INTRODUCTION
Seattle-Tacoma International Airport (STIA) is located in southwestern King County within the City of SeaTac. To comply with its NPDES permit, the Port of Seattle is developing LID BMP guidelines for future development and redevelopment projects at Seattle-Tacoma International Airport. In support of developing the guidelines existing GIS layers, geologic data, and other relevant information was used to identify shallow and deep stormwater infiltration opportunities across a broad landscape.

APPROACH
Infiltration feasibility was based on evaluation of factors that affect infiltration potential and identification of units that represent unique combinations of these factors. Information sources included GIS data from local municipalities and agencies, surficial quadrangle geologic maps, topographic survey information and LiDAR elevation data, and subsurface hydrogeologic information from boring logs. GIS layers of each factor were created.

WHERE ARE THE STEEP SLOPES?
LID facilities can potentially adversely affect downslope structures and can be more expensive to construct on steeper slopes. Surface slopes were calculated based on LiDAR elevation data prepared by Puget Sound LiDAR Consortium (2004) augmented with Port topographic survey data. The majority of the study area has either low or moderate surface slope gradient.

DOES THE SURFACE SOIL DRAIN?
Surface soil permeability is an important factor in the cost and effectiveness of shallow infiltration. Surficial quadrangle geologic maps by Booth and Waldron (2004) were modified as part of the Groundwater Study (Aspect, 2008) using data from hundreds of STIA boring logs, and the geologic units were categorized into broad low, moderate and high permeability categories based on experience with similar soils in the Puget Sound lowlands.

IS THE GOOD UNSATURATED SOIL VERY FAR DOWN?
The depth of the receptor unit is important as it can affect the viability and cost of infiltration. Deep infiltration can be suitable when permeable unsaturated layers such as an advance outwash unit exits beneath low permeability surface soils such as glacial till.

IS THE GOOD UNSATURATED SOIL VERY THICK?
Infiltration is typically only feasible if the permeable unsaturated zone is at least 5 feet thick. In addition, high water tables or groundwater mounding may be limiting factors for infiltration.

RESULTS
Infiltration feasibility was based on evaluation of factors that affect infiltration potential and identification of units that represent unique combinations of these factors. Shallow and deep infiltration maps were created highlighting areas with good, moderate, and poor infiltration feasibilities. Portions of the study area are considered to have good or moderate feasibility for shallow infiltration, however, over half of the study area is not expected to be suitable for shallow infiltration due to the presence of low permeability glacial till soils or other factors.

IMPLICATIONS FOR STORMWATER MANAGERS
The GIS-based infiltration feasibility approach provides a cost-efficient method using existing data to identify potential stormwater infiltration opportunities across broad landscapes. This project is applicable to other NPDES permittees as new municipal stormwater permits for Eastern and Western Washington now require jurisdictions to use LID for new developments and redevelopment if feasible.

CONTACT
Tom Atkins, Senior Associate Water Resources Engineer
tatkins@aspectconsulting.com (206) 838-5850
Aspect Consulting
401 2nd Avenue S Suite 201
Seattle, WA 98104