CASE STUDY
Improving stakeholder communication through 3D visualisation

JACOBS AUSTRALIA | EMU SWAMP DAM PROJECT, QUEENSLAND, AUSTRALIA
THE PROJECT

The Emu Swamp Dam is a proposed 12,100 megalitre urban and irrigation supply dam on the Severn River in Stanthorpe, Queensland. Estimated to cost $84 million, the project aims to increase security and agricultural proficiency for Queensland, in an area known for drought. Jacobs, one of the world’s leading providers in technical, professional and construction services, was contracted to complete a detailed business case, including a reference design. Jacobs used 3D subsurface modelling solution Leapfrog Works to assess risk and communicate that risk effectively to stakeholders.

The project has been ongoing for many years and the Federal Government has announced it is looking to co-fund, with private farmers and developers already pledged to provide 29% of the cost. The Environmental Impact Statement (EIS) has been extended to April 2020 and with funding approval from Federal and State Government, it will then go to tender.

Graeme Jardine, APAC ME Technical Director Engineering Geology, Jacobs Australia, comments, “Leapfrog Works had a very positive impact on our understanding and communication of the geology. Using 3D visualisation gave the project clarity and meaning and allowed us to effectively communicate to all stakeholders. This 3D visualisation was particularly beneficial for those with no technical background. Using an industry-specific tool like Leapfrog Works really helped with the successful delivery of the business case.”

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SITUATION

The Emu Swamp Dam will provide the surety of additional water supplies to enable increased cultivation to the benefit of the local economy. It is estimated that it will secure up to 700 local jobs and will increase production for Queensland fruit...
farmers and viticulturists who have previously had to truck in water from New South Wales.

Jacobs Australia was engaged to provide all engineering expertise, stakeholder communication, environmental works to offset harm, baseline economics and provisional water sales assessment.

The project faced many challenges including determining an economic and safe design, securing significant water resources without affecting downstream flows, incorporating the project into State Water plans and liaising and communicating with a variety of stakeholders from local councils, chambers of commerce and government to private farmers, developers and the local community.

RESPONSE

Leapfrog Works’ fast and dynamic 3D subsurface modelling solution is specifically designed for the Civil Engineering and Environmental industries. The highly visual 3D subsurface models that Leapfrog Works produces help users understand geological risks better, which can then be more accurately communicated to all stakeholders through a range of sharing and collaboration tools.

Graeme Jardine comments, “We used Leapfrog Works specifically as a communication tool with the community and non-technical forums to show them what we’d discovered through our drilling programme. Communicating in 3D really helped people to understand and visualise the project. We were also able to use Leapfrog Works’ movie feature to create fly throughs which we could easily pause during consultations to explain key aspects. These impressive visualisations really helped to bring the project to life.”

The movie function has a high frame rate of up to 60 frames per second and works by simply dragging 3D scenes into a storyboard right inside the modelling software. Transitions are added automatically and easily tweaked to help the Jacobs team to tell the story of the Emu Swamp Dam project. The real benefit is that you don’t need to be a graphic designer – the geologist themselves can produce a quality fly through tour of the project without any specialist movie making training required.

UNDERSTANDING THE GEOLOGY

The risks associated with any dam project are considerable, not least due to the risk of the valley bulging and associated permeability. By using Leapfrog Works to create a subsurface model, Jacobs were able to gain a clear understanding of the geology and mitigate the risks they faced. This included proposing a grout curtain to stop seepage and piping failure. The subsurface model also identified weathered decomposed granite in the south-east abutment, which meant that the dam footprint could require widening and/or the use of anchors. The model also allowed Jacobs to plan for the use of spillway rock in the construction work and helped determine that clay for the embankment dam would need to be hauled from outside the local area. Other environmental
considerations identified included use of the rock from the spillway excavation in the construction work, and efficient management of the significant surplus. Identifying all of these sources quickly and accurately is essential as they have an impact on the overall project cost and delivery.

Graeme Jardine concludes, “Leapfrog Works was able to save us considerable time as it’s designed to meet the specific needs of the industry. We don’t need to switch between software packages, we can carry out all of the modelling in one place. Works is also extremely versatile and means we can interact with Building Information Model (BIM) designs and ground investigation databases, such as gINT & Holebase, as needed. This meant that we could bring all information into Works’ highly visual environment, giving us a holistic view of the whole project, further helping reduce risk in decision making.”

OUTCOME

It is likely that the decision regarding the Emu Swamp Dam’s go ahead is made in 2019 and could result in more borehole drilling to fully understand ground permeability – the Leapfrog model will help to inform this work when the project progresses to the detailed design phase. If required, this new drilling data can be easily incorporated into the subsurface model using Works’ dynamic updating feature. This ‘dynamic’ updating means that new data, gained from the field, can be loaded into Leapfrog Works and will automatically flow through to the end model and rapidly update it, with associated time saving and efficiency gains.

Jacobs are now using Leapfrog Works as their preferred geological modelling tool for other significant projects in the Asia-Pacific region and are looking to expand its application into the America’s and the UK.

“We’re finding that using Leapfrog for tender designs on other dam projects really helps showcase how we’re going to work on a project,” concludes Graeme Jardine.

Seequent’s Civil & Environmental Product Manager, Pat McLarin, comments, “Leapfrog Works is designed to support civil engineering project workflows to the benefit of the wide cross section of teams and stakeholders that are commonly involved. We’re delighted Works helped deliver the business case for what could be a landmark project in Queensland.”
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