Project Order
Proforma 2014

1. Short Project Title

Economic assessment and forecasting

Long Project Title	Economic assessment and forecasting of future impacts on regional economies and how local businesses can respond
GISERA Project Number	3
Proposed Start Date	March 30, 2015
Proposed End Date	June 30, 2016
Project Leader	Paul Graham and Tom Measham (co-project leaders)

2. GISERA Research Program

- ☐ Biodiversity Research
- ☐ Water Research
- ☐ Marine Research
- ☒ Social & Economic Research
- ☐ Land Research
- ☐ GHG Research

3. Research Leader, Title and Organisation

This project is being led by Paul Graham and Tom Measham

4. Summary

Looking forward from the construction phase to the operation phase, economic assessment and modelling is required to prepare for and respond to likely economic effects of the coal seam gas sector, mitigate downward trends and capitalise on opportunities. To meet this need, this project will develop leading edge economic assessment and modelling to equip

the Surat region with the data and analysis to prepare for the operation phase of the industry, from the scale of individual businesses through to regional and state planning. The project will be conducted in three phases:

1) **ECONOMIC ASSESSMENT.** Conduct a detailed review of available modelling techniques and rank their appropriateness for the application in subsequent phases of the project. In considering the available modelling techniques the first phase will include an overview of past economic research conducted in the region and identify any gaps which need to be filled, along with considering relevant variables and time horizons for forecasting in phase 2. Phase one will also involve interviews with carefully selected local businesses with a story to tell using a purposive sampling strategy to understand how they are experiencing the change from construction to operation and consider what information, tools and guidance they need to remain resilient and prosperous. The first phase will also include discussions with gas company management staff to determine details of company expenditure data and consider the feasibility and applicability of this data for modelling purposes in phase 2 including issues concerning data consistency, confidentiality and scale.

   Phase one will culminate in an evaluation and ranking process for assessing the applicability, feasibility and value of diverse modelling options. This evaluation process will be conducted by the project team and peer reviewed by an external group of leading economists with international standing.

Assessment criteria	CGE (national, sub-national)	Input-Output	Econometric (panel analysis, cluster analysis)
Appropriate scale			
Data availability			
Data salience			
Modelling timeframe			
Value for money			

2) **FORECASTING.** Conduct economic modelling to forecast likely economic outcomes based on the detailed review conducted in phase 1 of the project. Depending upon the outcome of the model ranking process, phase 2 may involve developing and/or outsourcing components of the final model to forecast expected economic outcomes. This may involve commissioning regional CGE modelling from external providers, such as The Centre of Policy Studies (CoPS) who operate the MONASH model from at Victoria University.

3) **DISSEMINATION.** The project team will work with local, regional, State and National stakeholders to disseminate the findings from the research needed inputs into planning processes.

Economic assessment and forecasting

The project will build on and greatly extend existing GISERA research in Social and Economic Project 1 (Monitoring Regional Transition) which considered social and economic effects during the construction phase comparing CSG regions with a control group of other Queensland regions which had similar social and economic conditions to the Surat and Bowen basins prior to the development of CSG. Research outcomes of this initial work have been published in the most prestigious economics journal in Australia, the *Australian Journal of Agricultural and Resource Economics*, and have been presented in international conferences, local workshops and cited in government documents such as the Gas Market report from BREE.

Supporting local business innovation and resilience

In addition to the economic assessment and modelling outlined above, the project will also consider the experiences of **local small and medium enterprises (SME's)** during and following the shift from construction to operations, identifying their information needs and strategies for positively managing this change. This will be achieved through interviews with businesses to identify the characteristics of those which are responding positively to the dynamic business environment, and how to support others to manage change effectively. In conducting this work the project team will consider and complement the research needs and challenges addressed by related institutes including the University of Queensland.

5. Budget Summary (From Excel Budget Pack worksheet "Project Plan Summary")

Expenditure	2011/12 Year 1	2012/13 Year 2	2013/14 Year 3	2014/15 Year 4	2015/16 Year 5	Total
Labour (CSIRO)				62,489	171,519	234,008
Operating (CSIRO)				6,500	56,000	62,500
Total Costs				68,989	227,519	296,508
CSIRO						
Total Expenditure				68,989	227,519	296,508

Expenditure per Task	2011/12 Year 1	2012/13 Year 2	2013/14 Year 3	2014/15 Year 4	2015/16 Year 5	Total
Task 1				22,689		22,689
Task 2				32,774		32,774
Task 3					22,689.50	22,689.50
Task 4					22,689.50	22,689.50
Task 5					22,689.50	22,689.50
Task 6					65,125.16	65,125.16
Task 7					22,689.50	22,689.50
Task 8					22,689.50	22,689.50
Task 9					39,782.25	39,782.25
Task 10					22,689.50	22,689.50
Total Expenditure				55,463	241,045	296,508

Cash Funds to Project Partners	2011/12 Year 1	2012/13 Year 2	2013/14 Year 3	2014/15 Year 4	2015/16 Year 5	Total
CSIRO				$44,000	$191,225	$235,225
Sub Total				$44,000	$191,225	$235,225
Total Cash to Partners				$44,000	$191,225	$235,225

Source of Cash Contributions	2011/12 Year 1	2012/13 Year 2	2013/14 Year 3	2014/15 Year 4	2015/16 Year 5	Total
GISERA				$44,000	$191,225	$235,225
Total Cash Contributions				$44,000	$191,225	$235,225

In-Kind Contribution from Partners	2011/12 Year 1	2012/13 Year 2	2013/14 Year 3	2014/15 Year 4	2015/16 Year 5	Total
CSIRO				$11,463	$49,820	$61,283
Total In-Kind Contribution from Partners				$11,463	$49,820	$61,283

	Total funding over all years	Percentage of Total Budget
GISERA Investment	$235,225	79%
CSIRO Investment	$61,283	21%
TOTAL	$296,508	100%

Task	Milestone number	Milestone Description	Funded by	Participant Recipient	Start Date	Delivery Date	Fiscal Year	Fiscal Quarter	Payment $
Task 1	1	Project initiation workshop and establish project reference group	GISERA	CSIRO	Mar-30	Apr-15	14/15	3	18,000.00
Task 2	2	Prepare overview and synthesis of economic effects during construction phase	GISERA	CSIRO	Apr-15	Jun-15	14/15	4	26,000.00
Task 3	3	Interviews with local business on experiences of change from construction to operation phase	GISERA	CSIRO	Apr-15	Jul-15	15/16	4	18,000.00
Task 4	4	Detailed appraisal of economic modelling options	GISERA	CSIRO	July-15	Aug-15	15/16	1	18,000.00
Task 5	5	Evaluation and ranking of modelling options	GISERA	CSIRO	Sep-15	Sep-15	15/16	1	18,000.00
Task 6	6	Develop model and prepare data, test and calibrate	GISERA	CSIRO	Oct-15	Nov-15	15/16	2	51,665.00
Task 7	7	Conduct model runs	GISERA	CSIRO	Nov-15	Dec-15	15/16	2	18,000.00
Task 8	8	Interpret modelling results and report findings	GISERA	CSIRO	Jan-16	Feb-16	15/16	3	18,000.00
Task 9	9	Develop tools and information to help manage operations phase	GISERA	CSIRO	Feb-16	Apr-16	15/16	4	31,560.00
Task 10	10	Disseminate findings through GISERA communications, presentations and conferences	GISERA	CSIRO	Apr-16	Jun-16	15/16	4	18,000.00

6. Researchers

Researcher	Time Commitment (project as a whole)	Principle area of expertise	Years of experience	Organisation
Paul Graham	10%	Energy Economics	15	CSIRO
Tom Measham	10%	Rural Geography	15	CSIRO
David Fleming	25%	Econometrics, regional science, GIS	8	CSIRO
Andrea Walton	25%	Community resilience and wellbeing	7	CSIRO
Yiyon Cai	10%	CGE modelling	8	CSIRO

7. GISERA Objectives Addressed

To provide a legacy of knowledge that enables communities in this and other regions to benefit from future resource developments, and to enhance regional economic benefit from CSG developments.

8. Program Outcomes Achieved

Improved understanding of economic impacts and benefits from CSG development to guide industry, government, NGO's and local SME's aiming to derive economic benefit from resource developments.

9. Program Outputs Achieved

Outputs include reports, scientific papers, industry and stakeholder workshops, conference presentations and popular précis of research findings and implications.

10. What is the knowledge gap that these research outputs will address?

The shift from construction phase to operation phase of the CSG industry holds many uncertainties, including new potential business opportunities, decline in some economic sectors and shifting demographics and service economies. All of these require careful planning based on the best available information. This project addresses this gap by providing that information for economic forecasting during the operations phase of the coal seam gas industry.

11. How will these Research outputs and outcomes be used in State Government and other managers?

These insights will better enable local businesses, industries and government to anticipate and implement strategies that enhance the benefits and reduce the negative impacts associated with economic changes brought about by the unique footprint and pace of onshore gas development. It can inform policies and programs of state and local governments, NGO's, and CSG companies who aim to enable economic benefit to extend further into regional supply chains. Similarly, this knowledge will enable local SME's and communities to better anticipate and plan for these changes and to leverage the increased economic activity in the region for sustained benefit. The outputs and outcomes will assist all parties to target their interventions during the construction and operations phases.

Pathway to impact

1) Who are the parties who could benefit from the work?
- Local and regional economic development organisations and agencies
- Local businesses in Queensland and in other resource regions
- Western Downs Regional Council
- Advance Western Downs
- Maranoa Regional Council
- Regional Australia Institute
- Bureau of Resources and Energy Economics (BREE, Canberra)
- CSG-LNG companies presently operating in Queensland
- Onshore gas companies operating in other regions in the future
- Local Chambers of Commerce and Industry
- Queensland Department of State Development, Infrastructure and Planning
- Queensland Department of Education, Training and Employment
- Commonwealth departments responsible for regional Australia

2) What decisions do or could these people make?
- Planning decisions to guide regional development in CSG regions
- Decisions about provision of services to affected regions to support economic development
- Business development strategies to maximise benefit from CSG development
- Decisions about local training, employment and procurement

3) What information will you give them to improve their decisions/actions?
- Forecasts of likely effects on the regional economy under different scenarios
- Lessons from successful local businesses to navigate changing circumstances

4) By what means will these decisions be informed by your work?
- Popular précis of research findings and implications
- Project reports
- Public dissemination of findings through popular press and media (e.g. The Conversation)
- Face to face presentations to parties listed above.

5) What will be the benefit of these improved decisions/actions?
- Improved planning to support a vibrant local economy in regions with CSG
- Improved preparation for cyclical effects in future regions experiencing onshore gas development.
- Better targeted capacity building for local businesses

12. Project Development (1 page max.)

The need to assess econometric impacts from the construction phase and to forecasting ongoing economic effects during the operation phase has been widely recognised by the GISERA Research Advisory Committee and the GISERA Management Committee. Initial economic results from the 'Monitoring Regional Transition' project have been trail-blazing in terms of their uptake amongst CSG policy stakeholders including the Bureau of Resource and Energy Economics Gas Market Report, the National Farmers Federation and others. This project takes the depth and breadth of this work to another level of sophistication and moves from an assessment of what has happened to forecasting what will happen during the operations phase. This proposal is in its third iteration and it has received the benefit of feedback from GISERA RAC and Management Committee culminating in this refined and innovative proposal.

The proposal also builds on a related avenue of development in the form of how small to medium enterprises are experiencing and responding to the shift from construction to operations across various sectors. The proposal retains a focus on documenting and understanding the strategies employed by different businesses in order to provide guidance to other businesses who will experience similar changes in the future. These lessons will be applicable within Queensland as the industry spreads to new towns and more particularly to new jurisdictions where the onshore gas industry is yet to develop, providing a legacy of knowledge for the future.

13. Project Objectives and Outputs

1) **To obtain a picture of what's happened during construction**
   The first objective involves synthesising existing work conducted by GISERA project staff and related projects conducted by other research agencies and, where applicable, fill in any important gaps.

   Output: A summary report of economic effects during construction.

2) **To forecast what operations will bring**
   The second objective is the main focus of the project and involves developing new and/or adapting existing models to forecast economic effects during the operation phase.

   Output: Report on economic forecasts calculating likely economic effects during the operations phase.

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3) Develop tools and information to help manage the operations phase.
The third objective is to develop tools and information that can be of benefit to businesses and organisations when planning how to respond to the forecasts identified in objective 2.
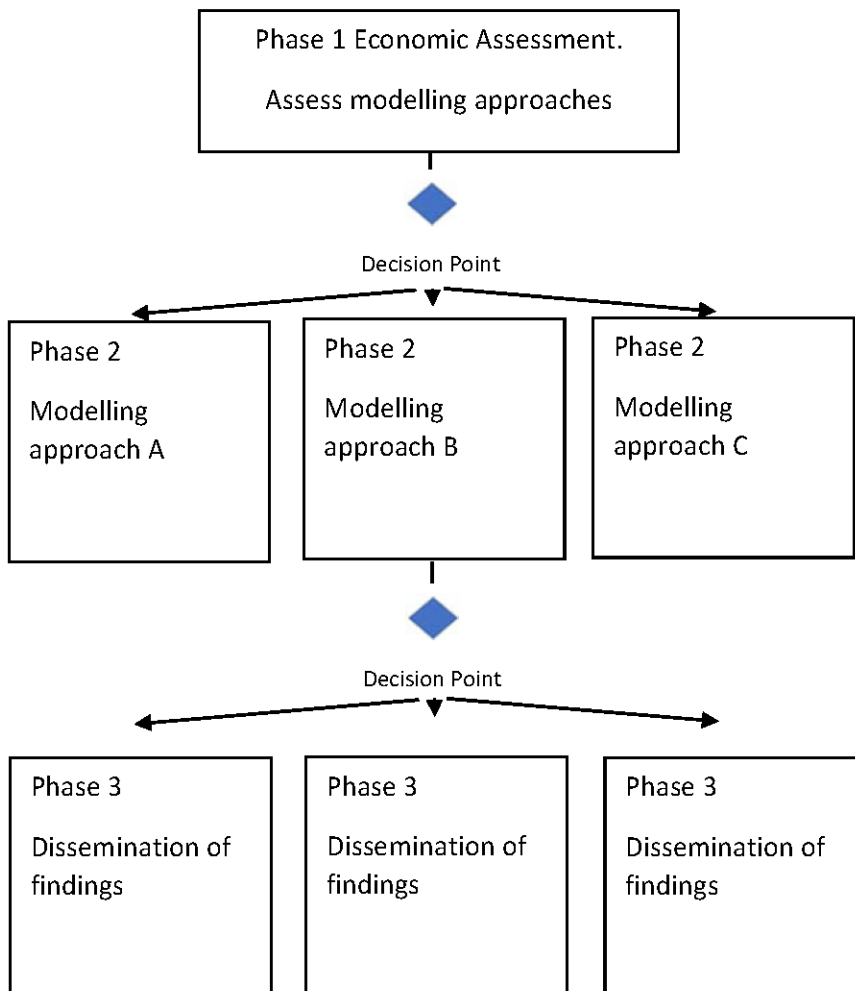
Output: Lessons for supporting local business development and regional planning.

Other research outputs will include:
- Scientific journal papers
- Evaluation and selection of appropriate modelling tool(s)
- Conference presentations at relevant national and international conferences
- Face to face workshops to communicate findings.

14. Project Plan

There will be a phase gate between each of the three phases. Following phase 1 (Economic Assessment) there will be a phase gate to decide on which economic modelling methods to employ in phase 2 of the project. Following phase 2 of the project, there will be a phase gate to decide the best strategy for disseminating the findings of the project, including strategies for communicating with local, regional, State and national stakeholders

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                │  Phase 1 Economic Assessment.     │
                │                                   │
                │  Assess modelling approaches      │
                └──────────────────────────────────┘
                              ◆
                        Decision Point
     ┌──────────────┐  ┌──────────────┐  ┌──────────────┐
     │ Phase 2      │  │ Phase 2      │  │ Phase 2      │
     │              │  │              │  │              │
     │ Modelling    │  │ Modelling    │  │ Modelling    │
     │ approach A   │  │ approach B   │  │ approach C   │
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     │ Phase 3      │  │ Phase 3      │  │ Phase 3      │
     │              │  │              │  │              │
     │ Dissemination│  │ Dissemination│  │ Dissemination│
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The decision point between phases 1 & 2 shall occur between Tasks 5 & 6. The decision point between phases 2 & 3 shall occur between Tasks 8 & 9. The decision shall be taken by the GISERA Director considering advice from the project team and project reference group.

14.1 Project Schedule

ID	Task Title	Task Leader	Scheduled Start	Scheduled Finish	Predecessor
Task 1	Project initiation workshop and establish project reference group	Tom Measham and Paul Graham	Mar-15	Mar-15	N/A
Task 2	Prepare overview and synthesis of economic effects during construction phase	David Fleming	Apr-15	Jun-15	N/A
Task 3	Interviews with local business on experiences of change from construction to operation phase	Andrea Walton	Apr-15	Jul-15	N/A
Task 4	Detailed appraisal of economic modelling options	Paul Graham and David Fleming	July-15	Aug-15	Task 2
Task 5	Evaluation and ranking of modelling options	Paul Graham and Tom Measham	Sep-15	Sep-15	Task 3
Task 6	Develop model and prepare data, test and calibrate	David Fleming and Yiyong Cai	Oct-15	Nov-15	Task 4
Task 7	Conduct model runs	David Fleming and Yiyong Cai	Nov-15	Dec-15	Task 6
Task 8	Interpret modelling results and report findings	Paul Graham and Tom Measham	Jan-16	Feb-16	Task 7
Task 9	Develop tools and information to help manage operations phase	Tom Measham and Andrea Walton	Feb-16	Apr-16	Task 8
Task 10	Disseminate findings through GISERA communications, presentations and conferences	Paul Graham and Tom Measham	Apr-16	Jun-16	Task 10

Task 1.

TASK NAME: Project initiation workshop and establish project reference group

TASK LEADER: Tom Measham and Paul Graham

OVERALL TIMEFRAME: 1 month

BACKGROUND: Establishing a highly functioning project team with effective links to clients is an important foundation for the project.

TASK OBJECTIVE: This task will be to establish the project, rapidly develop professional working relationships amongst the project team and with industry representatives to facilitate exchange of information and uptake of findings.

SPECIFIC DELIVERABLE: Workshop completed.

Task 2.

TASK NAME: Prepare overview and synthesis of economic effects during construction phase

TASK LEADER: David Fleming

OVERALL TIMEFRAME: 3 months

BACKGROUND: In order to contextualise the project within existing research and build effectively on past research it is vital to develop an overview and synthesis of research findings to take stock of the effects during the construction phase.

TASK OBJECTIVE: To prepare an overview and synthesis of economic effects during construction phase.

SPECIFIC DELIVERABLE: Short synthesis report of construction phase economic effects.

Task 3.

TASK NAME: Interviews with local business on experiences of change from construction to operation phase

TASK LEADER: Andrea Walton

OVERALL TIMEFRAME: 4 months

BACKGROUND: Part of preparing for the operations phase more generally is to take the pulse on businesses from diverse sectors which are already adjusting to this change and document their goals, strategies, concerns and information needs.

TASK OBJECTIVE: Conduct, transcribe and analyse interviews to understand and document the experiences of businesses experiencing the change from construction to operation and their goals, strategies, concerns and information needs.

SPECIFIC DELIVERABLE: Interviews completed.

Task 4.

TASK NAME: Detailed appraisal of economic modelling options

TASK LEADER: Paul Graham

OVERALL TIMEFRAME: 2 months

BACKGROUND Several different modelling options exist, each with separate strengths and weaknesses including the types of questions they can answer, their robustness at different scales and the types of data they require in order to provide meaningful outputs. Modelling options include general equilibrium models, micro simulation, input-output modelling and econometric models. This task will consider the range of options and develop criteria for evaluating them in task 5. This task will also include peer review from modelers of international standing.

TASK OBJECTIVE: Conduct a detailed appraisal of economic modelling options.

SPECIFIC DELIVERABLE: Summary report on modelling options.

Task 5.

TASK NAME: Evaluation and ranking of modelling options

TASK LEADER: Paul Graham and Tom Measham

OVERALL TIMEFRAME: 1 month

BACKGROUND: · The evaluation of modelling options will provide the rationale for which modelling option will be employed in subsequent tasks.

TASK OBJECTIVE: Evaluate and rank modelling options according to criteria developed in task 4.

SPECIFIC DELIVERABLE: Modelling recommendation submitted to GISERA Director for endorsement.

Task 6.

TASK NAME: Develop model and prepare data, test and calibrate

TASK LEADER: David Fleming and Yiyon Cai

OVERALL TIMEFRAME: 2 Months

BACKGROUND: Based on the assessment developed in tasks 1-5, the modeling approach will be decided at the phase gate between tasks 5 and 6. Prior to conducting any modelling, the model needs to be developed, refined, populated with data, tested and calibrated in order to provide robust results.

TASK OBJECTIVE: Develop, prepare, test and calibrate economic model.

SPECIFIC DELIVERABLE: Model test runs completed satisfactorily.

Task 7.

TASK NAME: Conduct model runs

TASK LEADER: David Fleming and Yiyon Cai

OVERALL TIMEFRAME: 2 Months

BACKGROUND: Following testing in task 6 the model runs will be conducted to provide robust forecasts as per the objectives of this research.

TASK OBJECTIVE: Conduct model runs based on approach defined in Task 5 and development in Task 6.

SPECIFIC DELIVERABLE: Model runs completed.

Task 8.

TASK NAME: Interpret modelling results and report findings

TASK LEADER: Paul Graham and Tom Measham

OVERALL TIMEFRAME: 2 Months

BACKGROUND: This task will involve interpreting the modeling results and preparing a report on the findings including graphic representations.

TASK OBJECTIVE: Prepare a written report with interpretations of modelling findings.

SPECIFIC DELIVERABLE: Written report.

Task 9.

TASK NAME: Develop tools and information to help manage operations phase

TASK LEADER: Tom Measham and Andrea Walton

OVERALL TIMEFRAME: 3 Months

BACKGROUND: The modelling results reported in Task 8 will be translated into tools, based on the decision at the phase gate phases 2 and 3 and incorporating insight from the qualitative interviews conducted in Task 3 in order to make the information more accessible to local businesses and regional planning processes seeking to manage the operations phase effectively. In developing Task 9, the project team will exchange findings and insights with related research conducted by the University of Queensland Centre for Coal Seam Gas.

TASK OBJECTIVE: Develop visual aids and information to assist local and regional stakeholders.

SPECIFIC DELIVERABLE: Visual aids and fact sheets.

Task 10.

TASK NAME: Disseminate findings through GISERA communications, presentations and conferences

TASK LEADER: Paul Graham and Tom Measham

OVERALL TIMEFRAME: 3 months

BACKGROUND: The project will disseminate findings beyond the immediate stakeholders in the region in order to share the information and insight with a wide audience. This will involve academic outlets (internationally relevant conferences) and public audiences (popular press), policy and industry briefings.

TASK OBJECTIVE: Disseminate findings to wider GISERA stakeholders.

SPECIFIC DELIVERABLE: Summary of communication outputs developed in collaboration with GISERA communications staff.

15. Budget Justification

The budget has been determined on the basis of the range of areas of expertise required to provide economic analysis and forecasting. It includes an allocation for model construction and/or modelling services conducted by a third party.

16. Project Governance

Project Reference Group: The project leaders will invite the following representatives to participate in the project reference group:

- Alison White (Social Development Manager, Origin)
- Caleb Yeoh (Senior Compliance, Research & Reporting Advisor, QGC)
- Ross Lambie (Gas Market Program Leader, Bureau of Resource and Energy Economics – BREE)
- State Government researcher
- University of Queensland researcher
- Additional company representatives on case by case basis

Members of this reference group will be consulted individually or in small groups to ensure industry and stakeholder feedback guides the project development. It will look forward focusing on how to make the best use of information generated by the project beyond the present.

17. Communications Plan

General communication will be managed by GISERA.

Building on successful models of communication already developed in existing GISERA projects, the project team will work closely with GISERA communication to tailor communications outputs to stakeholder and public audience. The proposed outputs include:

- 1 popular press article (e.g., in *The Conversation*)
- Stakeholder verbal briefings as recommended by GISERA communications team
- Video/post-cast presentations as recommended by GISERA communications team

18. Risks

1. Availability of data – Handled by scoping out availability in the first stage and modifying approach to modeling in response, to suit the data available. A particular requirement is data from CSG companies on their local spending, information that is certainly in their contractor databases, but not traditionally made available for economic modeling by outsiders. To build trust to enable access to certain elements of these data sets, time has been allotted early in the project for relationship building and piloting of the models to illustrate how the data will be used.

2. Contentious views of CSG development in the community – Access to information from particular businesses may be restricted if business owners are concerned about being known to be profiting from development that others are unhappy with. The researchers have developed, and are continuing to develop, relationships with local business owners and managers to help to alleviate this risk.