

Green Infrastructure / Low Impact Design

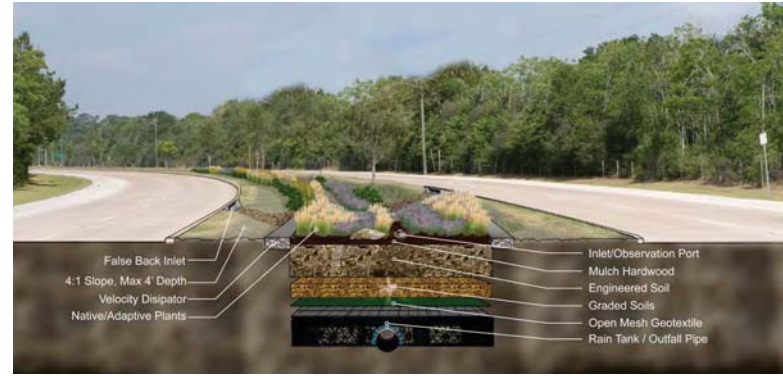
Project Approach

By incorporating new drainage methods, altering the straight and narrow appearance and providing attractive native landscaping, the traditional storm water landscape can be transformed. Green infrastructure and low impact design solutions can implement numerous techniques to achieve dramatic differences in performance by utilizing: raingardens, vegetated swales, planter boxes, native plants, underground detention, permeable pavement, biofiltration systems, filterra street inlets, paver drainage systems, etc.

Effective low impact drainage bioretention cells require a wide and shallow profile versus the standard roadside ditch or large drainage pipes designed to expedite storm water runoff off-site. This meandering has several positive effects: first, the visual corridor changes allowing views of the bioretention cells landscaping and second, the bioretention cells can more effectively manage segments of drainage by being segmented but interconnected themselves.

Instead of standard stormwater interceptors and bar ditches, the low impact drainage system uses native grasses and plant material to slow the stormwater as well as cleanse the stormwater of impurities. The addition of groupings of trees creates an attractive experience and amenity when compared to standard design. Green infrastructure design solutions have revealed that creating a meandering pattern of the bioretention cells effectively drains appropriate paving segments while preserving safety and maintainability.

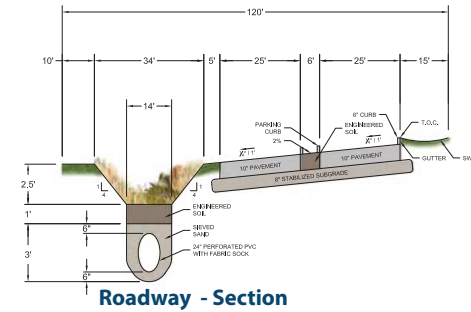
Bioretention



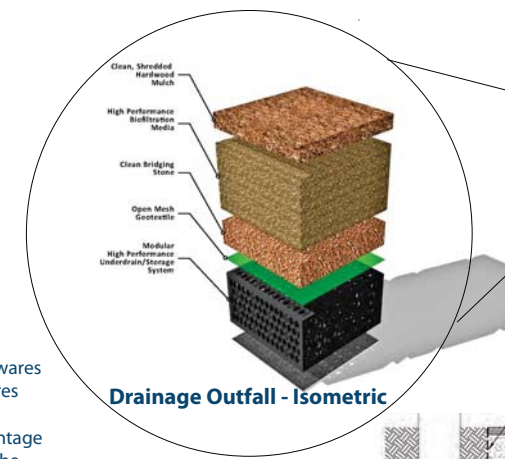
SOURCE: GRAPHIC COMPLETED BY MATTHEW THORNTON FOR CONSTRUCTION ECO SERVICES WHILE EMPLOYED AT EHRA



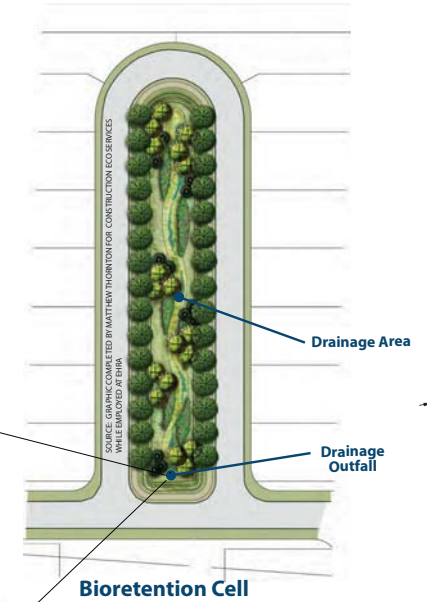
Stormwater Outfall Solutions



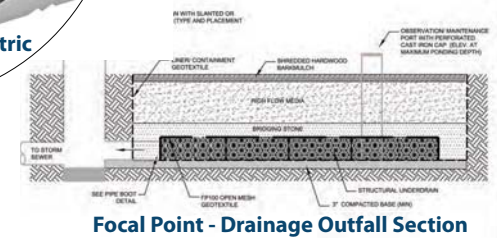
Roadway - Section



Drainage Outfall - Isometric



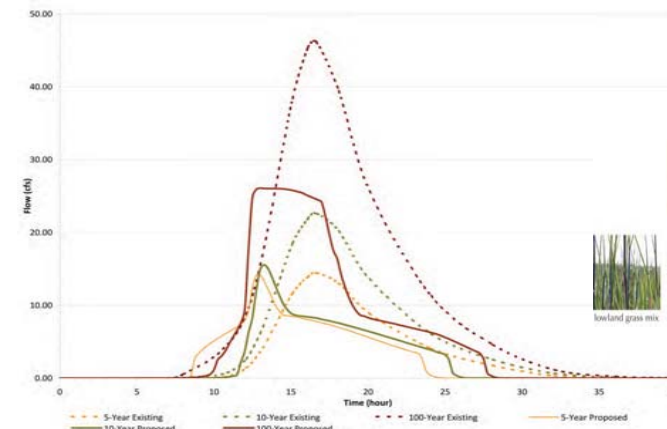
Bioretention Cell



Focal Point - Drainage Outfall Section

Hydrology and Hydraulics

Interconnected Channel and Pond Routing ("ICPR") and Civil 3-D HydroFlow-Hydrograph Extension softwares can be used to model the proposed hydrologic and hydraulic conditions for a project site. These softwares enabled us to accurately represent the Low Impact Design/Green Infrastructure hydrologic techniques including the SCS Unit Hydrograph Method or Rational Method depending on site sizes. The main advantage of using the SCS Method is that it allows the properties of the multiple soil types to be accounted for in the hydrograph calculations. The benefits of the engineered soils are reflected by adjusting the Curve Number (SCS Method) or C-coefficient (Rational Method) to reflect a specific Type soil in the improved areas. The hydraulic benefits of the Low Impact Design/Green Infrastructure elements are modeled using a stage-area component that accounts for the total storage volume provided in the bioretention cell.



Native Plant Palette



Filterra - Inlet System

Green Infrastructure Toolbox

