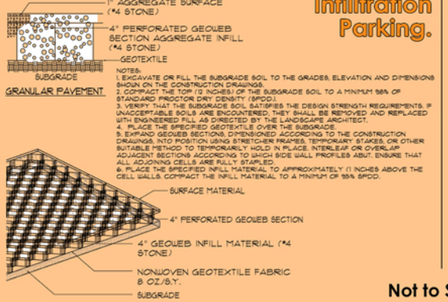
The Landscape Architect incorporated design elements that would help reduce downstream impact in three ways:

1. Bioretention Cells for Stormwater Infiltration: Eight bioretention cells were created to help remove pollutants from runoff and infiltrate stormwater into the ground rather than channel it. These cells help remove up to 80% of the Total Suspended Solids and 40% of the phosphorus content of the stormwater, an element that is in particular high concentration due to the fertilizer and heavy maintenance required by the ball fields. In addition, these cells help reduce the amount of water that is discharged off site through infiltration, and the stormwater that is shed through the underdrain system is significantly cooler compared to typical surface runoff, thus lessening the impact on downstream aquatic organisms.

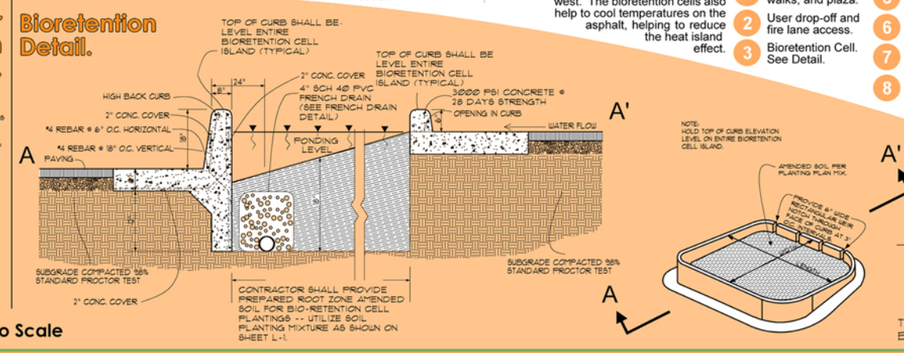
2. Porous Pavement for Stormwater Treatment: At the lowest point of the parking lot, the western edge, an entire bay of parking stretching the length of the lot was created using gravel aggregate held within a synthetic Geoweb containment system. This system ensures that the gravel pavement meets the structural requirements for vehicular parking, while at the same time infiltrating and treating stormwater runoff that passes through its porous voids. As runoff infiltrates through the gravel pavement, microorganisms break down oils and other pollutants attached to water molecules, cleansing and decreasing the volume of stormwater that would normally shed off the site.

3. Creative Detention to Reduce Stormwater Discharge Rates: As opposed to creating a typical detention facility which usually results in unusable space, in severe rain events the Legion Field parking lot detains stormwater along the pervious pavement parking bays. This helps keep the space functional, detains runoff when necessary, and infiltrates water as much as possible, reducing downstream discharge. A granite stone masonry wall with a "V" notch allows larger rain events to discharge into a typical concrete drop inlet, which in turn directs water to the pre-parking lot renovation stormwater outfall.

Cellular Infiltration Parking.



Bioretention Detail.



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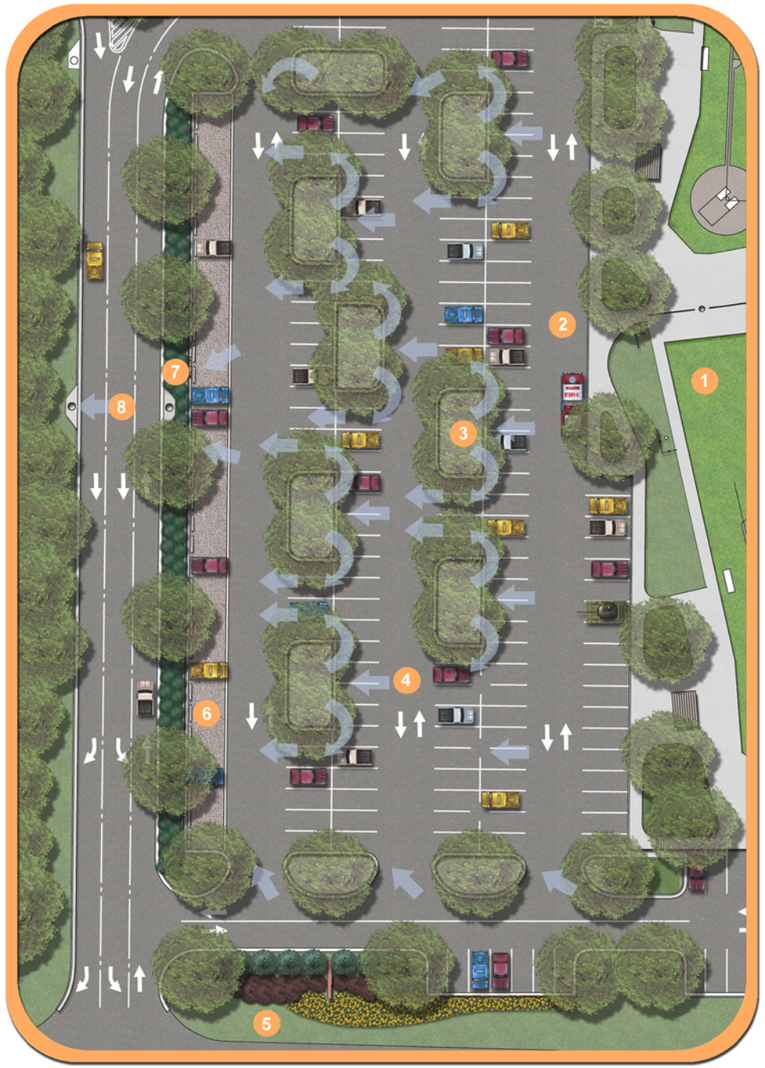


Legion Field Parking Lot Plan and Runoff Movement.

Scale: 1"= 30'

This plan view rendering illustrates the design of the new parking and the flow of stormwater from the high points to the east, to the low points to the west. The bioretention cells also help to cool temperatures on the asphalt, helping to reduce the heat island effect.

Key:

1. Adjacent ball fields, walks, and plaza.
2. User drop-off and fire lane access.
3. Bioretention Cell. See Detail.
4. Typical asphalt parking lot with 12' travel lane.
5. Entrance signage and landscape feature.
6. Cellular Geoweb (tm) infilltration parking
7. Granite detention wall overflow orifice.
8. Discharge under road to existing outlet structure.

Conclusion:

Landscape architects are in a unique position to help municipalities understand, design, and implement the construction of parking lots that better integrate stormwater management and treatment into the overall aesthetic. The Landscape Architect in this project provided a progressive model for the County, while helping to protect the public interest and safety downstream.

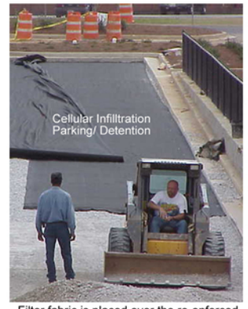
As the Legion Field Parking Lot reveals, Landscape Architects posess a multidisciplinary understanding of stormwater, soils, ecology, and design that can help provide communities with a sensible and functional 21st century approach to parking lot design.

Construction

One of the bioretention cell walls is formed.

The outfall structure and the granite detention wall is constructed.

As work continues, the ponding levels of the bioretention cells are established.



Filter fabric is placed over the re-enforced gravel pavement that also serves as detention.

The top coat of asphalt and the plant material is placed.

Finished Product

Rectangular concrete weir notches help control stormwater velocity entering the bioretention cells and also act as wheel stops. In large rain events, stormwater fills the cell to the ponding limit, then spills back out through the weirs, running down hill to either another bioretention cell or to the cellular infiltration parking and detention.

The bioretention cells are staggered throughout the parking lot. These cells are planted with material, such as River Birch (Beula nigra) and Bald Cypress (Taxodium disticum) which are well adapted to survive in xeric and mesic conditions. These cells also help cool the surface temperature of the parking lot, helping reduce the heat island effect.

The lowest row of bioretention cells overflow directly into the gravel cellular infiltration basin, which also serves as parking. This pervious area helps filtrate and treat stormwater. This photo shows the distinct ponding line that has been carefully maintained in each cell.

In severe rain events, water which is not infiltrated becomes detained against the granite wall and discharges through the 'V' notch orifice.

A Landscape Architect's Solution to Parking Lot Stormwater Quality and Quantity Management.

Rockdale County, Georgia