

## Visit report 5/10/16 - Mott MacDonald: Green Infrastructure

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Today the participants and supervisors of the study tour were welcomed at the Mott MacDonald office in New York. Mott MacDonald develops together with the New York City Department of Environmental Protection (NYCDEP) green infrastructure in New York. After a presentation at the Mott MacDonald office in downtown Manhattan the already realized green infrastructure in Jackson Heights - Queens was visited.

The presentation started with a short introduction of the problem, according to Mott MacDonald the problem with the rainwater is that there are only few green areas in New York and that all the water goes to the combined sewages. During heavy rain showers the surplus water is discharged by combined sewage overflows (CSO) into the open water and rivers. New York has to develop tools to deal with this problem, the first tool they use to address this problem is to implement green infrastructure. The development of grey infrastructure, bigger sewers and stronger pumps, is not desirable by the NYDEP. The green infrastructure is implemented to reduce the costs for green infrastructure. In 2007 the development of the green infrastructure was started by Mott MacDonald. The possible infrastructure that might be implemented is green roofs, porous pavements, right of way bioswales and storm water green streets. Until now only porous pavements and bioswales have been implemented in the visited project area. The aim is to implement as many as possible of these green infrastructure in the project area. There are many different problems that Mott MacDonald has to deal with when implementing the bioswales or porous pavements. The biggest problems are caused by regulations that limit the amount the possible locations.

The bioswales are designed to handle a rain shower of 1 inch (25,4mm), in 90% of the cases the amount of rain does not exceed the 1 inch level. The method in designing and implementing the bioswales is the following:

1. Site selection
2. Geotechnical analysis
3. Survey
4. Design
5. Construction

In the beginning before the geotechnical analysis is done, desktop research is done to determine possible locations. The geotechnical analysis ensures that the water from the bioswales can pass through the underlying soils with a speed of 0,12 inch/hour (3,1 mm/hour). If the locations passed through the geotechnical analysis and the survey the design of the bioswale starts. The concrete structure of the bioswales is standardized, but for each location an individual inlay that has to be determined. As earlier mentioned there are various problems Mott MacDonald has to deal with when implementing the bioswales, a problem arising during the construction of the bioswales is the season. One has to watch out for the seasons when it is allowed to plant plants and trees in the bioswales. The total costs, engineering and construction, of each bioswale is about \$ 20.000.

Another interesting thing next to the engineering aspect of this project was the reaction and interaction with the inhabitants of the project area. According to Mott MacDonald the project was developed with and for the inhabitants. Their reactions on the new green trips is mainly positive.

