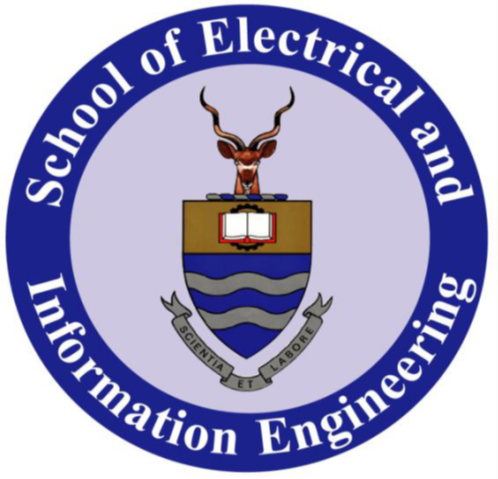
**UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG**

**SCHOOL OF ELECTRICAL AND INFORMATION ENGINEERING**



**ELEN 7046: Software TECHNOLOGIES AND TECHNIQUES**

Report on the Hydrological Analysis Application, for the Department of Water and Sanitation

By

**Tefo Radebe [ref.:]**

**Khumbulani Ncube [ref.:]**

**Tranquility Mahlangu [ref.:0609372K]**

DECLARATION

We hereby declare that all the information contained in this report is our own work of the group report (i.e. Report on the Hydrological Analysis Application, for the Department of Water and Sanitation) except where specific reference is made by name or in the form of a numbered reference.

|  |  |  |  |
| --- | --- | --- | --- |
| **Member** | **Tasks** | **Time/ H** | **Discretionary/ %** |
| Tefo | Frontend/ Visualisation |  |  |
| Khumbulani | Frontend/ Visualisation |  |  |
| Tranquility | DB/ Rest API/ FE | 263 |  |

X date:

Mahlangu, T.

Mr.

X date:

Ncube, K.

Mr.

X date:

Radebe, T.

Mr.

Table of Contents

[Abstract 3](#_Toc486650824)

[1. Background and Problem statement 4](#_Toc486650825)

[2. Introduction 5](#_Toc486650826)

[2.1 Licensing 5](#_Toc486650827)

[3. Requirements/ Scoping 5](#_Toc486650828)

[4. Project Management 5](#_Toc486650829)

[5. Architecture and Design 5](#_Toc486650830)

[6. Project Management 5](#_Toc486650831)

[7. Conclusion 5](#_Toc486650832)

[References 6](#_Toc486650833)

# Abstract

This report details process followed in the design and implementation of the Hydrological analysis application for the department of Water and Sanitation.

It explores the research and decision making process the group followed from the analysis of the problem statement to the scoping of essential requirements.

Then finally discuss the solution and the choice of technology and design used.

# Background and Problem statement

The department of Water and Sanitation provides large datasets of historical data spanning over a century that is aggregated daily by peak flows and peak levels.

The team wondered if the knowledge and decision making that informed the positioning of the stations still holds today.

Noting the climate challenges, in particular global warming and persistence draught conditions, this seemed worth investigating further.

The team envisioned that if this application could allow the user to visualize peak flows and peak levels per station, alongside a view of rainfall patens per respective station.

Then this could yield meaningful trends over the centuries and inform future plans of stations and their catchment areas and for irrigation planning just to name a few.

# Introduction

Hydrological analysis (Hydra) is a dashboard styled web application that’s provides tools to maintain the stations and to visualize the data in a graphical user interface.

This application was developed using MongoDB, Express, Angular and NodeJS – (MEAN) Stack framework.

The methodology used was agile, in particular Xtreem Programming (XP) and Evolutionary Prototyping.

The visualization of rainfall per station is not part of this application as we could not obtain a dataset that accurately depicts the necessary info.

## 2.1 Licensing

This application is open source licensed under GPL-3.0, GNU GENERAL PUBLIC LICENSE Version 3, 29 June 2007

# 

# 3. Requirements/ Scoping

# 4. Project Management

# 5. Architecture and Design

# 6. Development Tools

# 7. Conclusion

# References

|  |  |
| --- | --- |
| [1] | https://cle.wits.ac.za/access/content/group/ELEN7046\_2017/elen7046-proj-2016.pdf |
| [2] |  |