



# **Developing Spatial Infrastructures for the Q.U.T. Samford Ecological Research Facility\***

**Mr Robert Webb**

Lecturer and Spatial Science Subject Coordinator,

Faculty of Built Environment & Engineering, Queensland University of Technology

2009 Winner: Asia-Pacific Spatial Excellence Award – Education & Professional Development

\* Peer Reviewed Conference Paper

*Developing Spatial Infrastructures for the QUT- SERF Mr. Robert WEBB*



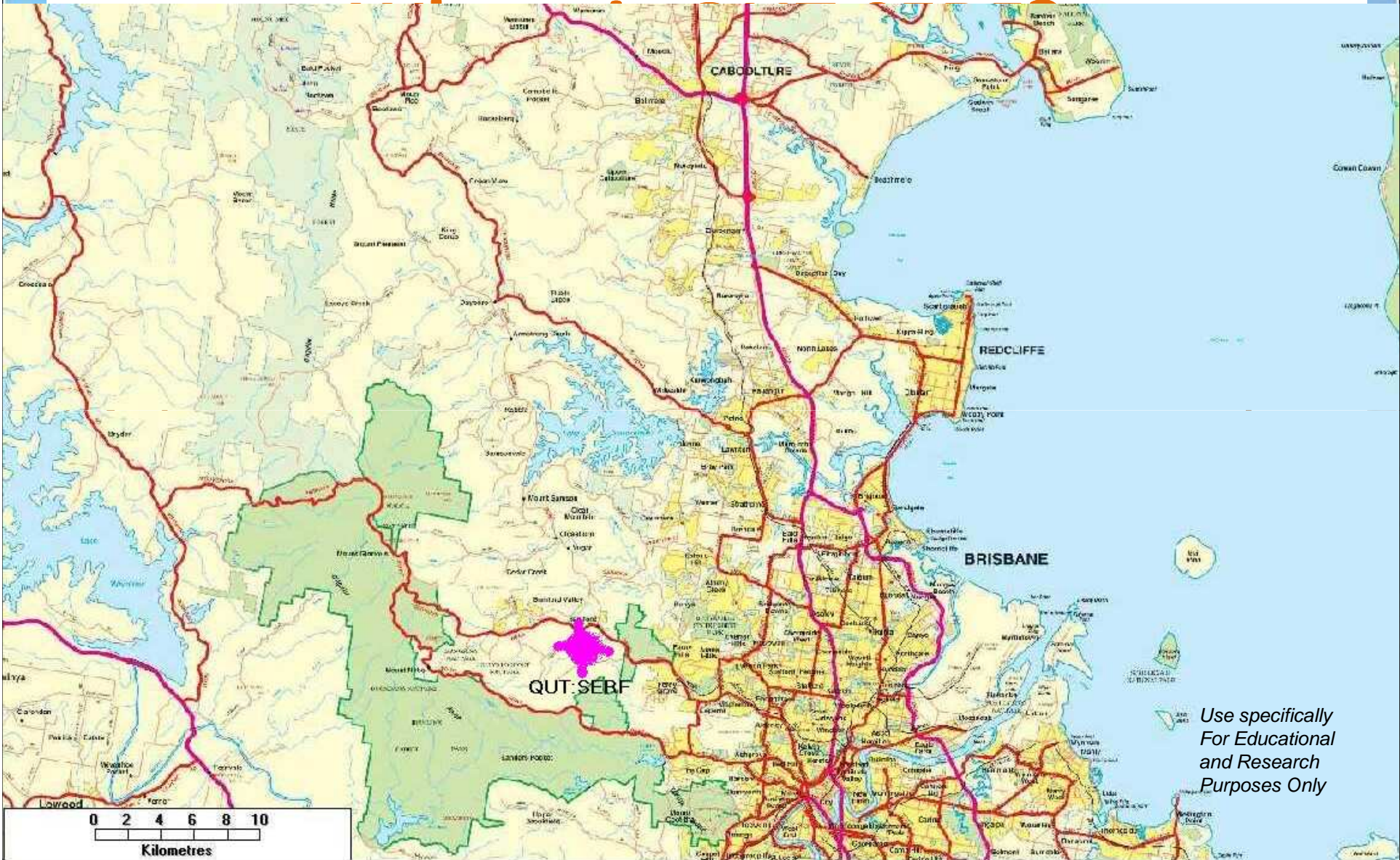
# Outline of Presentation

- Introduction
- Historical Background to the Land
- Development of SERF Spatial Information
- Development of Survey Control Infrastructure
- Ortho-Photography Spatial Information Layer
- 100metre Confluence Point Infrastructure
- Engaging Students in Real-World Learning
- Conclusion

# Introduction

- ❑ Samford Ecological Research Facility (SERF) is NOW managed by QUT: Institute for Sustainable Resources
- ❑ Camp Mountain land purchased by the Marks family in 1877
- ❑ Dr Elizabeth Nesta Marks (Patricia) used the property until shortly before her death in 2002.
- ❑ Under the provision of her will, instructed the executors of her estate to identify a suitable beneficiary for this land who would use the property for “**ecological purposes**”.





*Use specifically  
For Educational  
and Research  
Purposes Only*

QUT | Samford Ecological Research Facility: SERF - Windows Internet Explorer

QUT Home | ISR Home

**About the Samford Ecological Research Facility (SERF)**

- SERF overview
- Accessing SERF
- Community
- Highlights
- SERF newsletter and media
- Contact us

**Research at SERF**

- Ongoing and recent research
- SERF research map
- Data policy and resources

**Teaching and learning at SERF**

- Faculty of Science and Technology
- Faculty of Built Environment and Engineering
- Faculty of Creative Industries

**Dr Elizabeth (Patricia) Nesta Marks Memorial**

- Biography
- Property history
- Scholarships and awards
- Dr EN Marks publications

**QuickLinks**

- Accessing SERF
- ISR home
- SERF newsletter

**SERF News and Events**

more news and events...

Community organisations (not allowing local knowledge omission):

- Some of our key engagement activities include:
  - Regular updates and meetings with the Marks family
  - Quarterly meetings with Samford District Historical Museum Society (SDHM) members
  - Bi-annual SERF newsletter, circulated to all neighbours, SDHM and available from the SERF website.
  - Soon-to-be-launched SERF website
  - An annual information session with the Samford community held at the property to showcase some of the research activities that are going on.

"If anyone has any ideas, suggestions or concerns with our activities at SERF, I insist that you please contact us. We are only new to this community and aim to be good neighbours however there is always a chance we may have overlooked something."

"Integrating with the community is a core element of QUT and the SERF and I encourage the community to put forward their thoughts and ideas to help us identify areas for improvement," Michelle added further.

climate change and atmospheric research.

SERF Research Leader Dr Jim Smith says, "It's important that SERF research doesn't substantially impact the environment negatively and the surrounding community."

"Our immediate goal is to complete a high-resolution geographic mapping of SERF to define the ecological zones in the area, for example the forested area, swampland and the open grass land." Identifying those zones will assist in defining the specific research experimentation and ecological monitoring in each area.

QUT researchers also seek to assist in repair of bordering Samford creek, which is classified a 'polluted' stream with the goal of increasing ecological diversity and abundance.

Jim also says that SERF has a potential for integration into a Long Term Ecological Research (LTER) facilities network which is an international program established by the United States National Science Foundation in 1980.

The LTER program is a collaborative effort involving international scientists and students documenting, analysing and understanding long-term (> 15 yrs) ecological processes, patterns and phenomena.

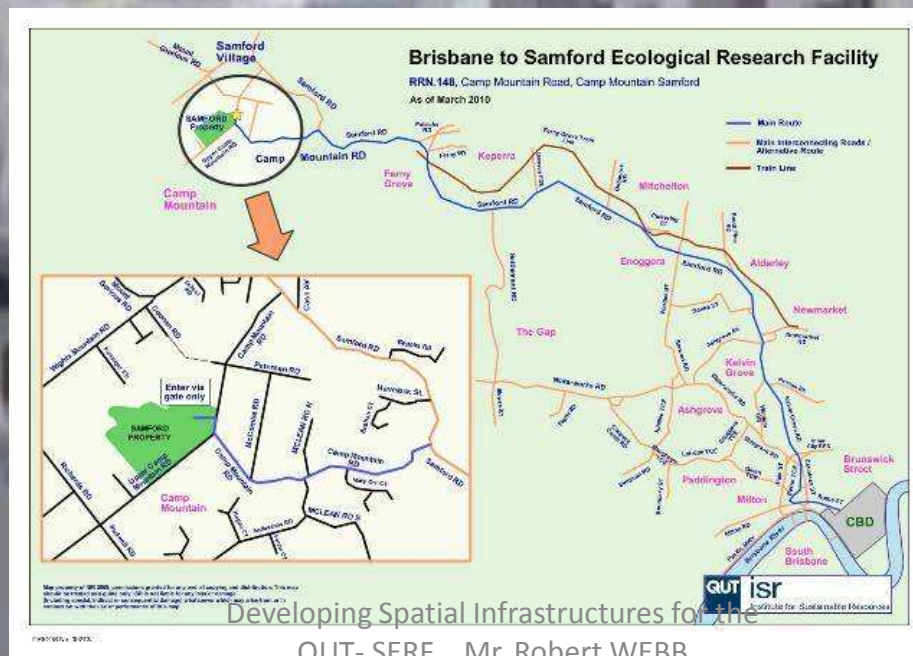
"Inclusion into the LTER network will help researchers monitor the effects of increasing urban and peri-urban development and climate change on the Samford Valley," he added further.

**Samford Ecological Research Facility**  
Institute for Sustainable Resources  
Queensland University of Technology

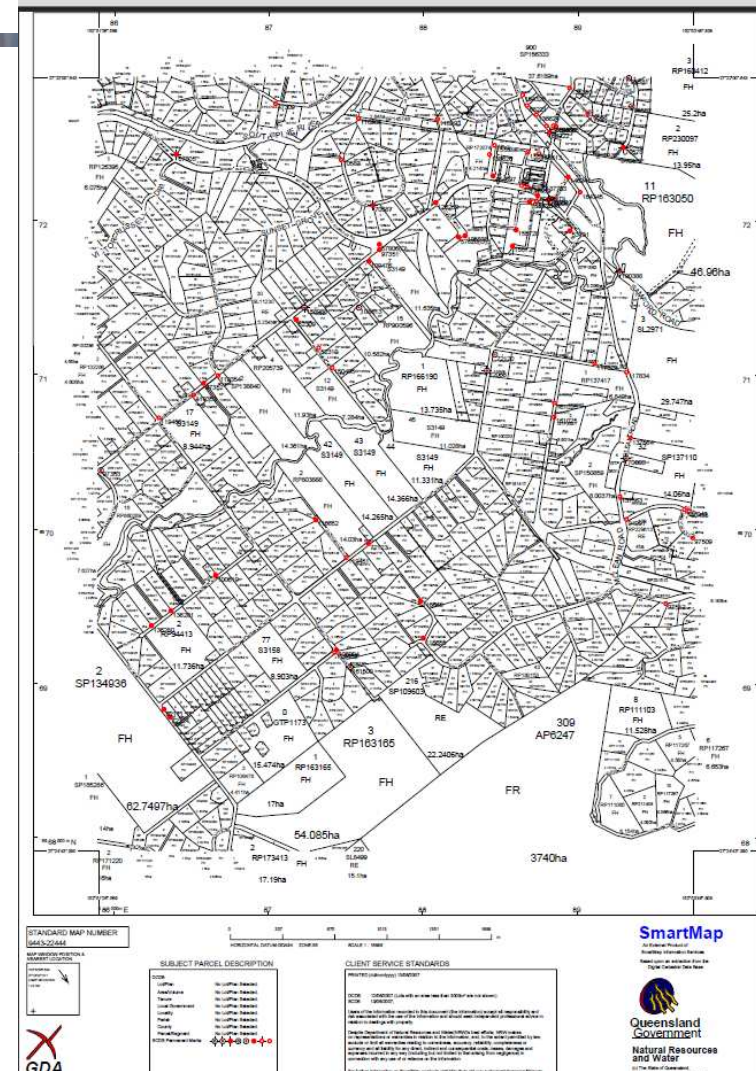
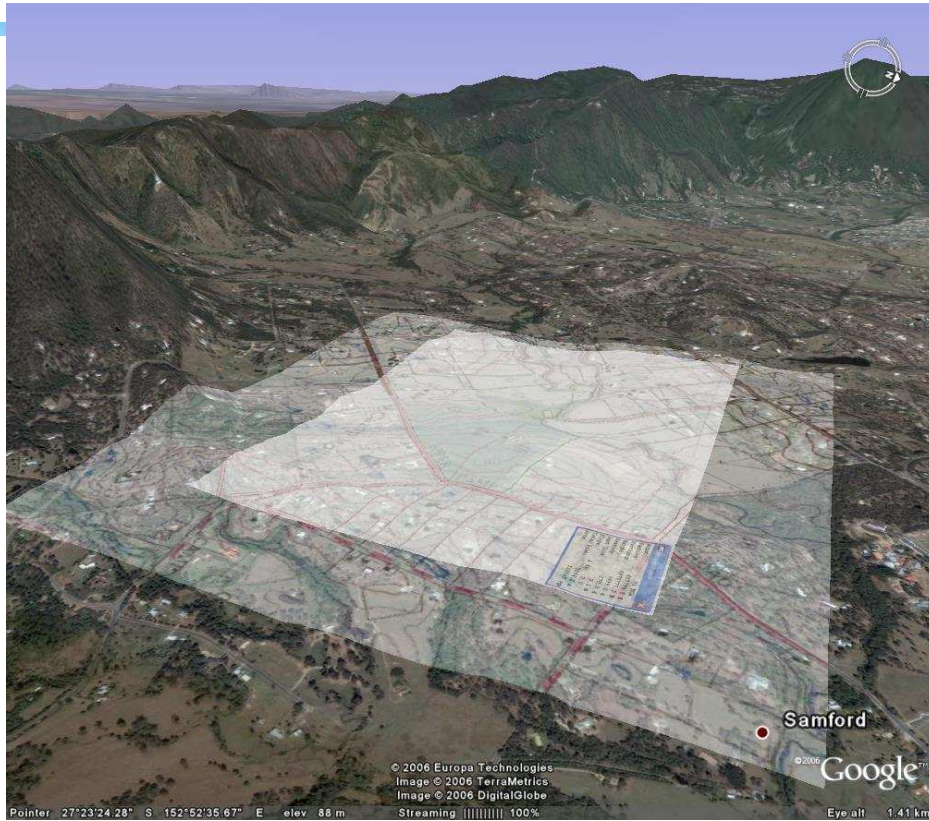
2 George Street  
GPO Box 2434  
Phone 07 3138 1904  
Fax 07 3138 4438  
Email samford@qut.edu.au  
www.isr.qut.edu.au

QUT isr  
Institute for Sustainable Resources

CRICOS No. 00213J



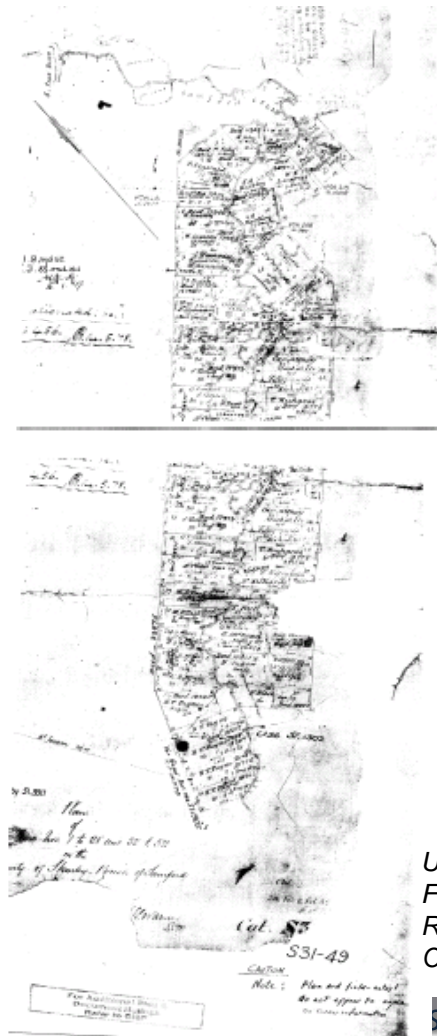
# Existing Property Boundary Framework



Use specifically  
 For Educational  
 and Research  
 Purposes Only

# Historical Background to the Land

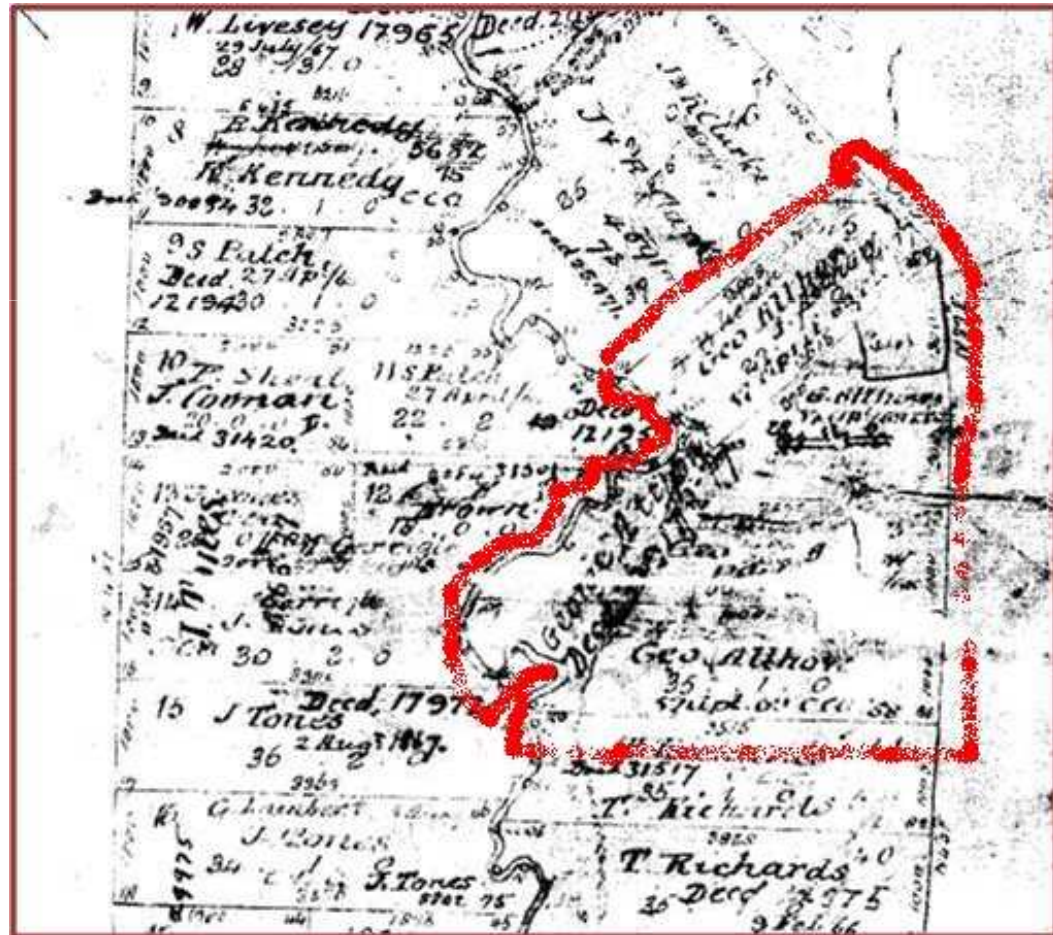
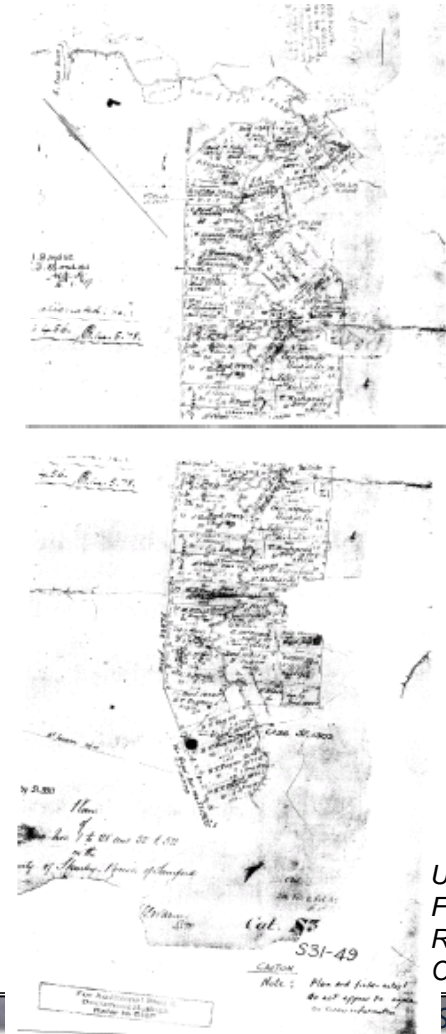
Extract from S3149 (1864) County of Stanley, Parish of Samford



Use specifically  
For Educational and  
Research Purposes  
Only

# Historical Background to the Land

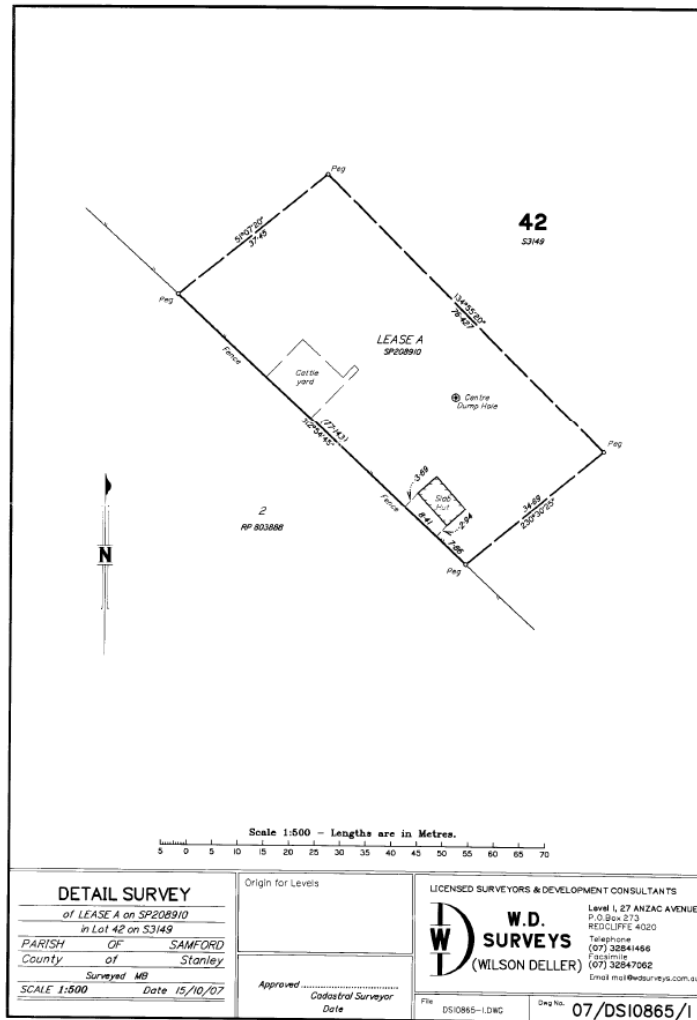
## Extract from S3149 County of Stanley, Parish of Samford



Use specifically  
For Educational and  
Research Purposes  
Only



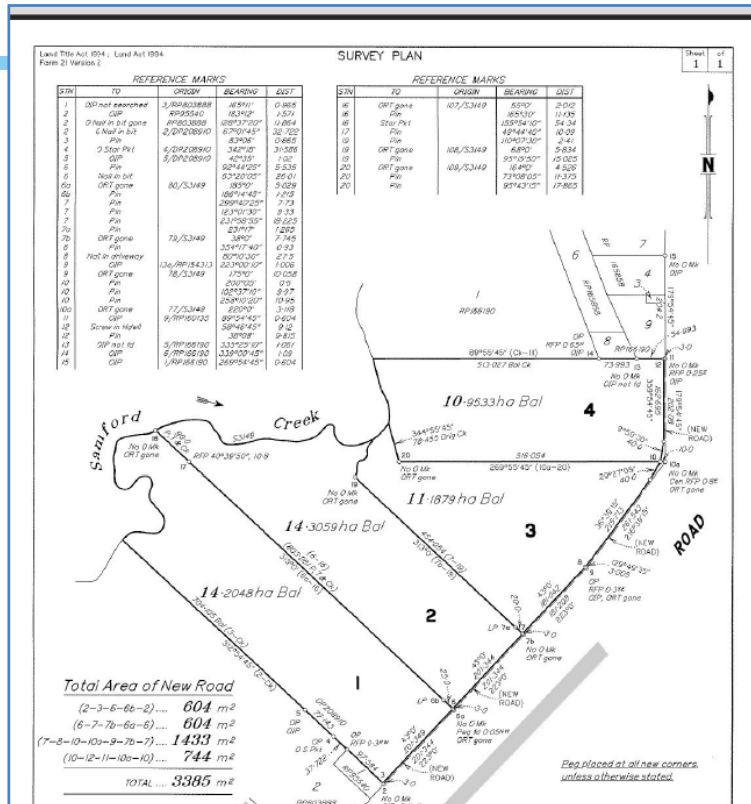
# 2007 Qld Heritage Survey Boundary- SLAB HUT: Lease A on SP208910 in lot 42 on S3149



Use specifically  
For Educational and  
Research Purposes Only

# 2008 road frontage re-survey: lots 1-4, SP214119

- ✓ Material Change of Use (MCU) development application approved by Pine Rivers Shire Council (PRSC) now part of amalgamated Moreton Bay Regional Council (MBRC).
- ✓ property zoning was changed from 'Rural Residential' to 'Educational Purposes'



For Educational and Research Purposes Only



# Development of SERF Spatial Information

- ❑ Spatial Infrastructure, in the context of this conference paper, refers to
  - ❑ the physical survey monumentation,
  - ❑ the associated precision positioning information,
  - ❑ and the creation of new spatial information layers (creation of new knowledge)

at a **site-specific** and **focused scale**.

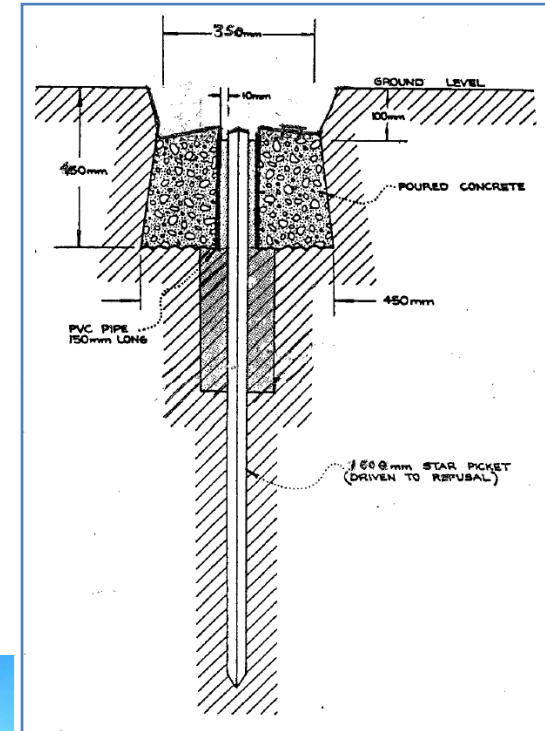
- ❑ 2 Client Requests
  - ❑ QUT Institute of Sustainable Resources
  - ❑ QUT Facilities Management group

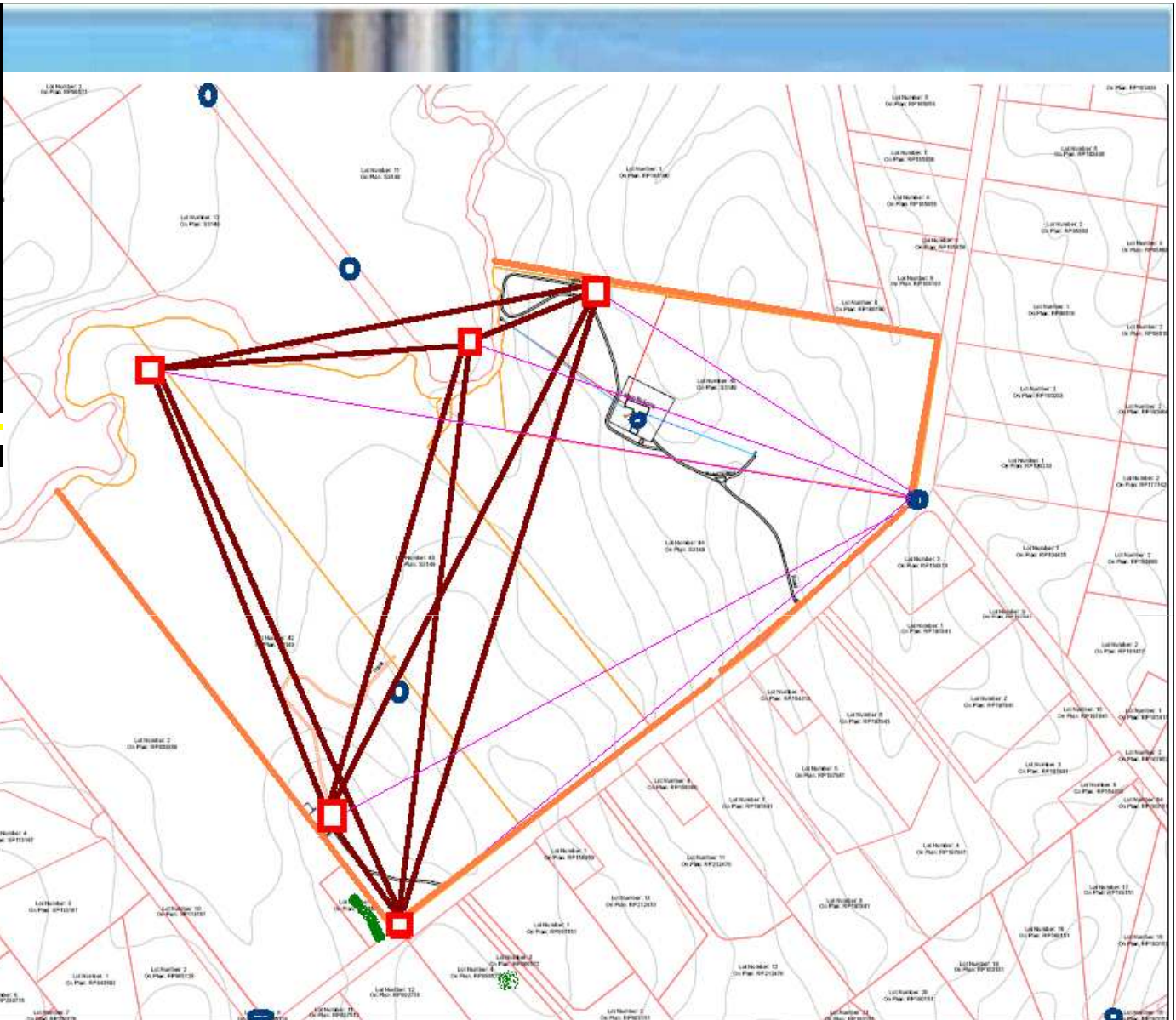
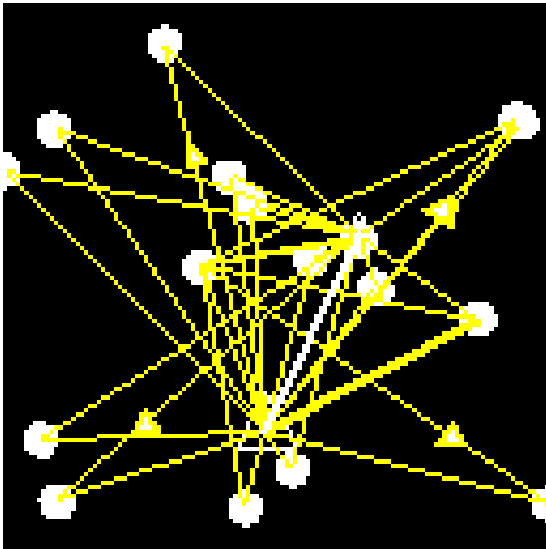
## Development of Survey Control Infrastructure

- ❑ Multi-purpose and site-specific primary survey control network designed considering real-world constraints imposed by terrain characteristics.
- ❑ Alpha-numeric descriptor: QUT999X
- ❑ Connections to surrounding PSM Survey Control Network (GPS ONLY) supported by comparisons with AUSPOS
- ❑ Ground Control Points and other measurement surveys propagate from this primary survey control network.

# Development of Survey Control Infrastructure

## Survey Control





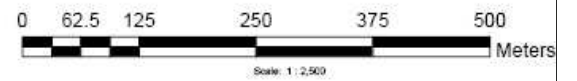
### QUT Samford Ecological Research Facility



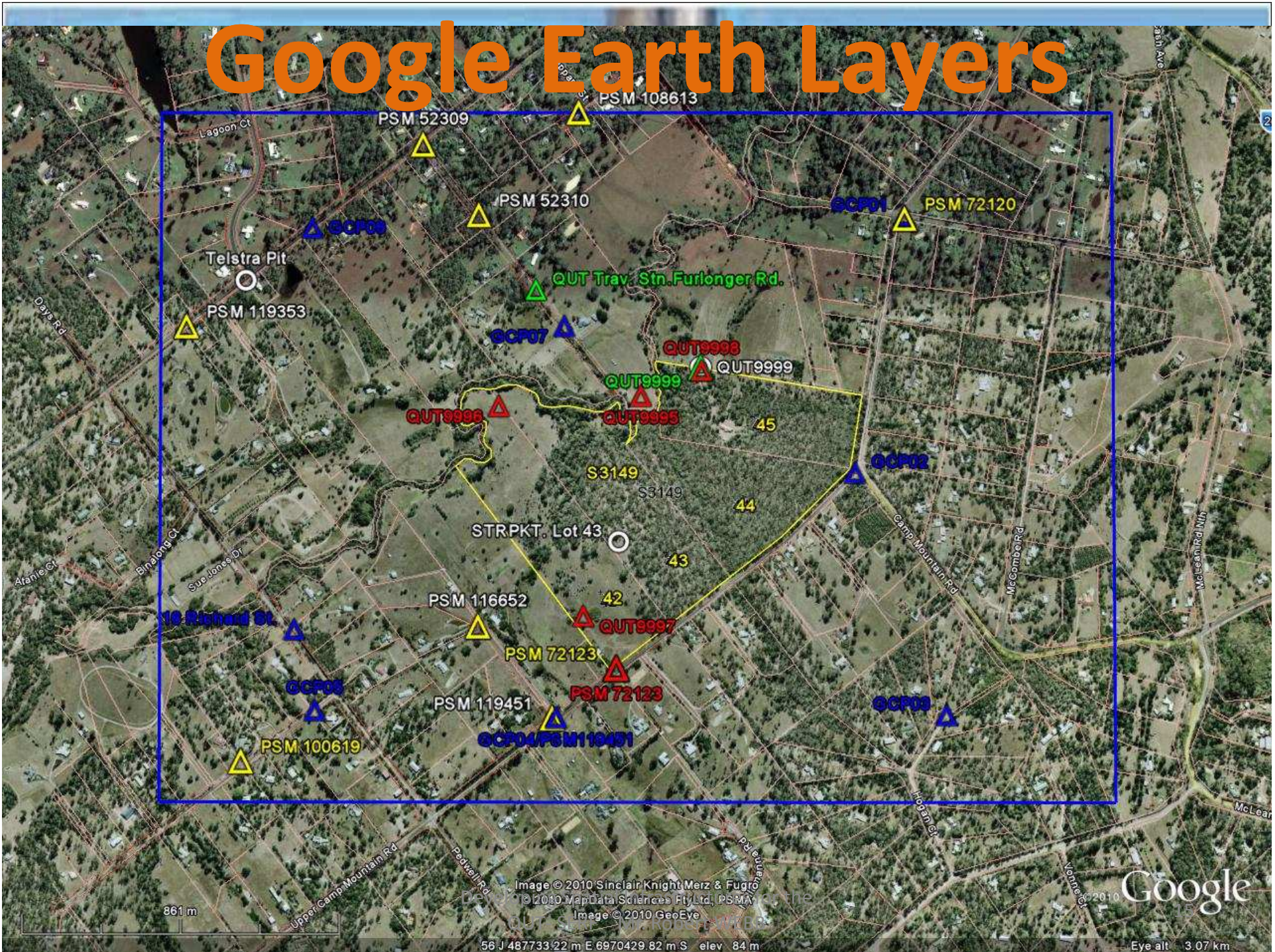
SDM  
 SDM is a data model that allows you to store and manage spatial data. It is a database that stores spatial data in a structured way. This map has been produced as a grid only.  
 Projection Data: March 2009  
 Note: This map has been created internally by The Queensland University of Technology as a training resource. It should not be used for any other purpose. Any copyright or other legal notices are the property of the original creator. Please contact the QUT for a copy of the original map.

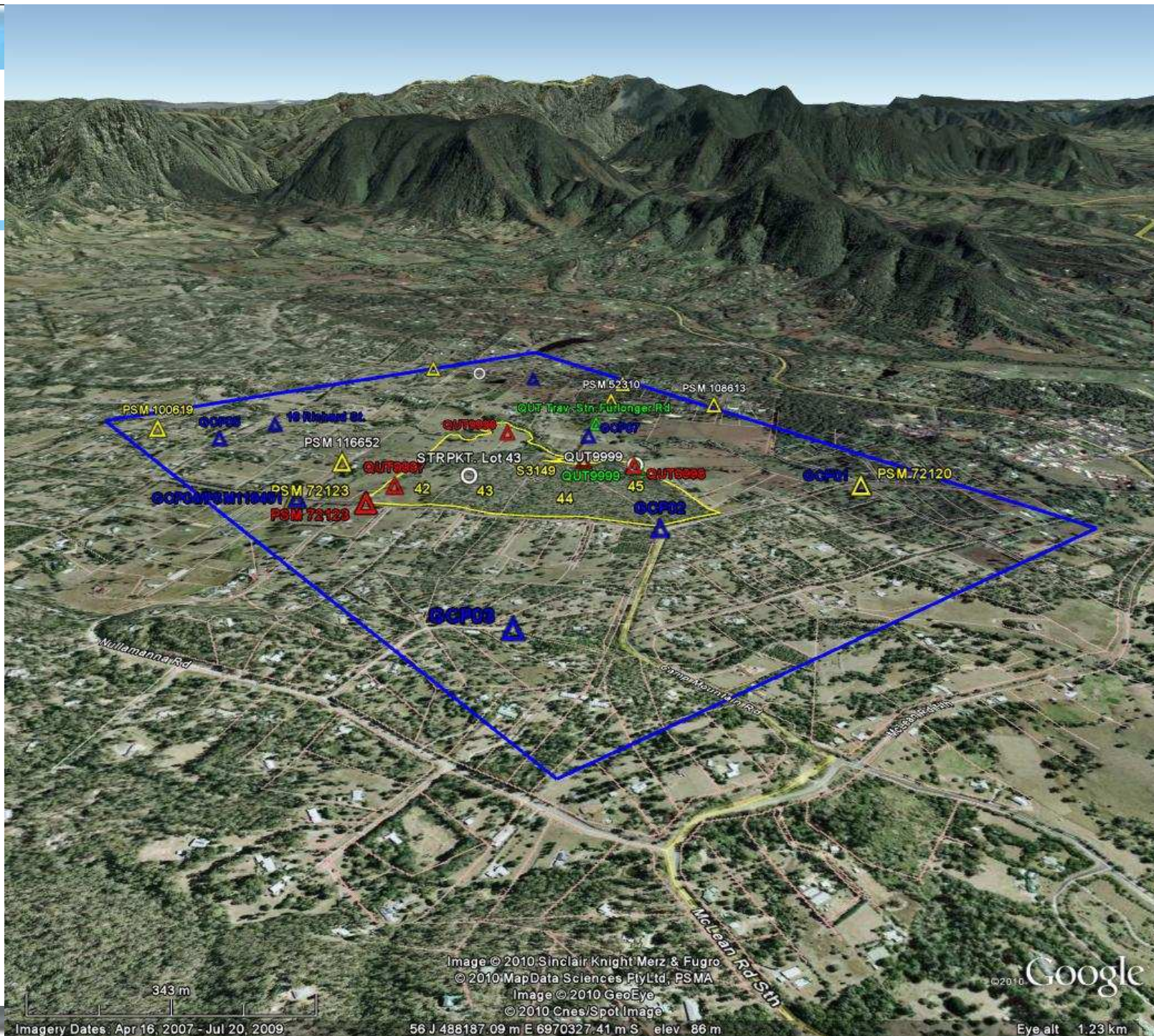


Queensland University of Technology



# Google Earth Layers





PSM 100619  
PSM 116652  
STRPKT. Lot 43  
PSM 72123  
PSM 72128  
PSM 52310  
PSM 108613  
PSM 72120  
18 Richard St.  
@UT Trav. Stn. Fullenger Rd.  
S3149  
42  
43  
44  
45  
OUTF001  
OUTF002  
OUTF003  
OUTF004  
OUTF005  
OUTF006  
OUTF007  
OUTF008  
OUTF009  
OUTF010  
OCP01  
OCP02  
OCP03  
OCP04  
OCP05  
OCP06  
OCP07  
OCP08  
OCP09  
OCP10  
OCP11  
OCP12

Nullamanna Rd

James Norman Rd

McLean Rd

McLean Rd Stn

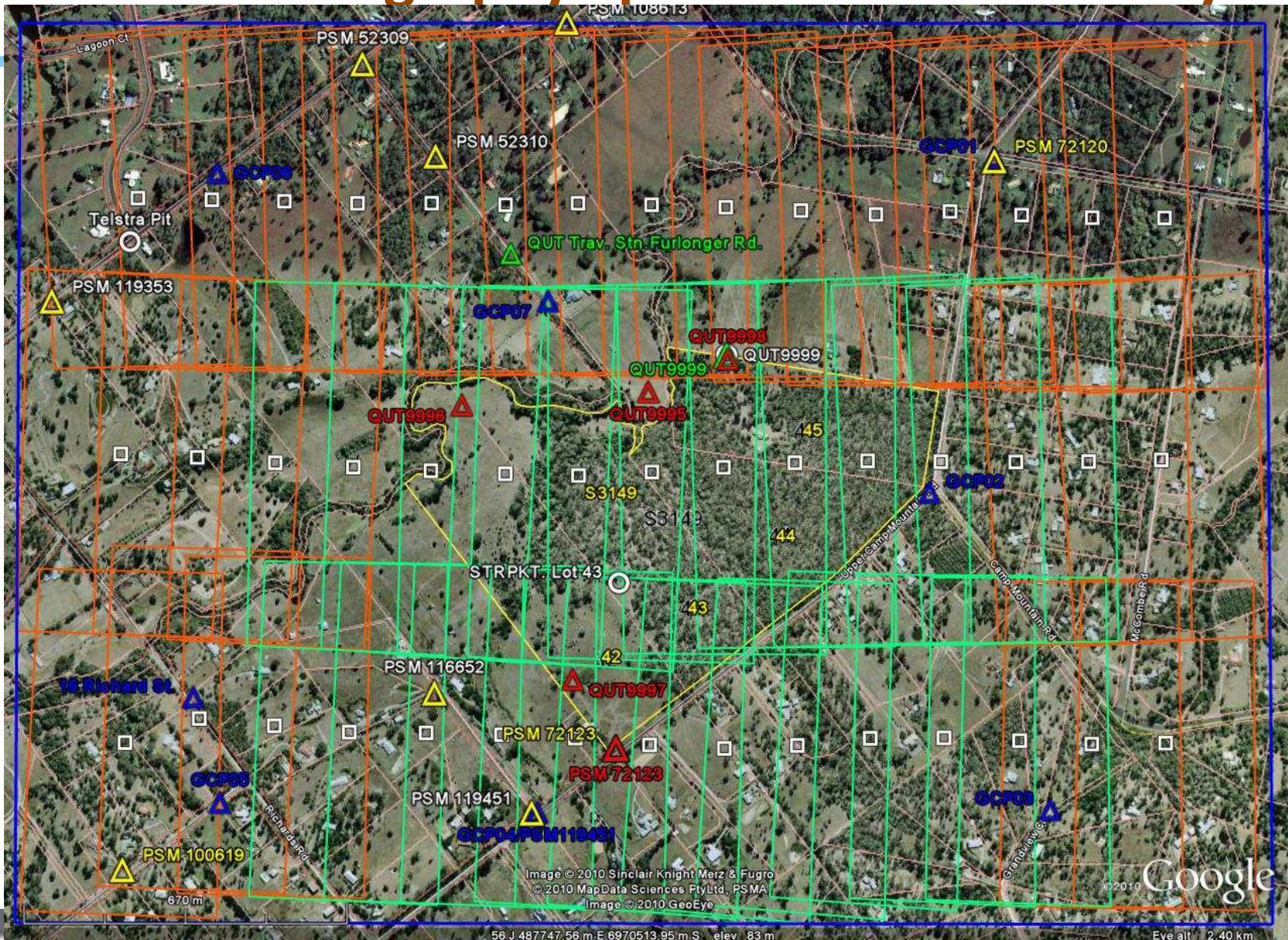
343 m  
Imagery Dates: Apr 16, 2007 - Jul 20, 2009

Image © 2010 Sinclair Knight Merz & Fugro  
© 2010 MapData Sciences Pty Ltd, PSMA  
Image © 2010 GeoEye  
© 2010 Cnes/Spot Image  
56 J 488187 09 m E 6970327 41 m S elev 86 m

© 2010 Google  
Eye alt 1.23 km

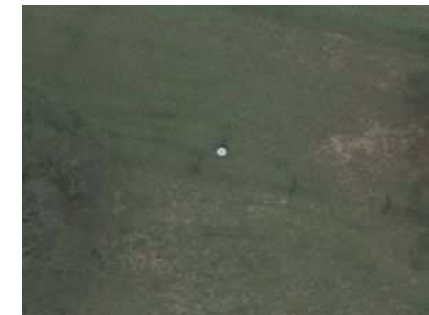


# Ortho-Photography Spatial Information Layer



# Ortho-Photography Spatial Information Layer

✓ Experimental targeting pre-photography





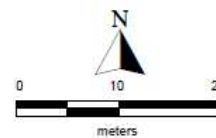
# ECOLOGY report- Tree species



## LEGEND

 Tree Location

**A** Tree identification (refer Ecology report)



Samford Ecological Research Facility  
Site Based Management Plan  
Ecological Assessment

Trees around Barracks

**FIGURE 4**




File: Fig4 WCR  
Date: 15.5.10  
09CH161 Dwn: ST

# Site Based Management Plan


**DRAFT**

*Site Based Management Plan for the Samford Ecological Research Facility*

*Prepared for Queensland University of Technology*








1800 131 3013

## SAMFORD ECOLOGICAL RESEARCH FACILITY SITE BASED MANAGEMENT PLAN

### CONTENTS

ACRONYMS.....	2
1.0 INTRODUCTION.....	3
1.1 AIM AND OBJECTIVES OF THE SBMP.....	3
1.2 SBMP STRUCTURE AND CONTENT.....	4
2.0 ABOUT SERF.....	5
2.1 THE SERF PROPERTY.....	5
2.1.1 Site Description and Location.....	5
2.1.2 Historical Background.....	6
2.1.3 Ecology.....	8
2.1.4 Bushfire.....	8
2.2 THE SERF FACILITY.....	9
2.2.1 Guiding Principles.....	9
2.2.2 SERF Governance Structure.....	9
2.2.3 SERF as a Research Facility.....	11
3.0 REVIEW OF LEGISLATIVE REQUIREMENTS.....	12
3.1 FEDERAL ORDINANCES.....	12
3.2 STATE ORDINANCES.....	13
3.4 LOCAL ORDINANCES.....	17
3.4.1 Material Change of Use Development Approval Conditions.....	19
3.5 QUT POLICY.....	19
4.0 SITE BASED MANAGEMENT ACTION PLAN.....	20
5.0 CONCEPT MASTER PLAN.....	63

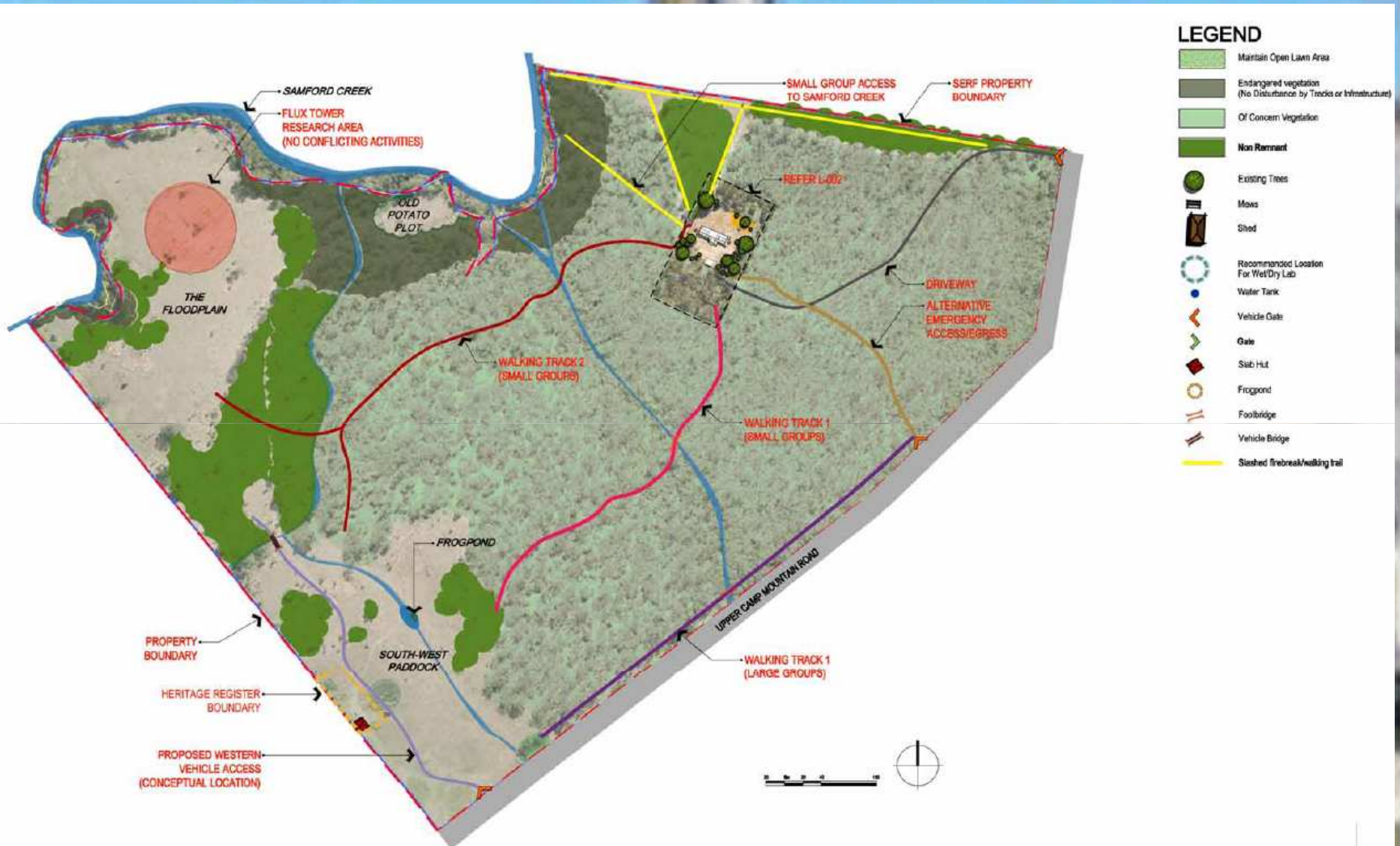
### TABLES

Table 1: Structure and Content of SBMP.....	4
Table 2: Federal Ordinances Relevant to SERF.....	12
Table 3: State Ordinances Relevant to SERF.....	13
Table 4: PRSC Overlays that affect the SERF property.....	17

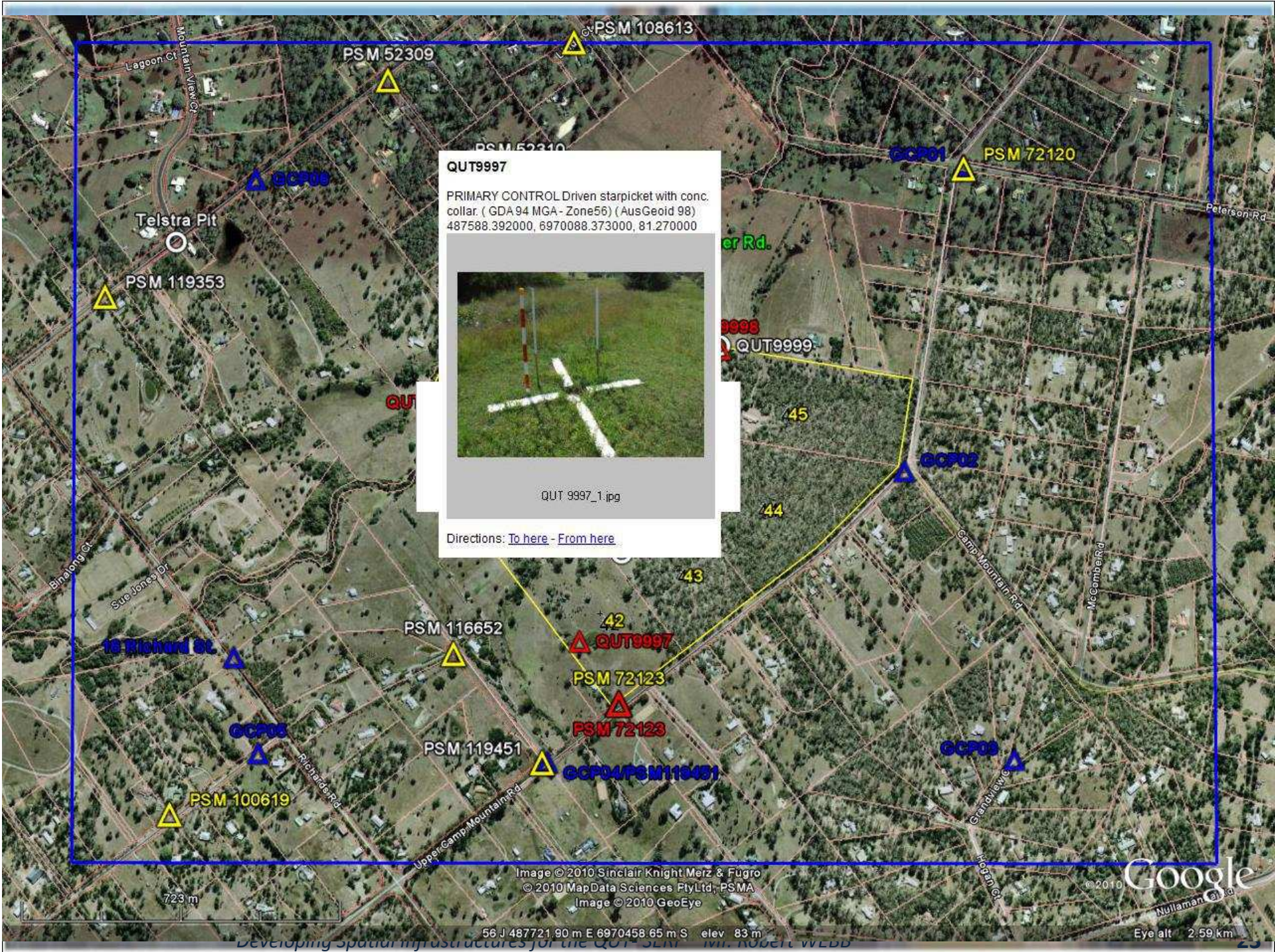
### APPENDICES

- APPENDIX A – Broad Ecological Assessment for SERF.
- APPENDIX B – SERF Governance Terms of Reference (SERF Management Committee, Research and Education Committee, Reference Group).
- APPENDIX C – Moreton Bay Regional Council (MBRC) Summary of Conditions of Approval.
- APPENDIX D – Action Plan Methodology.

# Concept Plan for SERF



**CONCEPT MASTER PLAN**  
 SAMFORD ECOLOGICAL RESEARCH FACILITY (SERF)  
 L-001



**QUT9997**  
 PRIMARY CONTROL Driven starpicket with conc. collar. ( GDA 94 MGA - Zone56) ( AusGeoid 98)  
 487588.392000, 6970088.373000, 81.270000



QUT\_9997\_1.jpg

Directions: [To here](#) - [From here](#)

Image © 2010 Sinclair Knight Merz & Fugro  
 © 2010 MapData Sciences Pty Ltd, PSMA  
 Image © 2010 GeoEye

Google

56 J 487721.90 m E 6970458.65 m S elev 83 m

Eye alt 2.59 km



**GCP02**

PHOTO GROUND CONTROL GI nail in painted photo target on road (within road island line marking) ( GDA94 MGA - Zone56) ( AusGeoid 98)  
 488328.732000, 6970475.883000, 69.092000



GCP02\_10.jpg



GCP02\_9.jpg



GCP02\_panorama2.jpg

Directions: [To here](#) - [From here](#)

Image © 2010 Sinclair Knight Merz & Fugro  
 © 2010 MapData Sciences Pty Ltd, PSMA  
 Image © 2010 GeoEye

Google

614 m

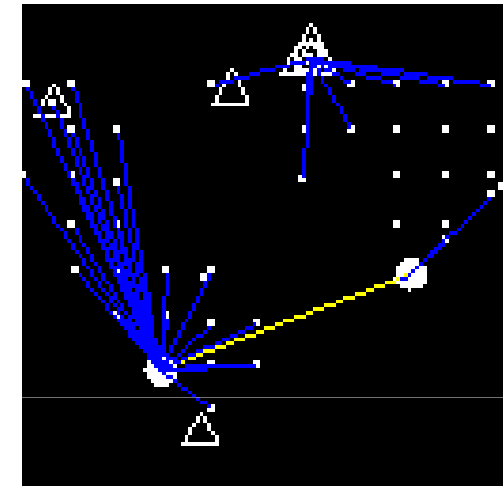
56 J 487832.03 m E 6969919.44 m S elev. 85 m

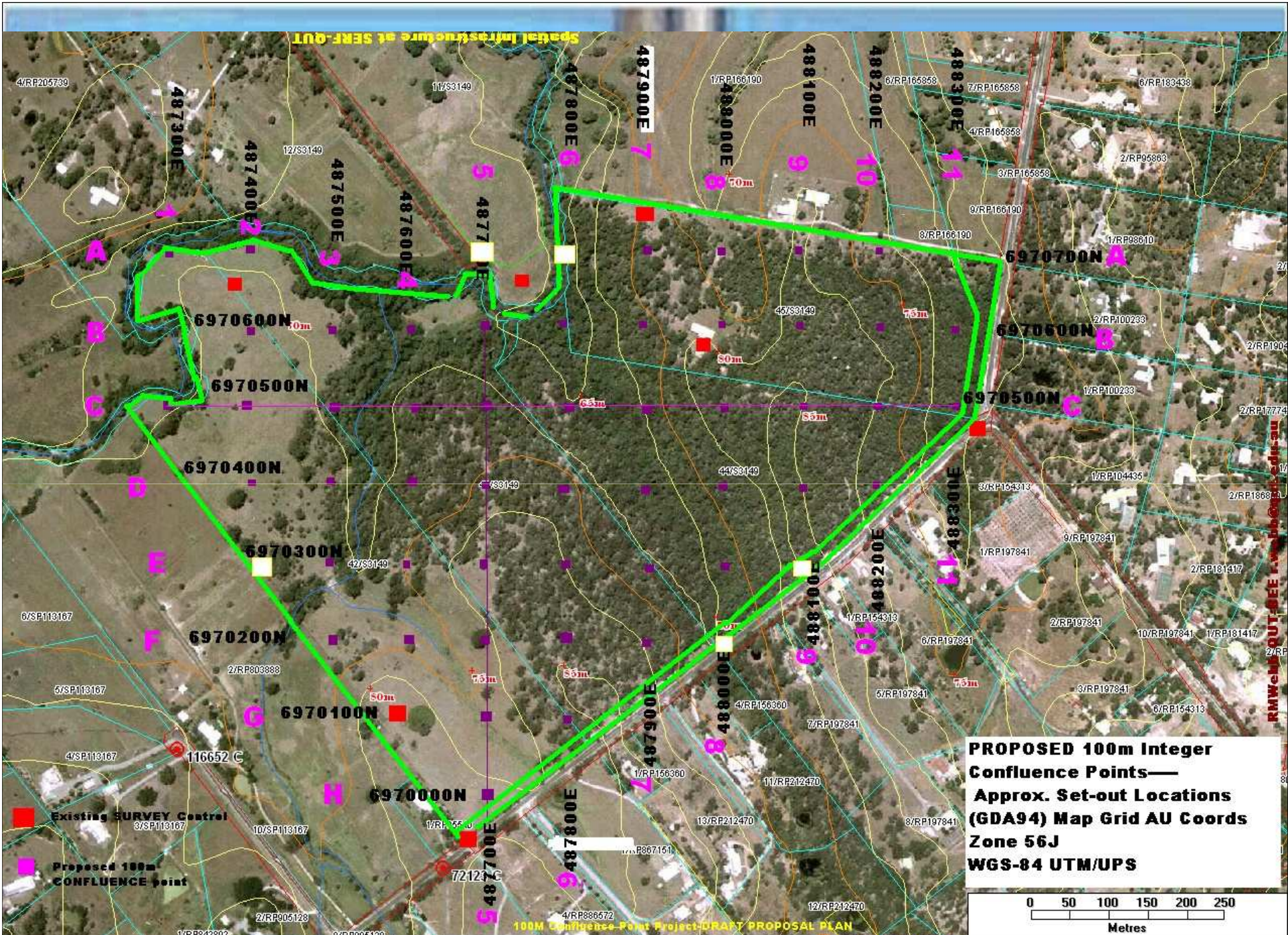
Eye alt. 2.23 km



# 100metre Confluence Point Infrastructure

- ✓ Aim to place a Survey monument (Galv. Star Picket) at the **Map Grid of Australia** even 100metre confluence points.
- ✓ Researchers only needed to check their relationship relative to a couple of known 100 metre grid points.





# 100metre Confluence Point Infrastructure

- ✓ Benefits to wider scientific studies at SERF
- ✓ Provides coordinated approach to flora and fauna sampling – Longitudinal studies every 3 years

The screenshot displays a multi-windowed desktop environment. The primary window is a spreadsheet titled 'SAMFORD SURVEY CONTROL' with columns for Name, Easting, Northing, Elevation, Height, Mark Type, July 2009 Adjustment, and Name. It lists various survey points such as OUT9996, OUT9999, GCP01, GCP02, GCP03, GCP06, GCP07, PSM7120, TELSTRAPT, IRRICHARD, TRAVOUTFURLONG, STRPKT BARRACKS, STRPKT LOV43, ECC27001, HS, G4, G5, G6, G8, FSOFFNS, F3, EP-CPEGrowth, EA, E4, E5, E6, E7, E8, E9, E10, E11, E12, E13, E14, E15, E16, E17, E18, E19, E20, E21, E22, E23, E24, E25, E26, E27, E28, E29, E30, E31, E32, E33, E34, E35, E36, E37, E38, E39, E40, E41, E42, E43, E44, E45, E46, E47, E48, E49, E50, E51, E52, E53, E54, E55, E56, E57, E58, E59, E60, E61, E62, E63, E64, E65, E66, E67, E68, E69, E70, E71, E72, E73, E74, E75, E76, E77, E78, E79, E80, E81, E82, E83, E84, E85, E86, E87, E88, E89, E90, E91, E92, E93, E94, E95, E96, E97, E98, E99, E100.

Other windows include 'Adjusted Geodetic Coordinates' showing a table with Point Name, Latitude, E error, Longitude, N error, Height, and H error. A 'Photos JULY 2007' gallery is also visible, displaying a grid of images from the survey site.

# Engaging Students in Real-World Learning

- ✓ Number of Student projects
- ✓ Learning Experiences in Real-World Environments



# Engaging Students in Real-World Learning

- ✓ 3<sup>rd</sup>-year Civil & Environmental Engineers
- ✓ 3<sup>rd</sup>-year Surveying students
- ✓ Project involved a hydrological assessment based on a detailed catchment analysis leading to the design of a new culvert structure
- ✓ Supported by small T&L grant.



# Conclusions

- ✓ Paper has achieved central aim to provide description of activities developing site-specific spatial information layers for the QUT SERF.
  - ✓ Survey control infrastructure
  - ✓ 100meter confluence grid infrastructure
  - ✓ Ortho-rectified spatial information layer.
- ✓ Researchers and student learning experiences will be enhanced by the creation of these foundation spatial information layers for multiple purposes.

SSSI  
QUEENSLAND

2010  
CONFERENCE

1ST-3RD SEPTEMBER  
WWW.OSSC.COM.AU



## Developing Spatial Infrastructures for the Q.U.T. Samford Ecological Research Facility\*

**Mr Robert Webb**

Lecturer and Spatial Science Subject Coordinator,  
Faculty of Built Environment & Engineering, Queensland University of Technology  
2009 Winner: Asia-Pacific Spatial Excellence Award – Education & Professional Development

\* Peer Reviewed Conference Paper

*Developing Spatial Infrastructure for the QUT-SERF Mr. Robert WEBB*



➤ **Questions?**

Developing Spatial Infrastructures for the  
QUT- SERF Mr. Robert WEBB

