**Abstract**

Potomac Interceptor is a pipe system, managed by DC Water, that conveys flow from various District suburban jurisdictions incl Dulles Aiport, Loudoun County, Fairfax County, Town of Vienna, Montgomery County, National Park Servcie and Navy Yard (Research Center) to the Blue Plains Advanced Wastewater Treatment Plant.

The purpose of this project is to conduct a two part analysis of structural and cost share analysis of sewer asset management system of the Potomac Interceptor. Using SQL, Pandas Python and machine learning tools, we are attempting to predict which pipe segments are at greatest risk of failure and would require more frequent inspections and labor. In another part we are attempting to calculate the cost share percentages of various jurisdictions at various locations. From there we will determine how a jurisdiction’s costs might be impacted by the riskiest pipe segments.

We selected District Suburban Jurisdictions for our pipe samples. These jurisdictions span part of the Maryland/Virginia border and range into part of DC. Some of the involved counties share access to the same pipes but would not necessarily share the same responsibility and labor costs. In our analysis we will determine which jurisdictions have the highest share of pipe segment that are the most at risk and then calculate what costs would be shared by the affected jurisdictions were those pipes to fail.

We will use Leaflet to create a map to highlight user juridictions and their pipe segments. We will preprocess and filter data downloaded from Maximo (IBM Asset Management Software) and DC Water and user jurisdiction’s reports using SQL. Once the data is filtered and preprocessed will be downloaded as csv file for use by the Pandas Pyhthon for flow, and share calauclation. Using jurisdictional flow and pipe condition data from the DC Water Report, we will use machine learning to predict the frequency of inspection cycles and risk per location. Combining this with timekeeping data from IBM Maximo we will determine the shared cost impact to the jurisdictions that we predict would be most affected by a pipe collapse.

**Selected Counties/Jurisdictions**

*Virginia:* [Town of Vienna, Fairfax and Loudoun Counties)

*Maryland: [ Montgomery County)*

*Federal : [NPS, and Navy Yard]*

*DC: District*

**Supporting Queries**

1. What factors affect pipe safety/longevity? (drops, bends, turbulence, pipe condition, environmental factors – flow/runoff/heavy sediment)
2. Determine the cost share based on flow, length travelled, and labour hours weighted percentages
3. What is the varies jurisdiction’s fiscal responsibility, and at various location?
4. Which jurisdiction will be impacted most by the riskiest pipes?
5. Which county is affected most by a pipe in bad condition? How would those costs be shared by jurisdictions connected by the same pipes?

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