SPEECH LAYOUT

Introduction us/problem:

* Introduce team – we are CORE and international company that focuses on projects by consulting, optimising, revolutionising and executing solutions for our clients.
* Four months ago GHD advertised the issue of waterway contamination from an historic landfill site located in Mackay. This landfill site
* Environmental protection act
* Why do we need to model it: landwater model is vital because of

Model (2mins)

* Richards equation
  + Coupling with..
* Outline evotranspiration
* Rainfall input
* Cjrea

I’d now like to introduce Zander to discuss how we implemented these conditions into our chosen software.

computational model (3-4 min)

* Thank you Laura, using matlab we …
* Why is the model efficient? <- focus question!!
* Adaptive time step

I’ll pass you to Olivia to introduce how we incorporated rainfall data specific to Mackay

Climate model

Thank you zander

* Data gathered from weather station Mackay Alert, nearby to the landfill site
* Initially
* This rainfall was averaged to find an overall daily average
* Cosine model – the limitation of this model was that it did not take into account the high number of days with zero rainfall this led to the implementation of the Fourier series approximation
* Fourier model – this model is highly versatile as it can create a model for any given dataset
* Average function
* Flood year
* Markov chains

I’ll pass you to Laura to explain how we validated our model

Bucket problem – also d

Thank you Olivia

* We modelled the implementation of our solution based on the analytic or expected solution
* The bucket problem disregards the more complex conditions and assumes no outflow at the boundaries and that the bucket is homogeneous meaning its made up of only one material. – also show drought year for hetero mesh
* The only condition introduced is the rainfall coming in from the top of the bucket.
* As seen in the graphs the model is valid ….
* Now that the model has been validated we can reintroduce this to the heterogenous problem with multiple different materials and boundary conditions

Analysis

* Constant, cosine , Fourier – Fourier reaches steady state the fastest (steady state is when the landfill can no longer accept more water – 95%) – evident that there are oscillation within the data – Baseline model
* Location of water table – evident that it remains roughly 2-4m below the landfill surface. Hence Fourier climate model was considered for the rest of the analysis (in the interest of time) .
* Benzene creek outflow based on range of Kc values
* Increasing evaporation rates in different sections (showing what an evaporate cap would do) – research plants that can result in greater evapotranspiration
* How changing the evaporation rate changes the water table 🡪 increasing evapotranspiration will lower the water table
* Provide recommendations on monitoring stations/evaporative measures if necessary
* Limitations of model (it is important to be transparent that there are limitations to the model) – there are tradeoffs

Project management

* Overview of approach to project – include animation thing that liv mentioned on the PPT
* Include PBS,WBS &OBS – established stakeholders
* Maintained good group dynamic – constant communication (met at least twice a week)
* Lessons learnt
  + Computational model took longer than expcted to implement – analysis when quite smoothly subsequent to its implementation
  + Previous experiences together, we knew where to allocate peoples roles as we knew peoples strengths/weaknesses. – we were also able to redelegate tasks along the way
* Quality assurance – drive home bucket problem validation/heterengous model also validated by project sponsor
* Risk impact – covid (one week of isolation)
* Not afraid to ask for help (very inclusive/positive environment)
* Iterative approach
* Time management – met up twice a week – progress was made every week as a group, we used github as a filesharing mechanism to be able to see edits that had been – we were constantly in contact with each

Conclusion

* Recommendations (limitation doesn’t properly account for flood year – this can be further investigated if you are hired)
* Evaoprtaive cap (provide summary

Any questions regarding our model or anything we can clarify further.