



Case Study: Umbiram Creek – designing a template for future resilience and recovery.

Project Overview

Since February 2020, severe flooding in the Cambooya region of the eastern Darling Downs, Toowoomba Regional Council area, Queensland, Australia, has caused potentially irreparable damage to infrastructure and productive agricultural land.

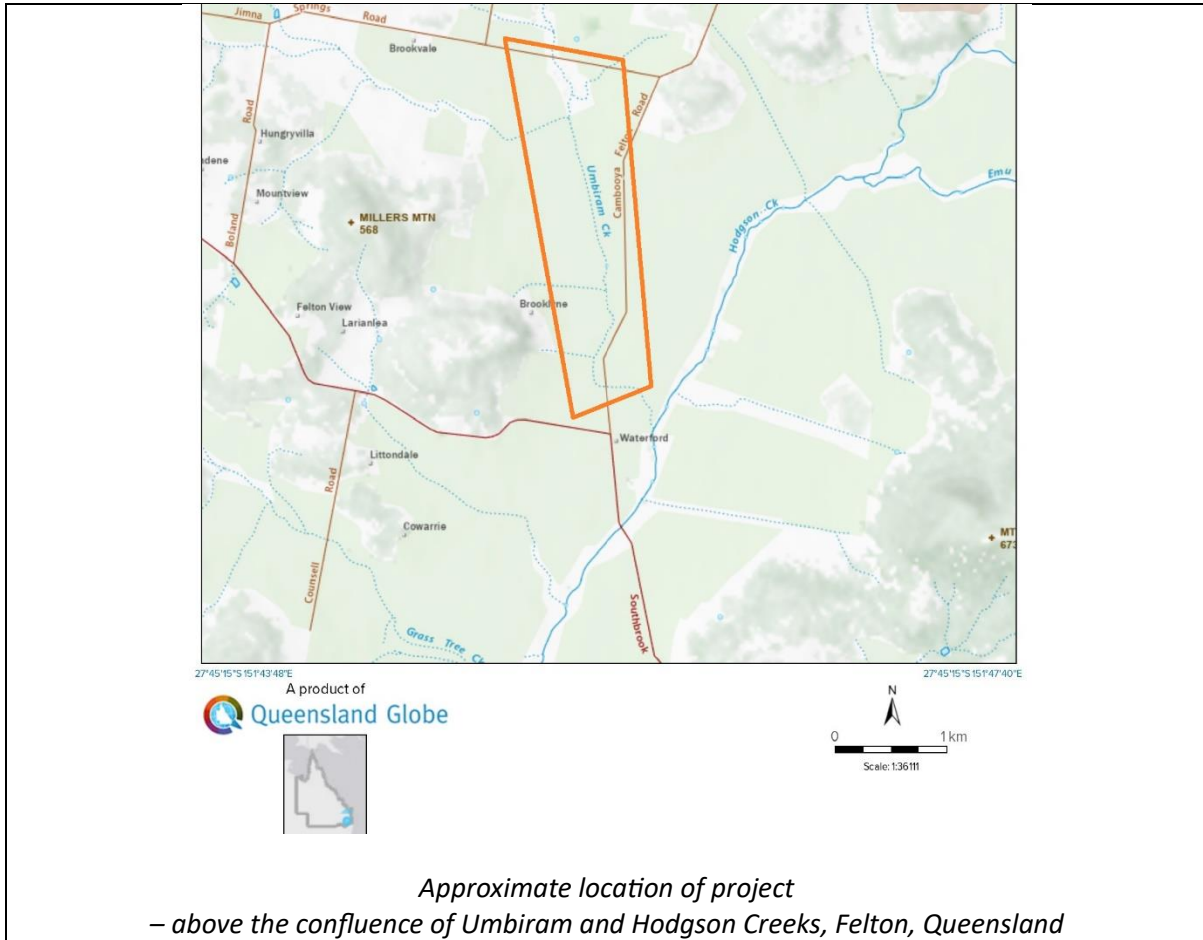
Cambooya Landcare was aware of the widespread stress being experienced within the community, particularly directly impacted primary producers. It is expected that severe flooding events will get worse into the future and engineering solutions are expensive.

Cambooya Landcare asked “what is the most effective way Landcare can help in this situation?”

This project aimed to engage landholders and authorities directly to develop a "template for resilience" - a model/example that provides logical steps to study the problems and agree on shared landholder solutions across property boundaries on a sub-catchment scale.

The site identified for this project was the Umbiram Creek catchment, upstream of the Cambooya-Felton Road where there was destruction of farmland and severe flood damage to the Cambooya-Felton Road surface. Four property / landholders were identified for the subject area. Toowoomba Regional Council was seen as a key stakeholder as culvert road crossings managed and maintained by the Council are impacted and possibly cause unintentional impact.

This project was made possible through a grant from the Queensland Government Department of Communities, Housing and Digital Economy - 2021 and 2022 Queensland Flooding - Category C - Flexible Funding Grants Program - Small grant program. (Reference: Agreement Number: con_14410, QFFGR1)



Implementation / Activities Undertaken

The initial data collection involved the precision drone capture (Hawkeye Access) of a detailed digital terrain 3D model for an area of 7.34 kilometre long by 1 km wide (7.34 square kilometres). This resulted in a large amount of pictorial data which identified suspected flood flow and “breakout” points; subtle changes in elevation and slope; likely silt/debris build up areas; impact of fence lines and other constructed works and likely flood flow lines.

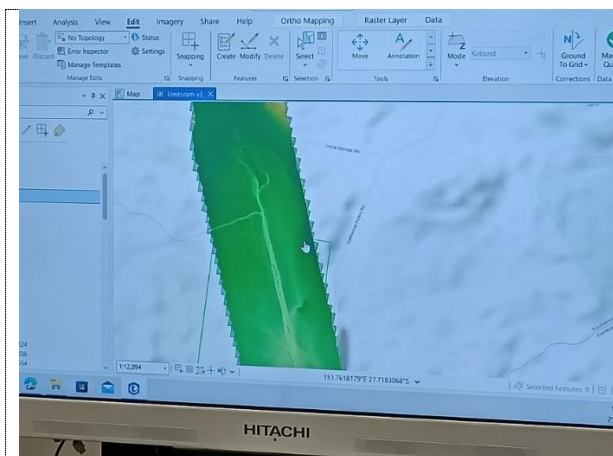
These data were then “workshopped” by the landholders and facilitated by the subject experts for drone mapping data capture and land use and land management consultant.

The graphic representation of the 3D mapping data provided an ideal vehicle by which to objectively work through problems and solutions. Viewing and analysing the graphic data, combined with the landholders’ on ground knowledge and historical experience in managing the properties proved to be very fruitful.

The assumptions were then ground-truthed and confirmed through site visits by the land management consultant.

Other available information was used to assess the situation:

- Historical aerial photography via the Queensland Government QImagery System. <https://qimagery.information.qld.gov.au/>
- Queensland Government Soil Conservation plans under the *Soil Conservation Act 1986*.



3D Data displayed graphically



Workshopping the data

Environmental Outcomes

This project has confirmed a number of factors that need to be addressed in order to see a reduction in the amount of risk to infrastructure and future loss of soils and good farming land.

The historical work to narrow and try to control the creek systems has, in hindsight, caused a major impact. Two road crossings are considered of particular concern as they act negatively by

unnaturally damming and redirecting the flow of water during flood events to cause unintended damage to adjoining properties.

Solutions identified are:

- Generally, undertaking activities to slow the water flow and allow the creek to develop a more natural flow system.
- Widening and returning the creek to a more natural / historical flow pattern.
- Restoring soil wash out areas by some small works and revegetation.
- Allowing natural silting to allow the creek to develop natural bends in the system to slow the flow.
- Redesigning historically constructed water flow infrastructure, such as banks and channels to be compatible with natural flows
- Moving fences to higher level and aligning them with flow based on locations identified by the mapping. Including off stream stock watering points
- Reducing grazing pressure and maintaining vegetation cover in the major flow areas to reduce silt loss.
- Redesigning creek crossings of Council roads with increase in pipe size and location. (This would be a Toowoomba Regional Council decision and responsibility.)

These solutions are already being addressed by landholders. Toowoomba Regional Council is being engaged with regard to the future design and maintenance of the road crossings.

Community and Social Outcomes

The project has proven that excellent practical outcomes can be achieved though landholders working cooperatively and positively together on a shared problem with shared solutions.

Full credit must be given to the landholders involved who have been professional and positive in their dealings with each other and the project facilitators. Their willing participation and positive attitude can be demonstrated as a shining example to the community of how to go about landscape scale, multi-property cooperation. This information was presented and analysed at a community workshop on 25 November 2023 at Felton Hall.

The on-ground work is yet to be completed. Floods will still impact. It may take many years to correct the problems. However, the people involved now have a practical and achievable plan to work with.

Next Steps

The outcomes of the project have proven that the methodology used is sound and worth further investment.

Ideally, further mapping work and engagement of more landholders could be undertaken upstream from the current site. Progress to widen the scope of this project depends on further funding being available.

Should other landholder groups, in other locations be identified, funding would be sought to undertake a similar process.

Acknowledgements

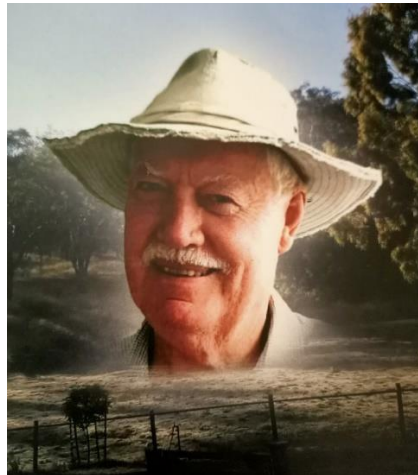
Joseph Canning - Hawkeye Access, Drone pilot

Mark Genrich - Land Management Consultant

The landholders

Queensland Government, Department of Communities, Housing and Digital Economy, Flexible Funding Team.

Cambooya Landcare Association Inc acknowledges the Traditional Owners of Country throughout Australia. We pay our respects to Elders past and present.



In memory of Ian Whan (31 January 1947 - 21 May 2023)