Report
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Surat Gas Project CSG WRMMP Annual Report

Reporting Period: 22 October 2024 to 21 October 2025

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Executive summary

This Annual Report presents the implementation of, and reporting for, the Water Resource Monitoring and Management Plan (WRMMP) for the Surat Gas Project (SGP), over the reporting period from 22 October 2024 to 21 October 2025. The WRMMP has been implemented in accordance with EPBC Approval 2010/5344 (Condition 17A) and aligned with the Coal Seam Gas Joint Industry Framework, with a focus on managing and mitigating potential impacts to groundwater and surface water resources.

During the reporting period, monitoring activities were undertaken in accordance with WRMMP requirements, with a primary focus on subsidence monitoring using interferometric synthetic aperture radar (InSAR) and plane flown light detection and ranging (LiDAR) datasets. Groundwater monitoring was limited to specific bores associated with the subsidence program, while no routine groundwater quality or surface water monitoring was required for the WRMMP. The monitoring program was supported by a structured, risk-based framework incorporating screening, investigation and trigger thresholds.

Results from subsidence monitoring indicate that ground movement across the project area remains stable and consistent with predictions. Approximately 78% of assessed grid cells were classified as stable, with only a negligible proportion showing downward movement. Although some areas showed limited data coverage due to agricultural land use constraints, these gaps were effectively supplemented by LiDAR-based slope analysis. Detailed assessment of slope change across relevant natural landscapes confirmed that all observed changes were significantly below trigger thresholds, and no site-specific investigations were required.

Groundwater monitoring data from UWIR bores demonstrate a strongly stratified and vertically compartmentalised hydrogeological system. Groundwater levels decline progressively with depth from the Condamine Alluvium through to the deeper coal measures, confirming limited vertical connectivity between aquifers. Importantly, there is no evidence of upward propagation of drawdown impacts into shallow aquifers, including the Condamine Alluvium, indicating that intervening aquitards are effectively containing pressure changes within deeper formations.

Water management activities, including the treatment and beneficial reuse of co-produced water, continue to operate effectively, with no significant incidents recorded during the reporting period. Flood risk assessments confirm that key infrastructure remains located outside modelled inundation zones for extreme flood events. Risk management continues to follow a precautionary approach, supported by established monitoring, reporting and adaptive management processes.

Consistent with WRMMP predictions and the Queensland Office of Groundwater Impact Assessment[1] (OGIA) modelling, no material impacts to groundwater, surface water, or associated environmental values were identified during the

[1] The Queensland OGIA is an independent office primarily responsible for assessing cumulative impacts from resource development in Queensland and then developing and supporting proactive strategies for managing those impacts. Its work is primarily focused on scientific investigation, modelling and monitoring relating to groundwater impacts, and support of an adaptive management framework for managing the impacts within the Surat Basin in Queensland.

reporting period. Similarly, no exceedances of Early Warning Monitoring System (EWMS) thresholds were observed, and no corrective actions were required. The WRMMP remains fit for purpose, with no triggers identified for plan revision.

Overall, the findings of this annual review report confirm that the Surat Gas Project is operating in compliance with regulatory requirements and achieving the intended environmental outcomes of the WRMMP. Ongoing monitoring, data sharing, and participation in industry research initiatives continue to support adaptive management and improve understanding of groundwater and subsidence processes in the Surat Basin.

1. Introduction

This Annual Report documents the implementation and reporting for the Water Resource Monitoring and Management Plan (WRMMP) for the Surat Gas Expansion Project (SGP) during the reporting period (22 October 2024 to 21 October 2025).

The SGP was approved under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (EPBC Approval 2010/5344) on 19 December 2013 and commenced development of CSG resources in the Surat Basin on 22 October 2020. The project operates within a regulatory framework that has evolved to incorporate the Coal Seam Gas – Joint Industry Framework (JIF), released by the Australian Government on 17 March 2021. The JIF, developed collaboratively by the Commonwealth and Queensland governments in consultation with the Coal Seam Gas (CSG) industry, establishes defined environmental outcomes for groundwater management in the Surat Basin.

To align the SGP with the JIF, the conditions of EPBC approval 2010/5344 were varied on 27 February 2025. As part of this variation, Condition 17A requires the preparation and implementation of a WRMMP to assess, manage, and mitigate potential impacts to matters of national environmental significance (MNES) related to water resources, arising from project activities, that are not covered by the JIF. The WRMMP also incorporates relevant commitments made by Arrow Energy in the SGP Environmental Impact Statement (EIS) (Arrow Energy, 2012) and Supplementary Report to the EIS (SREIS) (Arrow Energy, 2013).

The WRMMP was prepared in accordance with Approval Condition 17A and was approved by the Department of Climate Change, Energy, the Environment and Water (DCCEEW) on 21 November 2025. The WRMMP supersedes the Stage 1 and Updated CSG Water Monitoring and Management Plans (WMMP), approved by DCCEEW on 18 December 2018 and 22 November 2019 respectively.

This Annual Report summarises monitoring activities and outcomes undertaken in accordance with the WRMMP, assesses compliance with applicable EPBC approval conditions, and reports on performance against WRMMP objectives. The report also identifies any exceedances, incidents, or non-compliances recorded during the reporting period, describes the associated investigations and corrective actions, and evaluates the effectiveness of management measures implemented to protect water resources.

The Underground Water Impact Report (UWIR) 2021 for the Surat Cumulative Management Area (OGIA, 2021) came into effect on 1 May 2022 and continued to be in effect throughout the 2025 reporting period. All assessments undertaken during this reporting period used the 2021 UWIR outputs in accordance with the methodology outlined in the WRMMP. A draft UWIR 2025 (OGIA, 2025) was released for consultation after the reporting period, and outputs of the final UWIR 2025 will be considered in the next annual reporting period.

2. Surat Gas Project status

The SGP commenced on 22 October 2020, with 335 SGP production wells installed since the commencement date to the end of the reporting period, of which 247 have commenced production.

3. Joint Industry Framework

As stated in Section 1, the conditions of Arrow's approval EPBC 2010/5344 were varied on 27 February 2025, in part to align the SGP with the JIF (DCCEEW, 2021). In particular, Condition 14A (as varied) aligns the SGP with the JIF, such that the approval holder must manage impacts on groundwater resources and EPBC-listed springs in accordance with the relevant risk management framework/s (which is defined as the JIF).

The JIF establishes outcomes to be achieved for EPBC-listed springs and water resources (associated users of water resources are defined as water supply bores, aquatic groundwater dependent ecosystems [GDE], terrestrial GDEs [TGDE] and subterranean GDEs [SGDE]).

The JIF, under standard administrative approval conditions, requires an annual compliance report. The annual compliance report for the JIF was finalised on 14 January 2026 and submitted to DCCEEW, with a copy available at (https://www.arrowenergy.com.au/publicnotices/reports-and-plans/). In summary, the compliance report identifies:

- Arrow has not exceeded the risk threshold in the JIF for EPBC-listed springs or aquatic GDEs,
- Arrow has complied or is currently in the process of complying with its make good obligations identified under the Queensland *Water Act 2000* (Water Act) and UWIR, and
- The risk threshold in the JIF for TGDEs and SGDEs was exceeded. Preliminary risk assessments have been completed, identifying ten and eight high risk sites for TGDEs and SGDEs respectively. Arrow is currently undertaking the supplementary risk assessment for the identified high risk sites. No site-specific assessments have yet been required to be undertaken.

Since the JIF annual compliance report, Arrow completed the supplementary risk assessment for TGDEs on 14 February 2025. Multiple lines of evidence used in this assessment identified that all high risk sites were either not TGDEs, or not predicted to be impacted due to a lack of hydraulic connection to the predicted to be impacted aquifer.

The EPBC approval 2010/5344 conditions for the JIF are separate to those of the WRMMP, and the JIF will not be considered further in this Annual Report.

4. Monitoring programs

4.1 Monitoring activities undertaken

Table 4-1 summarises the monitoring activities conducted for the WRMMP during the current reporting period including groundwater, subsidence, and surface water/aquatic ecology (if triggered by assessment).

Table 4-1: Monitoring activities conducted during the current reporting period

Domain	Method / Network	Frequency	Data Collected
Groundwater	UWIR Water Monitoring Strategy network for which Arrow is the responsible tenure holder	Up to hourly for water levels/pressures and 6-monthly for water quality as specified in the UWIR Water Monitoring Strategy.	Water pressure/level; water quality Not required, except for the locations included in the subsidence monitoring assessment (Longswamp 31, Tipton 200, Tipton 202, and Tipton 203)
Subsidence	InSAR (Sentinel-1), LiDAR	InSAR 6-monthly; LiDAR twice yearly (May and August)	Vertical displacement; Slope change
Surface water / Aquatic ecology	Not required		

4.2 Groundwater monitoring

Arrow's groundwater monitoring data is provided to OGIA for potential inclusion (at the Queensland Government's Department of Local Government, Water and Volunteers discretion) on the 'Queensland Globe'[2] available at https://qldglobe.information.qld.gov.au/. The groundwater monitoring is undertaken specifically for the Water Monitoring Strategy (WMS) under the Surat UWIR (OGIA, 2021), with the data submitted at the end of March and September

[2] The Queensland Globe is a publicly available Internet database tool that includes physical, geographical and spatial data in a map format, and provides an online resource for environmental data. It provides access to Surat CMA UWIR WMS data, Arrow and other proponent monitoring data and DLGWV current and historical records.

2025 during the reporting period. Groundwater monitoring data collected for other purposes (see for example Section 8.1 and 8.2 of the WRMMP) was also submitted to OGIA.

As described in the WRMMP (Arrow Energy, 2025) there is negligible predicted impact to the Condamine Alluvium and surface water flux, or impact to aquatic ecology and aquatic ecosystems, and therefore a dedicated early warning monitoring system for these groundwater dependent assets is not currently required. Therefore monitoring of groundwater pressure or levels for this Annual Report is only assessed in the context of CSG induced aquifer depressurisation for the subsidence monitoring program. Similarly, groundwater quality monitoring is not required at any location under the WRMMP.

4.3 Subsidence monitoring

Introduction

At any point below the ground surface, the weight of overlying strata is supported partly by water pressure and partly by the fabric of the rock mass. Any reduction in water pressure therefore results in an increased proportion of the load being carried by the rock mass, leading to compression of the rock. Coal seam gas occurs within coal formations through adsorption of the gas to the coal under hydrostatic pressure. Depressurisation of the coal seams by groundwater extraction reduces hydrostatic pressure and liberates the gas from the formation. This depressurisation results in compression of the formation while the desorption of the gas also results in shrinkage of the coal. The combination of depressurisation and coal shrinkage results in formation compaction which, after some attenuation by the overburden, manifests as surface subsidence.

During the development of a CSG field, the effect of depressurisation of individual wells over time leads to interaction between the adjacent wells, which results in relatively uniform depressurisation within a field and a depressurisation surface which gradually decreases away from the CSG field. Any CSG induced ground surface movement is normally expected to be regionally consistent and, with the magnitudes predicted, unobtrusive in terms of environmental and land use impacts. However, monitoring systems have been established to distinguish any significant ground surface movement as a result of CSG operations from natural ground surface changes, such as attrition and climatic induced soil swelling and depletion.

OGIA has previously developed a 3D numerical model coupling geomechanics to groundwater depressurisation, predicting magnitude of subsidence and change in slope as a result of CSG operations in the area of the Condamine Alluvium. OGIA also developed an analytical model predicting magnitude of subsidence in the greater Surat Basin, as reported in the 2021 UWIR (OGIA, 2021).

The 3D numerical geomechanical model was built incorporating all available data on local geomechanical properties and lithological distributions, with predicted depressurisation from the OGIA groundwater model used as an input to make predictions of subsidence. OGIA (2021) used a model grid ranging from 250m by 250m to 750m by 750m, with 88 vertical layers, to account for variations in lithology, and then generated a set of 1,000 models from stochastic realisations of geomechanical properties to explore the range of uncertainty in predictions.

History matching of these models to the available Interferometric Synthetic Aperture Radar (InSAR) data in the vicinity of the Condamine Alluvium allowed the 50 best fitting models to be selected to generate predictions of subsidence. Predicted subsidence and change in slope are therefore reported statistically in the 2021 UWIR (OGIA, 2021) as a median (P50) prediction derived from those 50 model runs. Predicted subsidence from the 2021 UWIR, including predicted temporal development of subsidence at specific locations, is presented in Figure 4-1, with predicted maximum changes in slope within the cropping areas of the Condamine River floodplain at any time during CSG field development presented in Figure 4-2.

OGIA processed outputs from the uncertainty analysis to derive probability of magnitudes of subsidence and slope occurring at each model cell. This is presented as maps of the probability of 0.001% (0.01m in 1km) and 0.005% (0.05m in 1km) slope change, together with probability of 100mm and 150mm magnitude subsidence occurring within the cropping areas of the Condamine River floodplain, in Figure 4-3. The Horrane Fault is a large north-south trending fault zone east of Cecil Plains, with displacement of up to approximately 100m. Displacement of the fault and the low permeability of the fault core can result in differential depressurisation patterns either side of the fault, resulting in the greatest predicted change in slope across the Horrane Fault.

In 2023, OGIA published a report on coal shrinkage (Aghighi, et. al., 2023). Coal shrinkage is the reduction in coal volume due to the extraction of gas. Coal shrinkage contributes to the total subsidence observed at the surface and is implicitly represented in OGIAs prediction model (Aghighi, et. al., 2023).

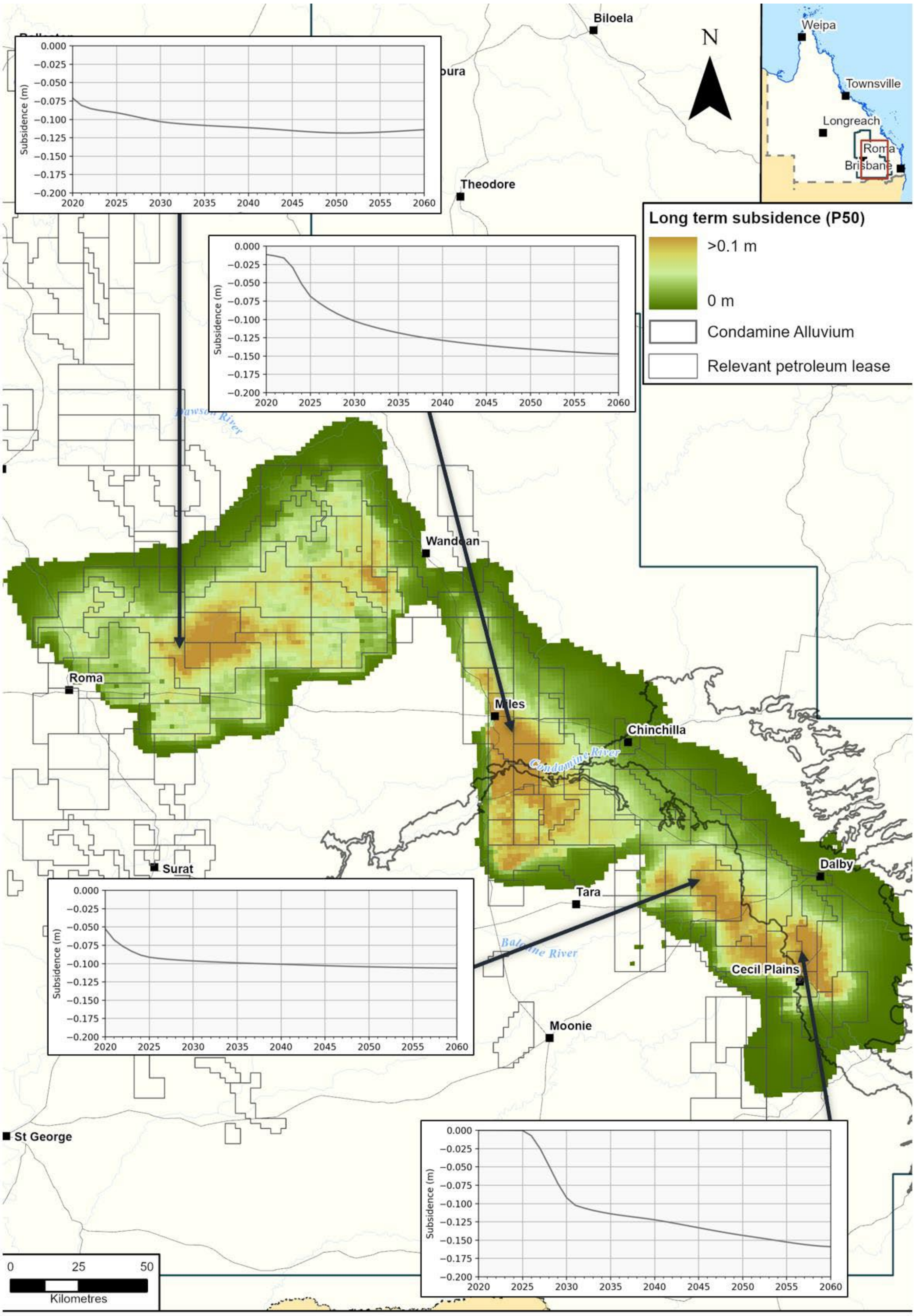


Figure 4-1: 2021 UWIR predicted long-term CSG-induced subsidence across the Surat Basin (after OGIA, 2021)

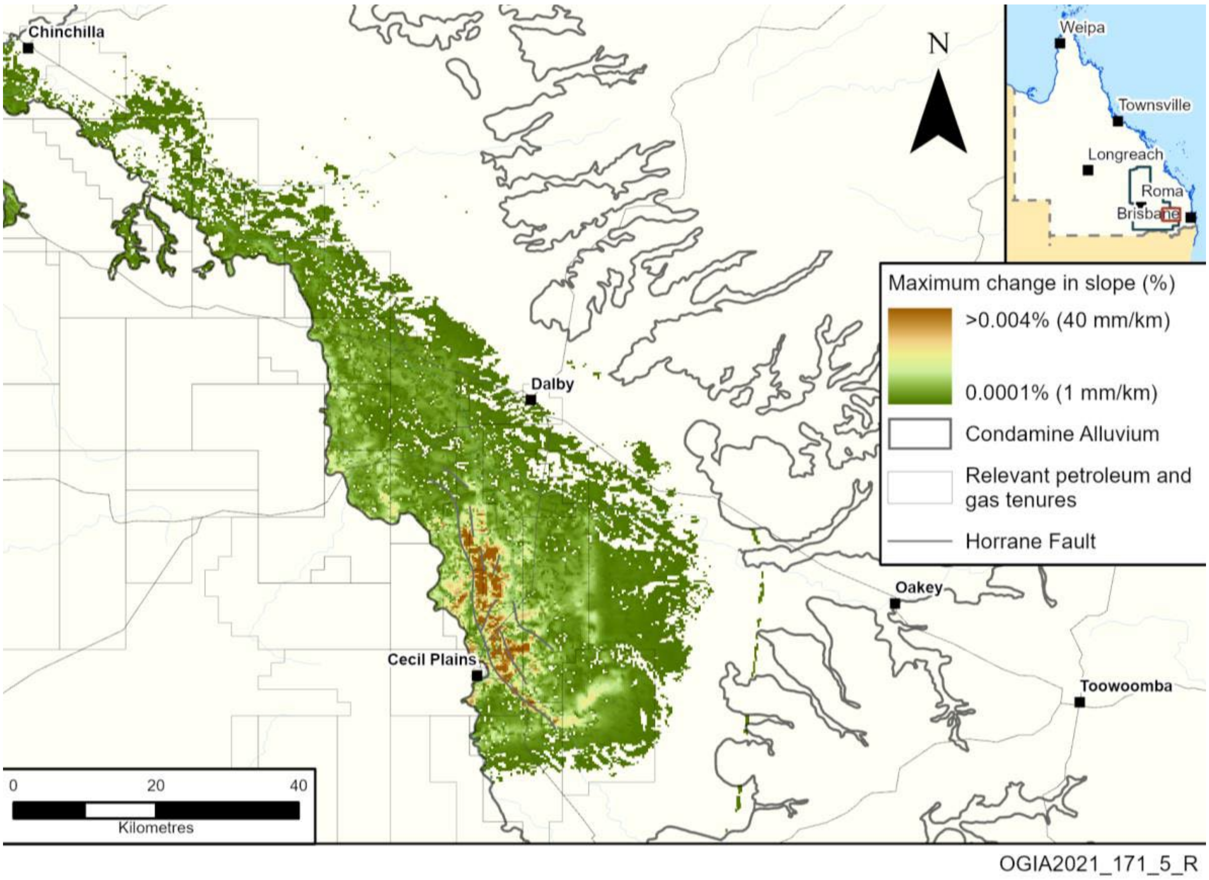


Figure 4-2: Predicted maximum change in ground slope from CSG-induced subsidence within the Condamine Alluvium area (after OGIA, 2021)

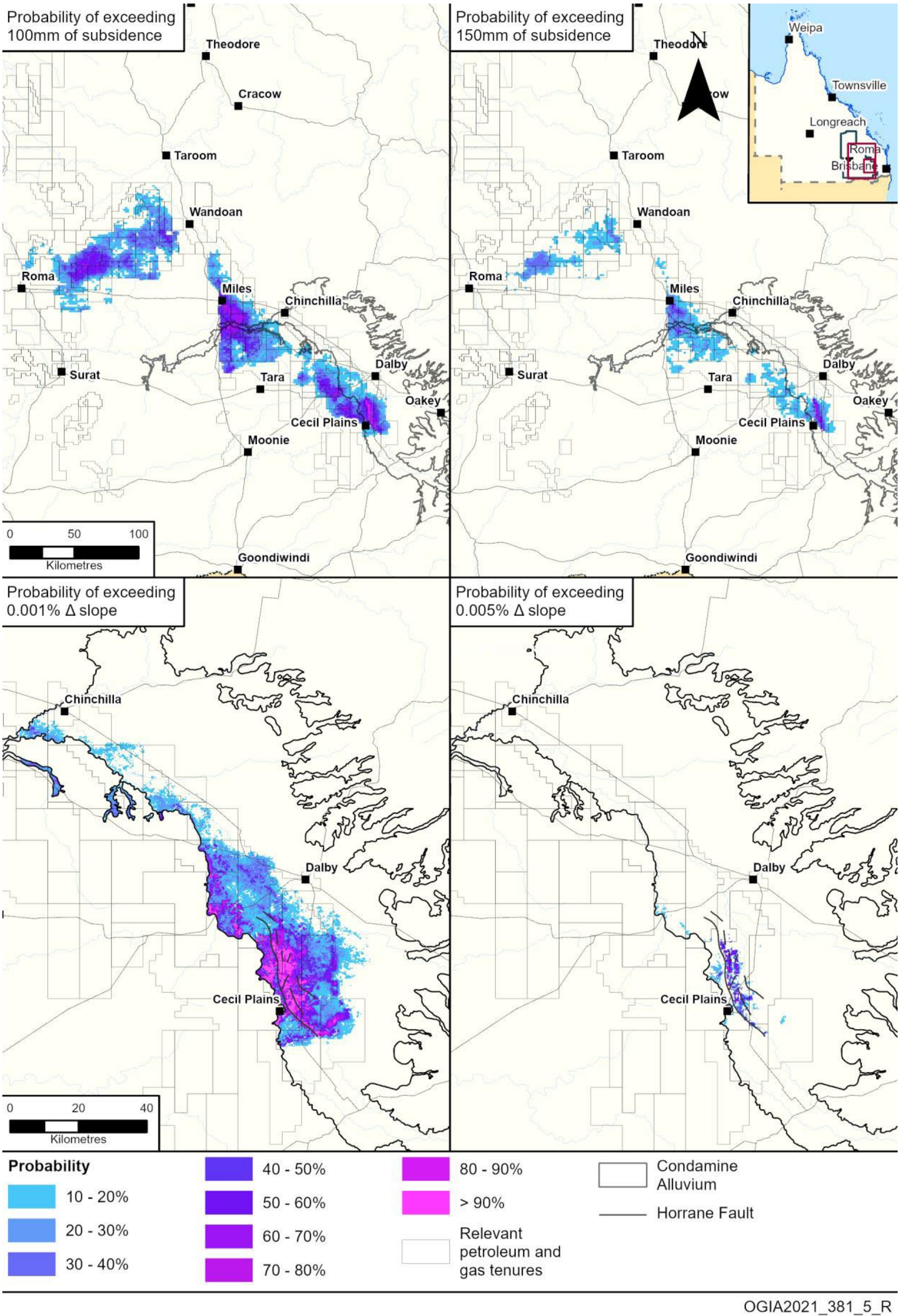


Figure 4-3: Probabilities of predicted subsidence and resulting change in slope within the Condamine Alluvium area (after OGIA, 2021)

Data collection

In accordance with the requirements of the WRMMP, Arrow maintains a subsidence monitoring program using satellite imaging in the form of interferometric synthetic aperture radar (InSAR) and plane flown light detection and ranging (LiDAR) datasets. The InSAR data are used to measure subsidence over an area and the LiDAR are used to estimate any changes in ground slope. Arrow undertakes routine subsidence monitoring every six months, coinciding with the receipt of bi-annual InSAR datasets. These datasets are provided to Arrow by a third-party supplier (TRE Altamira) approximately two months after the selected data acquisition dates in June and December. LiDAR is flown twice a year, generally in May and August when crop coverage is at its lowest and the ground is most visible.

After receipt of the InSAR and LiDAR data, it is analysed according to the steps detailed in Table 4-2 (copy of Table 7-2 in the WRMMP). The table identifies the screening levels, investigation levels and trigger thresholds that are applied to the datasets to identify if there is any potential settlement across the monitored region that has had an impact on MNES protected matters. The data processing and analyses taken to achieve each step in this table are outlined in the flow chart in Figure 4-4.

Table 4-2: Subsidence monitoring screening level, investigation levels and trigger threshold (WRMMP Table 7-2, p55)

Item	Description	Relevant assets	Criteria	Action / comment
Screening level – **Step 1**	Settlement rate from InSAR	All natural features	20 mm/year (for >50% of sampling points in 1 km by 1 km), or where there are <5 InSAR sampling points, within 4.5 km of CSG production wells	Areas where this criteria is exceeded will be subject to further screening for areal slope change and ponding areas (Step 2).
Screening level – **Step 2**	Change in slope	All natural features	0.01% change in average areal slope over 12 months (for 1 km by 1 km cell)	Areas where Step 1 criteria and this criteria are exceeded will be subject to investigation level assessment.
Investigation levels	Change in slope along transect from LiDAR	Drainage features across the Condamine River Floodplain	Changes in slope of 0.01% or greater (for areas 0.03-0.09% existing slope), or absolute changes in slope greater than 20% of existing (for areas >0.09% existing slope) over ~12 month previous (nearest suitable LiDAR surveys), due to subsidence.	Areas where this criteria is exceeded will be subject to trigger level assessment. Existing gradients less than 0.03% are already poorly draining and not progressed.
Trigger threshold	Outcome of site specific investigation confirms detrimental impact on MNES protected matter due to CSG induced subsidence	Any natural feature	Site specific investigation determines consequence category of medium or greater and risk to asset is medium or greater	Individual threshold based on the local conditions for identified MNES protected matter. Eg: confirmation of material reduction in yield to the receiving environment by hydrological assessment.

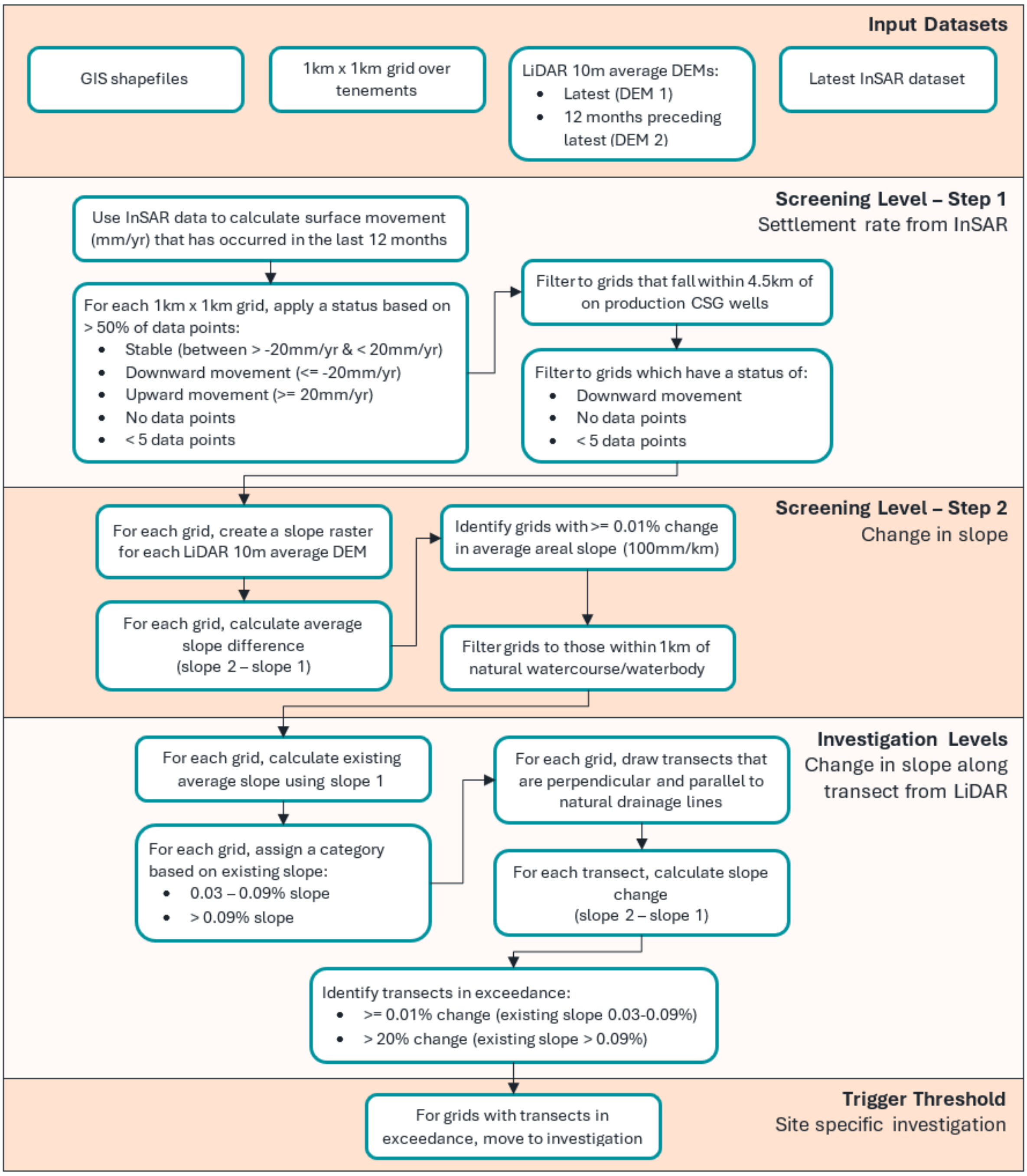


Figure 4-4: Flowchart of steps taken for subsidence monitoring and identifying areas for site specific investigations

This section details the results from routine subsidence monitoring performed on the June 2025 InSAR data delivery. The corresponding Light Detection and Ranging (LiDAR) datasets used are from the May 2024 and May 2025 data deliveries. For details on the InSAR and LiDAR methodologies, refer to Section 3, Appendix H of the WRMMP (Arrow Energy, 2025) (p.13).

InSAR time-series datasets

InSAR is a well-established surface monitoring technique for analysis of deformation of the Earth's surface, including subsidence and structural stability. To detect slow ground movements, such as CSG-induced subsidence, InSAR time-series datasets are required (Leonardi, 2024). It is important to note that the InSAR time-series results reflect the total observed surface movement and cannot distinguish between natural and anthropogenic contributions to this movement.

There are different time-series processing methodologies, and these utilise persistent scatterers (PS), distributed scatterers (DS) or a combination of both. These scatterers represent the different responses ground targets may have. PS have a strong, stable response over long time periods, while DS can be stable for shorter time periods due to changes in the landscape (Osmanoğlu et al., 2016; Xue et al., 2020). The signal response quality from ground targets is determined by how stable a ground point is. In urban environments, buildings are very stable and produce strong PS responses. In contrast, rural environments are likely to experience landscape changes (e.g., vegetation growth, soil moisture fluctuations, etc.) and have more DS responses. The spatial coherence for InSAR data points can be used as a proxy for data quality, and PS tend to have higher coherence compared to DS. If the landscape changes are large and/or occur over very short time periods, low to no coherence is likely, which leads to data loss over these areas.

Each time-series methodology has its own strengths and weaknesses. Ideally, the methodology selected will be governed by the monitoring area's landscape characteristics and what type of monitoring is required. Arrow currently obtains its InSAR time-series datasets from TRE Altamira, who use their proprietary SqueeSAR time-series methodology. This is considered an advanced PS interferometry technique that utilises PS and DS ground targets to generate the time-series datasets. This methodology works well in urban environments but may perform poorly over agricultural regions.

The agricultural activities over the Condamine Alluvium present challenges when using InSAR. This region is characterised by low coherence due to regular landscape changes. Figure 4-5 shows the spatial extent of InSAR vertical velocity points over Arrow's tenements for the period September 2015-June 2025 using the SqueeSAR time-series methodology. It also shows that this methodology produces large areas with little to no InSAR data coverage over the Condamine Alluvium.

TRE Altamira modified their processing methodology for the June 2025 InSAR data delivery and all subsequent data deliveries. They advised that this change resulted in a general reduction in measurement points, accompanied by lower coherence (refer to Figure 4-5). Given the length of the time-series (September 2015-June 2025), a natural loss of coherence in certain areas (such as agricultural fields) is expected. The remaining data points are considered to have higher measurement quality compared to previous data deliveries. Arrow has assessed a reduction in coverage of 3.28% across Arrow tenements due to this new processing method.

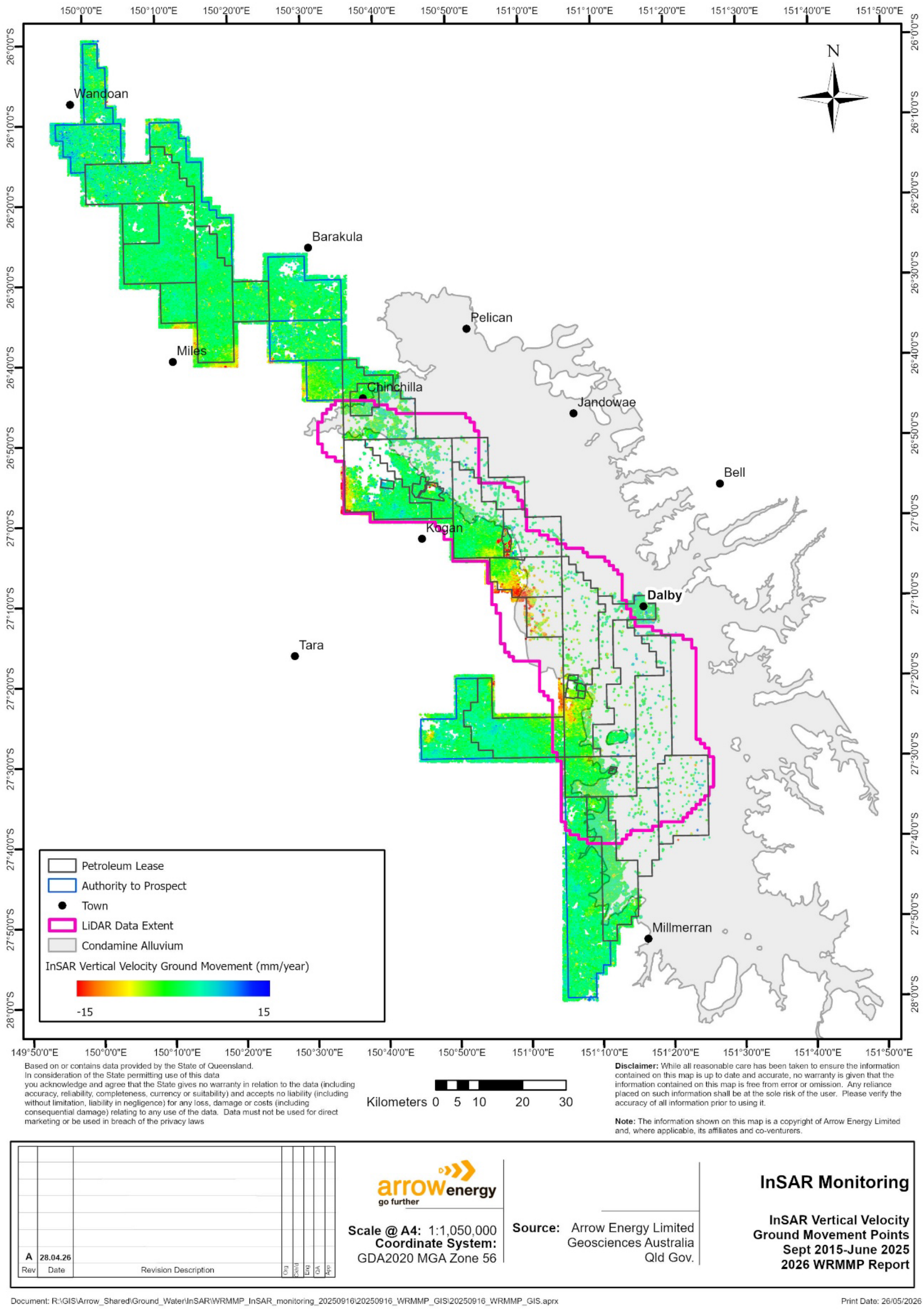


Figure 4-5: Spatial extent of InSAR vertical velocity points over Arrow's tenements for the period September 2015-June 2025 using the SqueeSAR time-series processing methodology. The lack of InSAR data coverage is noted over the Condamine Alluvium.

LiDAR datasets

Arrow's bi-annual LiDAR captures commence in May and August each year. May and August surveys typically reflect a reduced amount of vegetation on farmland, providing a clearer picture of the land surface. The LiDAR surveys encompass the Condamine Alluvium where development is both present and planned and has a minimum 1km buffer from the production wells. The spatial extents of the of the May 2024 and May 2025 LiDAR datasets are detailed in Figure 4-6.

For each LiDAR 3D point cloud dataset, the points classified as 'ground' have been used to generate a 10m average digital elevation model (DEM). This spatial resolution has been used to mitigate noise signals from agricultural activities, while still maintaining a high topographic resolution for slope change analyses.

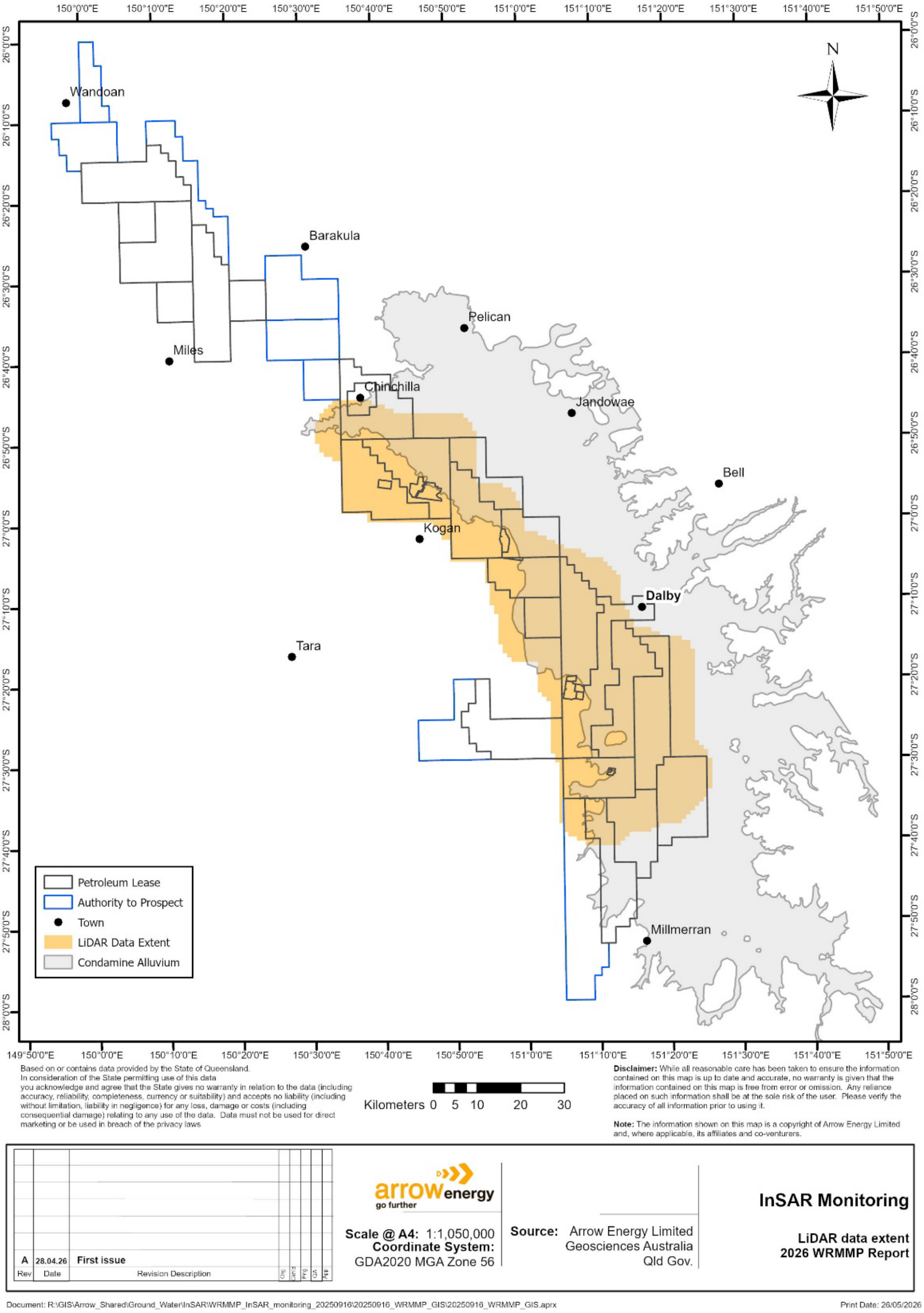


Figure 4-6: Spatial extent of the May 2024 and May 2025 LiDAR datasets

Data analysis

Outlined below are the analysis and results for each step detailed in Table 4-2 and Figure 4-4.

Screening Level – Step 1: Settlement Rate from InSAR

The first step was to create a fishnet of 1km x 1km grid cells to cover Arrow's Petroleum Leases (PL) and Authority to Prospect (ATP) tenements.

Regression analysis on the InSAR time-series datasets was undertaken to determine the surface movement (mm/year) for the last 12 months. The number of InSAR data points for each grid cell were then calculated. For each 1km x 1km grid cell, a status was applied based on >50% of data points (Figure 4-7):

- Stable (between > -20mm/year and < 20mm/year)
- Downward movement (≤ -20mm/year)
- Upward movement (≥ 20mm/year)
- No data points
- < 5 data points

While the 2D vertical movement was the primary dataset used, if < 5 vertical InSAR data points were present in a grid cell, the ascending and descending line of sight (LOS) datasets were subsequently used. While the LOS data values contain the sum of both vertical and horizontal ground movement, they can be used as a proxy for estimating vertical ground movement.

The initial status results revealed 78.48% of grids were stable and 21.39% had either no data or < 5 data points (Table 4-3).

A buffer of 4.5km around 'on production' CSG wells was then generated, and grids were filtered to only those that fall within this buffer. These grids were further filtered to those with a status of downward movement, no data points, and < 5 data points. This equated to 365 gride cells or 32.88% of the filtered grids (Table 4-3) that progressed to Step 2 of the screening level assessment.

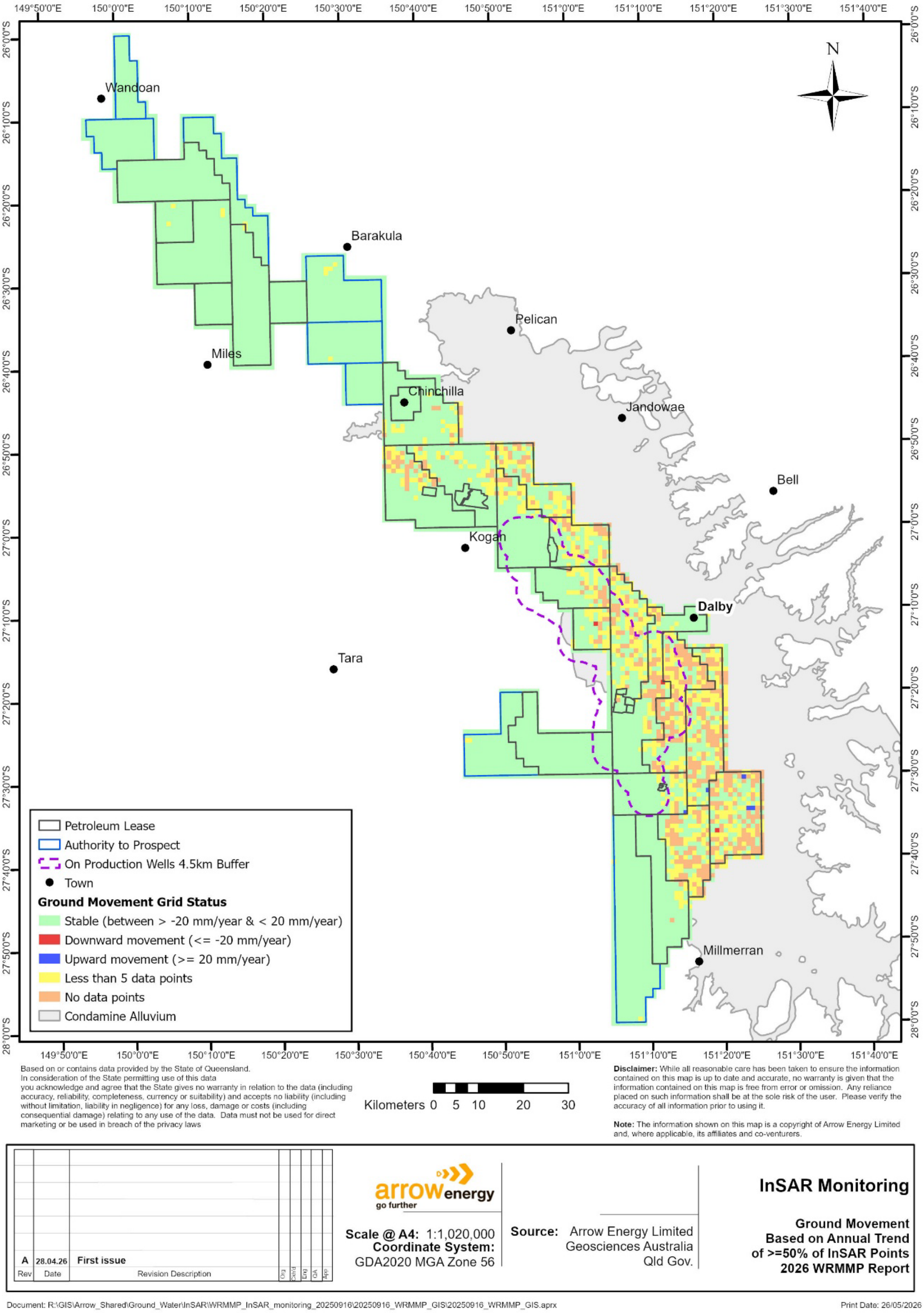


Figure 4-7: Grid status based on >50% of InSAR data point values

Table 4-3: Count of grids by status type

Main Status	Grid Count (full extent)	% of Grids (full extent)	Grid Count (within 4.5km well buffer)	% of Grids (within 4.5km well buffer)
Stable (between > -20mm/yr & < 20mm/yr)	4,798	78.48%	745	67.12%
Downward movement (≤ -20mm/yr)	3	0.05%	2	0.18%
Upward movement (≥ 20mm/yr)	5	0.08%	0	0.00%
< 5 data points	751	12.28%	223	20.09%
No data points	557	9.11%	140	12.61%
Total	**6,114**		**1,110**	**100%**

Screening Level – Step 2: Change in Slope

For each of the 365 filtered grids identified in Step 1, a slope raster was created for each LiDAR 10m average DEM.

The average slope difference was calculated for each 1km x 1km grid cell by subtracting the May 2024 LiDAR 10m average DEM from the May 2025 LiDAR 10m average DEM. Grids with ≥ 0.01% change in average areal slope (100mm/km) were then identified (Figure 4-8). Of the 365 grids, 254 registered a slope change of ≥ 0.01% over 12 months (Table 4-4).

Table 4-4: Grids with >= 0.01% change in average areal slope (100 m/km).

Status	Grid Cell Count	% of Grids
< 0.01% change	111	30.41%
≥ 0.01% change	254	69.59%
Total	**365**	**100%**

A 1km buffer around natural watercourses/waterbodies was created to filter grids to only those that have not had their topography artificially altered by agricultural activities. This ensures that only grids associated with the natural landscape are assessed, in line with the WRMMP requirements (monitoring subsidence impacts on MNES protected matters). This reduced the number of grids with a change in average areal slope of ≥ 0.01% from 254 to 148 (Figure 4-9).

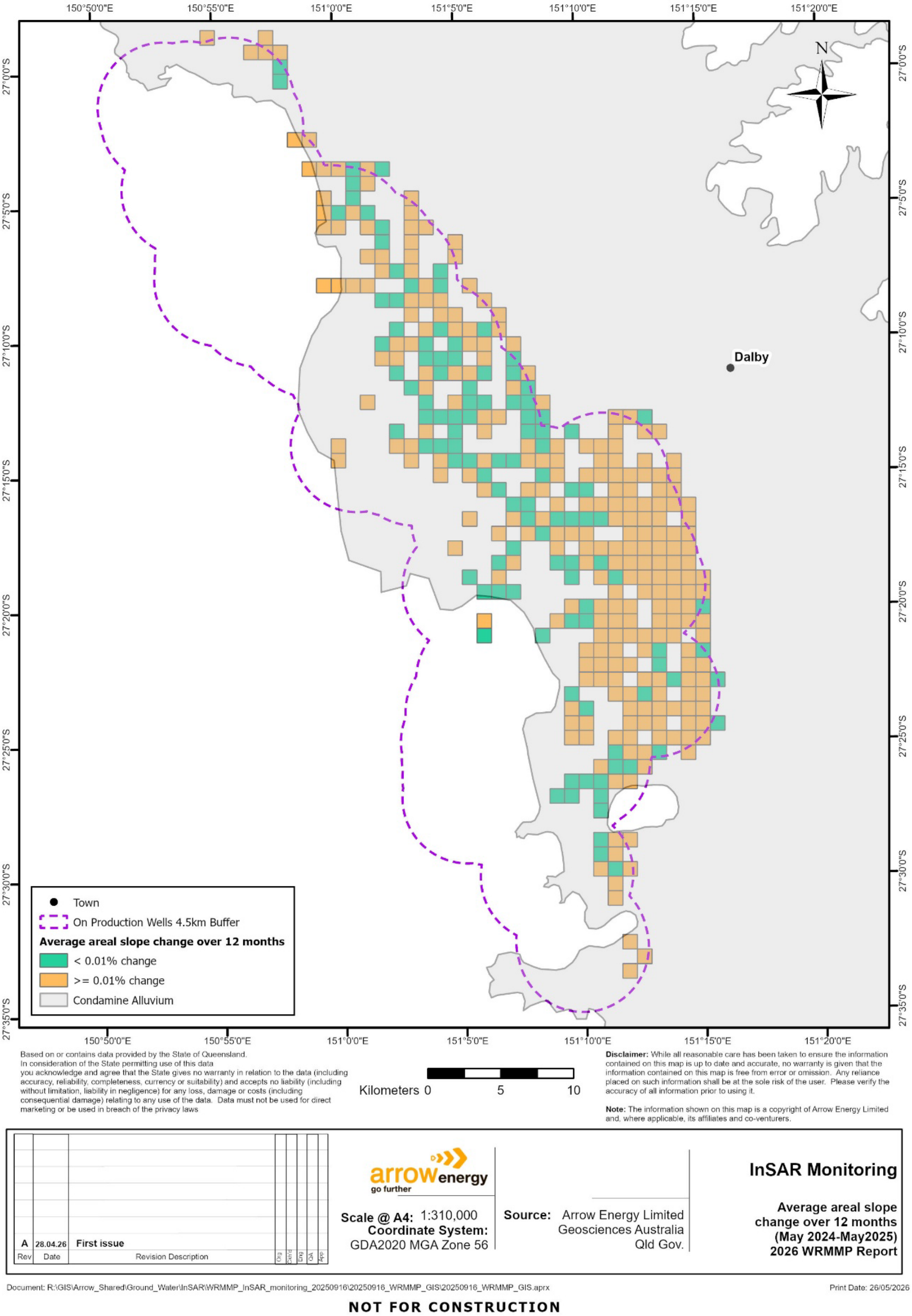


Figure 4-8: Average areal slope change over 12 months (May 2024 – May 2025) for grids with a status of downward movement, no data points or < 5 data points within a 4.5km buffer around production wells

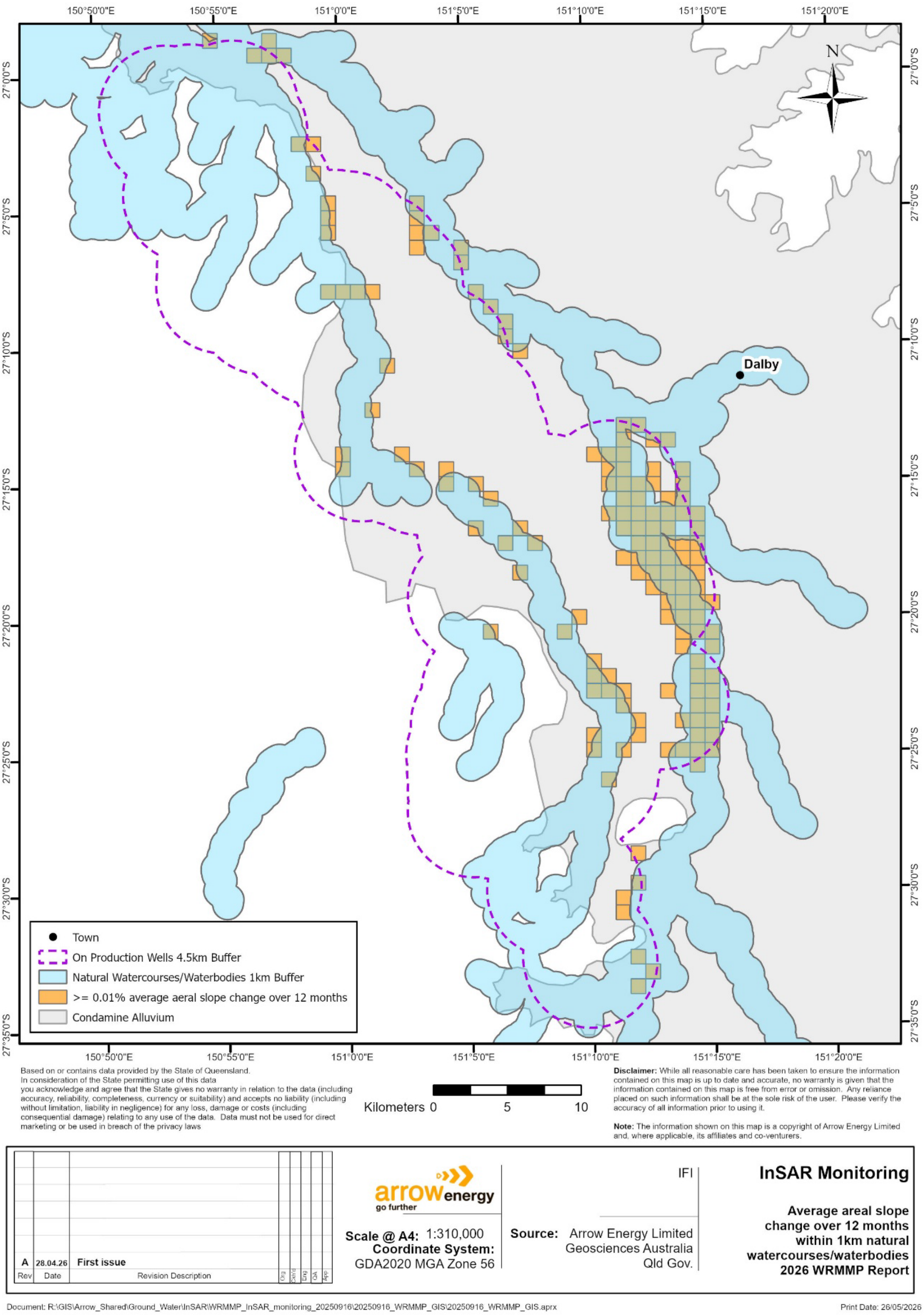


Figure 4-9: Filtering grids to those that fall within 1km of natural watercourses/waterbodies

Investigation Levels: Change in Slope Along Transect from LiDAR

For each of the remaining 148 grids identified in Figure 4-9, the existing average slope was calculated using the May 2024, 10m average LiDAR DEM. The grids were then split into two categories:

- 0.03 – 0.09% existing slope; and
- 0.09% existing slope.

All 148 grids recorded an existing average slope of > 0.09%.

Using the high resolution optical imagery provided with the LiDAR dataset acquisitions, the topographic features of each grid were manually inspected. This highlighted 51 grids which covered areas that have been artificially altered by agricultural activities despite being within the 1km watercourse buffer zone (see Figure 4-10 for an example). These grids then were excluded from further analysis, leaving 97 grids to assess with transects (Figure 4-11).

Using ArcGIS Pro, multiple transects were manually drawn for each grid. The transects were oriented both parallel and perpendicular to natural watercourses/waterbodies. An example of the transects drawn for a grid is shown in Figure 4-12. A total of 342 transects were drawn across the 97 grids. For each transect a linear regression trend and slope change was calculated. An example of results for transects drawn in Figure 4-12 are detailed in the six plots of Figure 4-13.

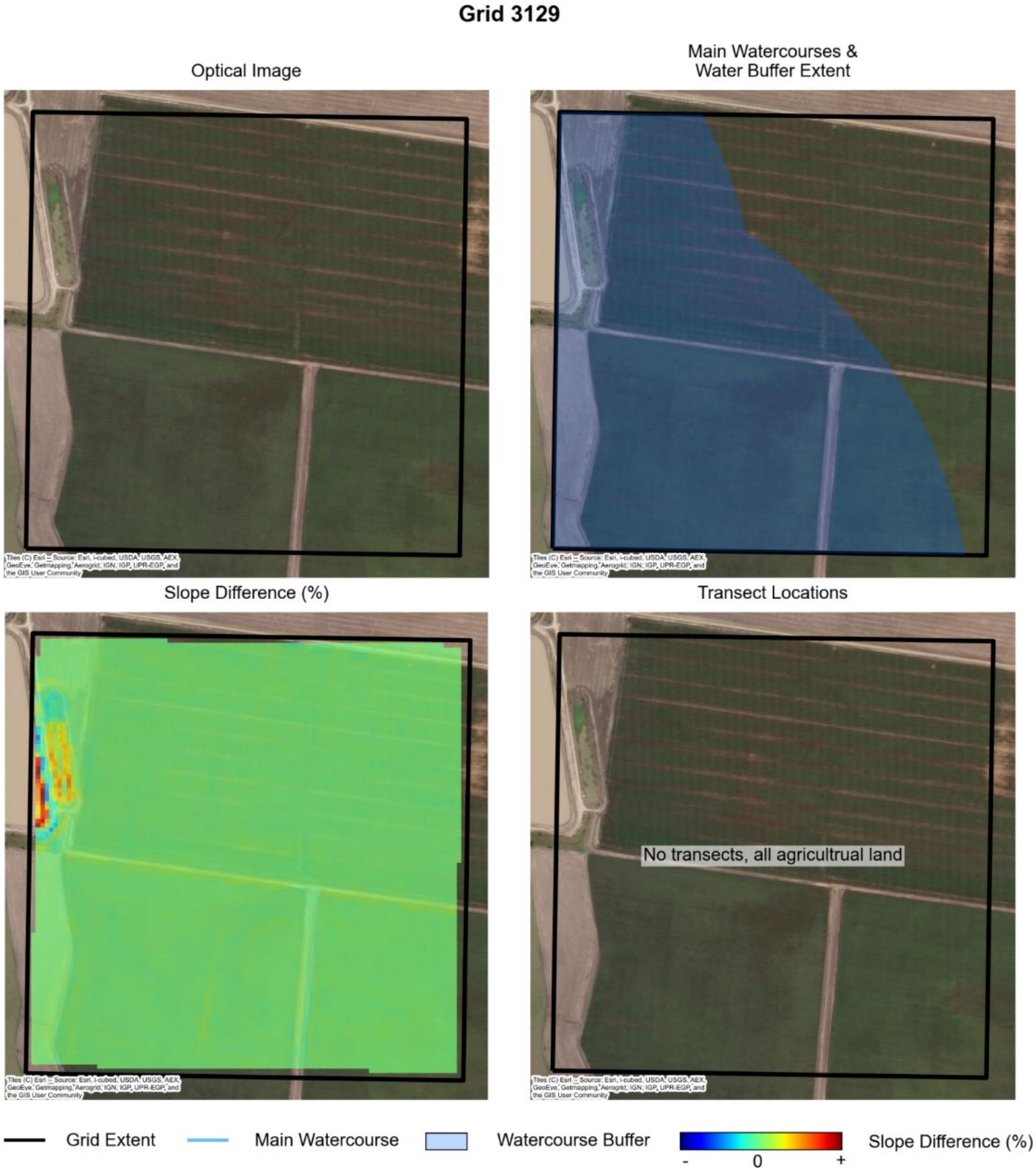


Figure 4-10: Example of a grid which falls within the 1km watercourse buffer zone, but contains topography artificially altered by agricultural activities

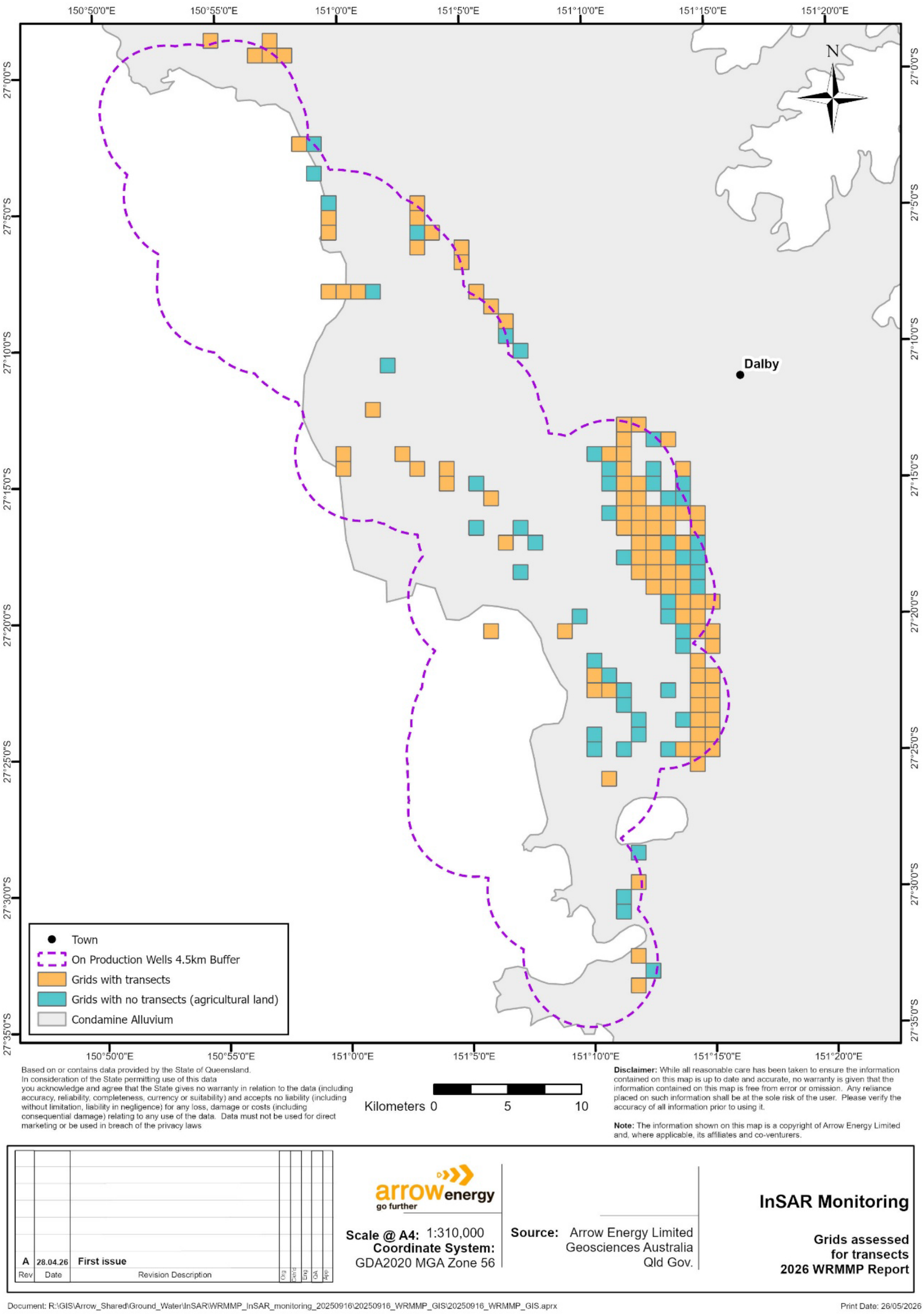


Figure 4-11: Grids filtered by landscape type (natural landscape or agricultural land) to determine which grids need transects drawn to assess absolute changes in slope

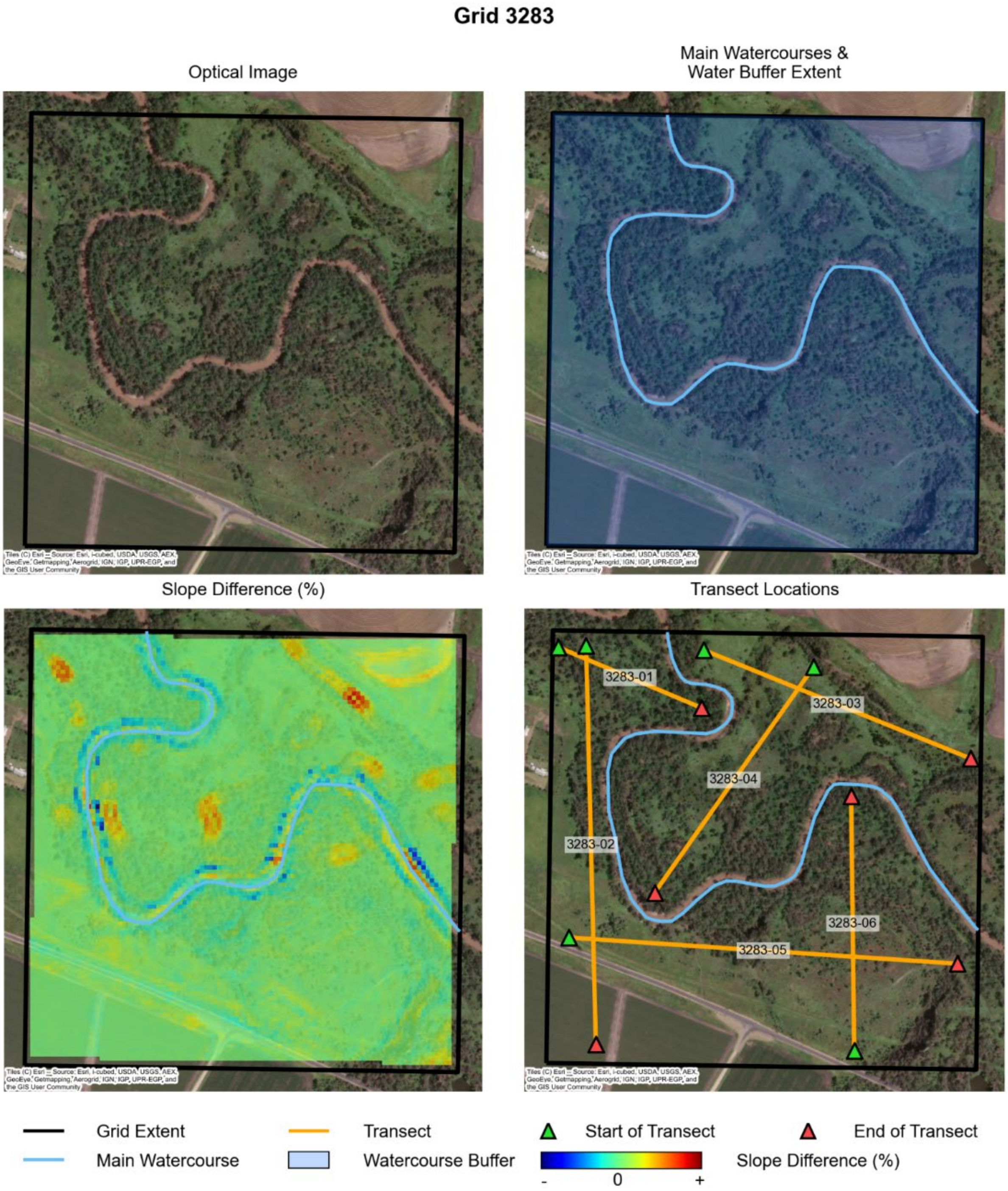
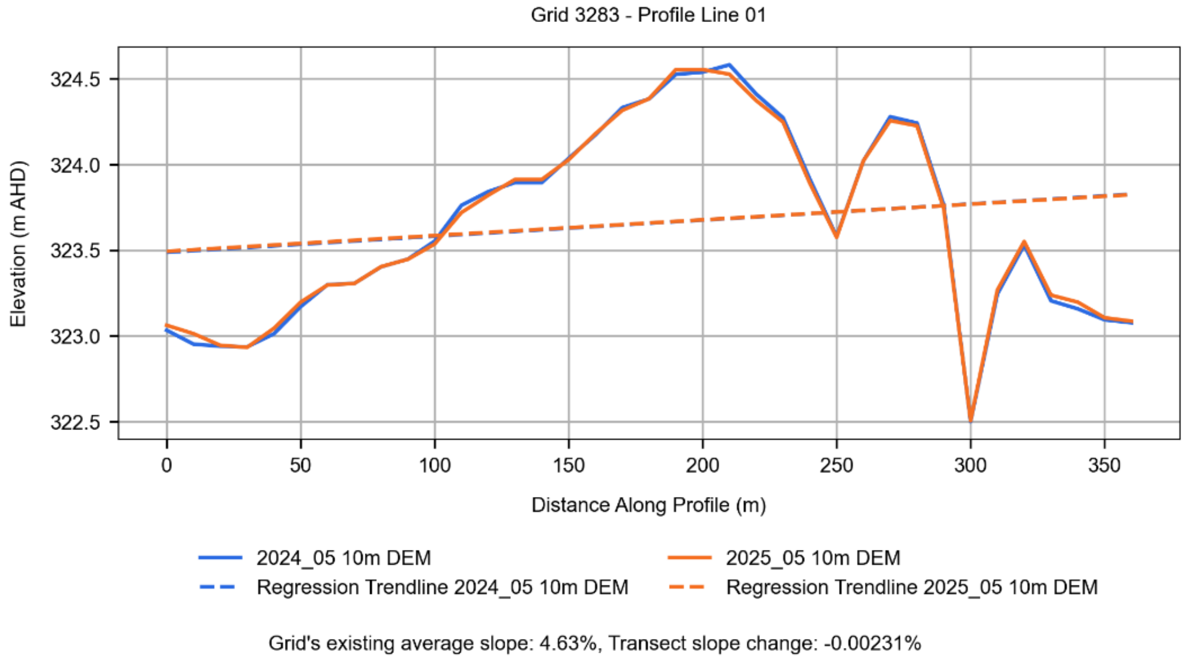
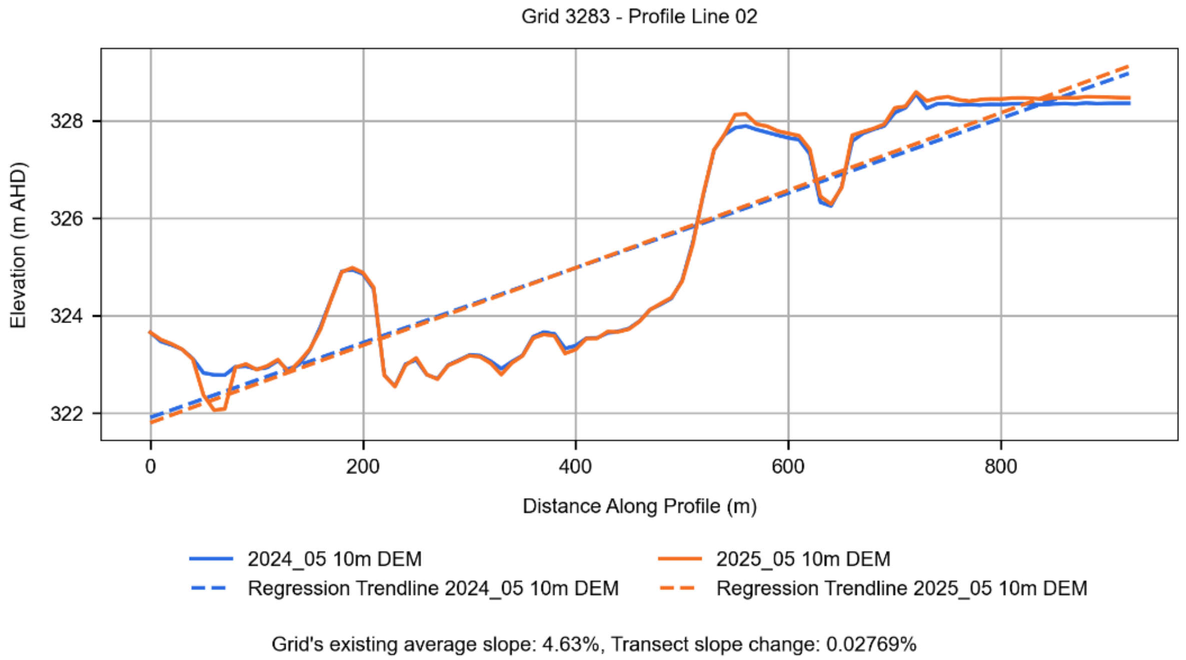
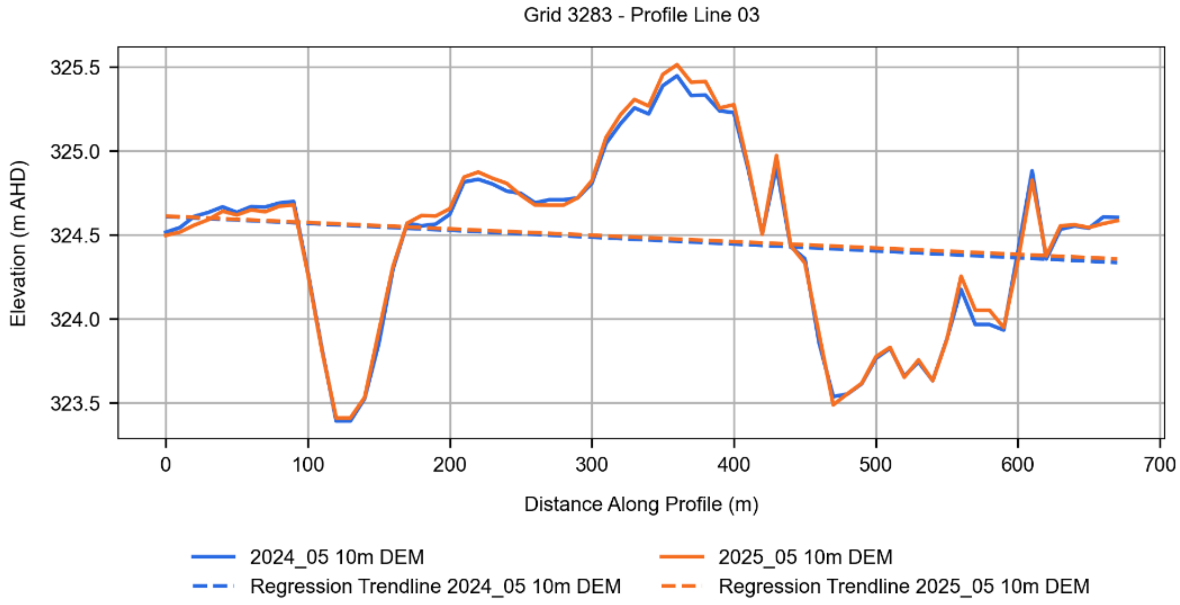


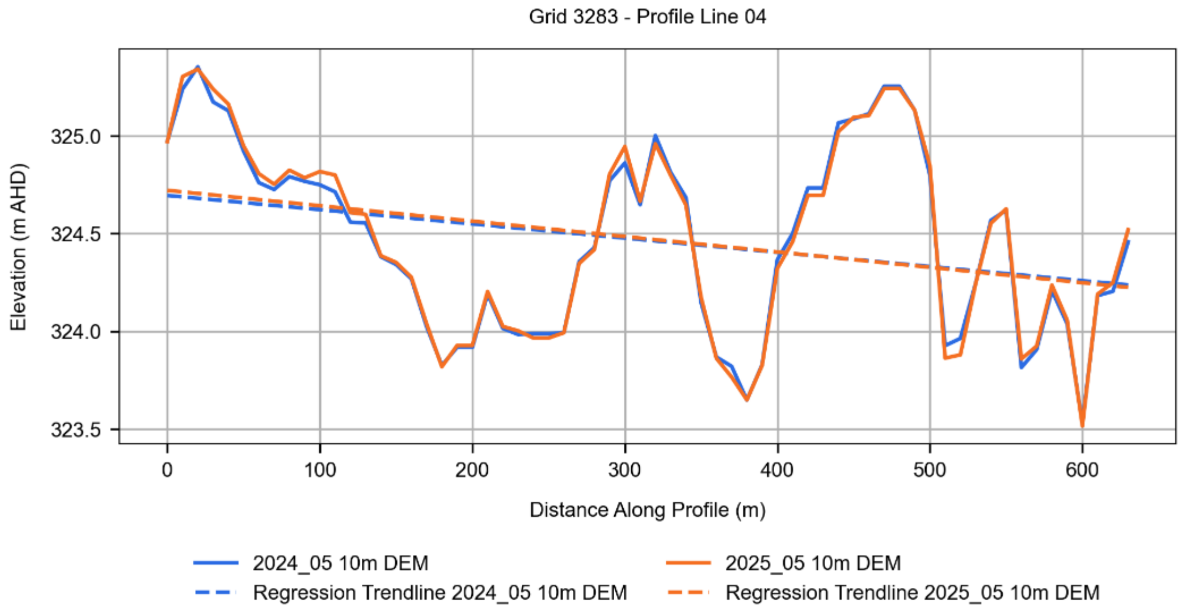
Figure 4-12: Example of a grid which falls within the 1km watercourse buffer zone and the transects drawn perpendicular and parallel to natural watercourses


Grid 3283 - Profile Line 01
324.5
324.0
323.5
323.0
322.5
Elevation (m AHD)
0
50
100
150
200
250
300
350
Distance Along Profile (m)
2024_05 10m DEM
2025_05 10m DEM
Regression Trendline 2024_05 10m DEM
Regression Trendline 2025_05 10m DEM
Grid's existing average slope: 4.63%, Transect slope change: -0.00231%


Grid 3283 - Profile Line 02
328
326
324
322
Elevation (m AHD)
0
200
400
600
800
Distance Along Profile (m)
2024_05 10m DEM
2025_05 10m DEM
Regression Trendline 2024_05 10m DEM
Regression Trendline 2025_05 10m DEM
Grid's existing average slope: 4.63%, Transect slope change: 0.02769%



Grid's existing average slope: 4.63%, Transect slope change: 0.00284%



Grid's existing average slope: 4.63%, Transect slope change: -0.00611%

arrow energy go further

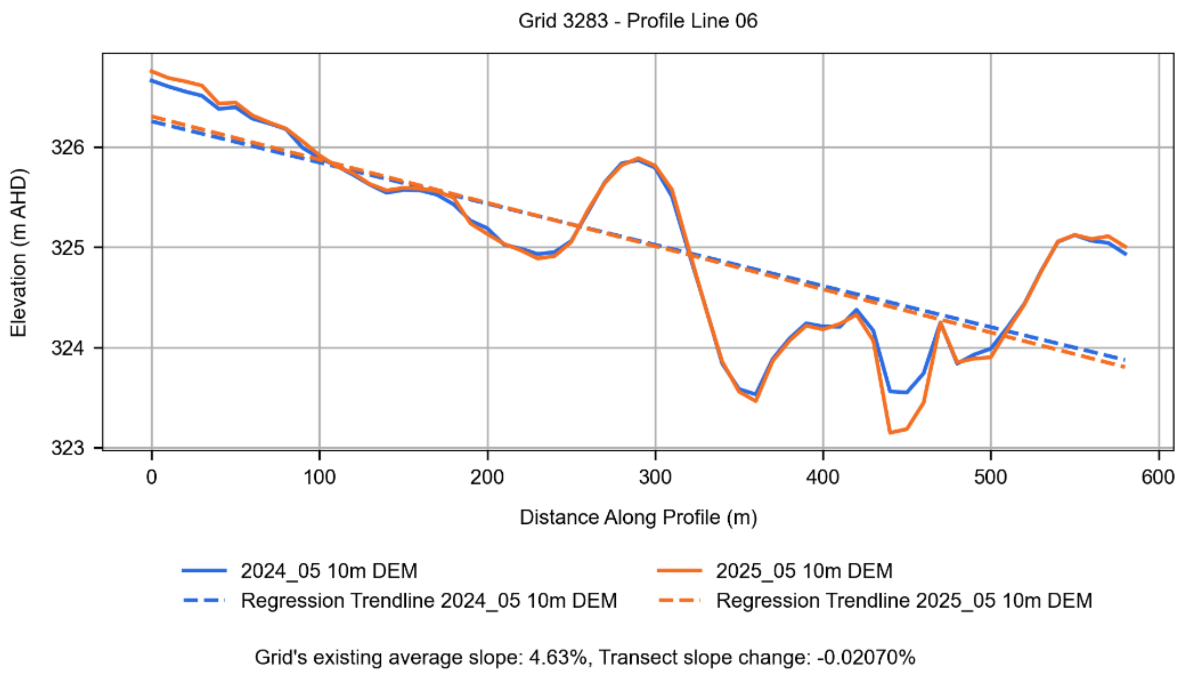


Figure 4-13: Example of the slope statistics for the transects shown in Figure 4-12

Trigger Threshold

Since all 97 grids have an existing slope > 0.09%, an absolute slope change of > 20% of existing slope is required to proceed to trigger threshold investigation. The absolute slope change for all the transects have been plotted and shown in Figure 4-14. The plot shows that the absolute slope changes for the last 12 months for all transects falls between 0.000036% and 0.412490%. These values are well below the trigger level of >20% and therefore no grids require site specific investigations into the impact of subsidence on their MNES status, and there has been no exceedance of the trigger threshold.

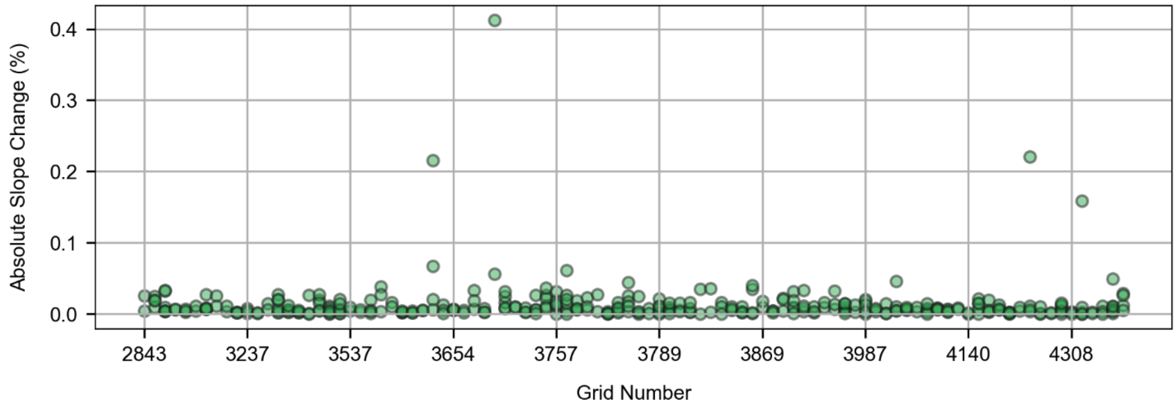


Figure 4-14: Absolute slope change for each transect drawn across the 97 grids identified for investigation.

Bore monitoring

The 148 grids identified in Figure 4-9 were cross-checked against the presence of UWIR water monitoring bores to assess CSG depressurisation which could lead to CSG induced subsidence. Five UWIR bores were identified in three of these grids, as shown in Table 4-5. Of these five grids, one covered predominantly agricultural land and therefore the corresponding UWIR bore Plainview 34, was excluded from further analysis.

Table 4-5: UWIR bores that exist within the 148 grids identified in Figure 4-9

UWIR Bore ID	Grid #	Comments	Bore Analysis Required
Longswamp 31	3982	Grid covers part of Lake Broadwater	Yes
Plainview 34	4135	Grid is predominantly agricultural land	No
Tipton 200	4133	Natural watercourse traverses the grid	Yes
Tipton 202	4133	Natural watercourse traverses the grid	Yes
Tipton 203	4133	Natural watercourse traverses the grid	Yes

A hydrograph of the groundwater level data collected from different monitoring intervals of abovementioned bores (Table 4-5) is shown in Figure 4-15.

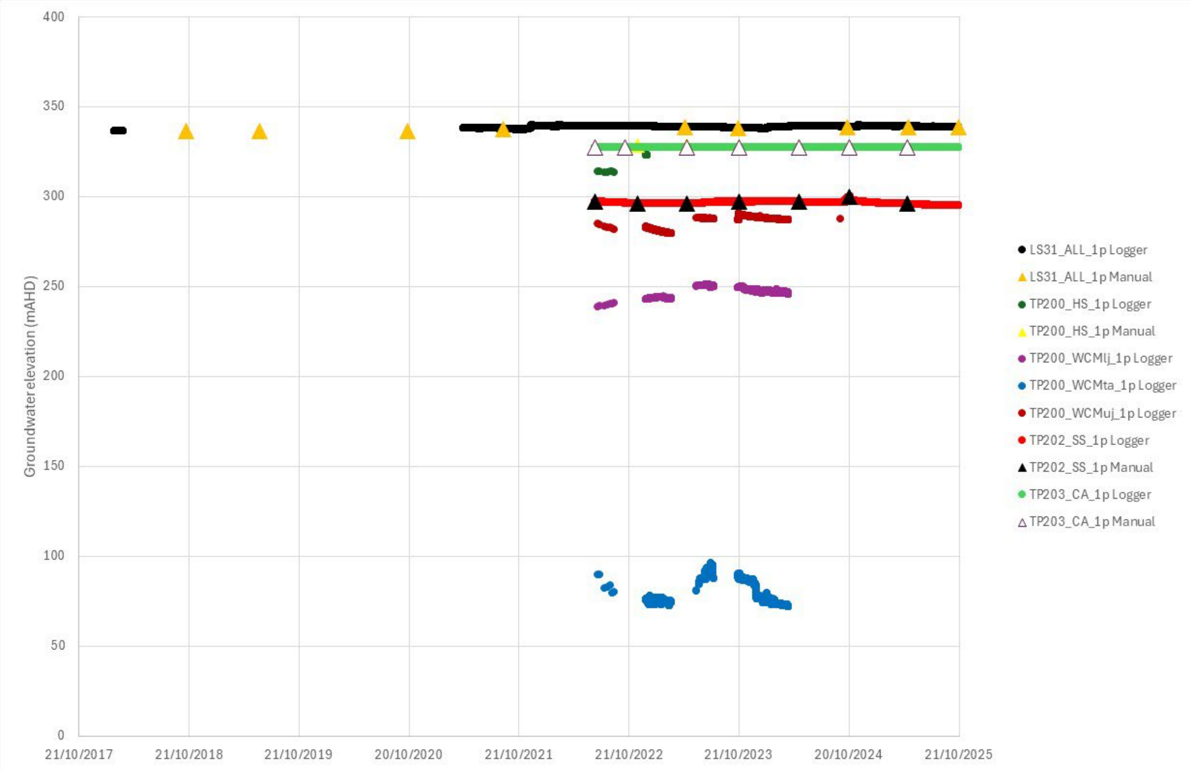


Figure 4-15 A hydrograph of the groundwater level data collected from different monitoring intervals of the UWIR bores that exist within the 148 grids (Table 4-5)

The monitoring bores presented in Table 4-5 are screened across multiple hydrostratigraphic units, providing a vertically distributed dataset spanning the Surat Basin sequence (Table 4-6). This distribution of screened intervals enables direct comparison of hydraulic heads across key aquifers and coal seams, facilitating assessment of vertical hydraulic gradients and the degree of stratigraphic control on groundwater behaviour.

The hydrograph data indicate a strongly stratified and vertically compartmentalised groundwater system extending from the Condamine Alluvium through the Springbok Sandstone and into the Walloon Coal Measures. The Condamine Alluvium monitoring bores (LS31 and TP203) exhibit consistently high and stable groundwater levels (approximately 330–340 mAHD), reflecting a well-connected, recharge-supported system. In contrast, the Springbok Sandstone (TP202), which is separated from the alluvium by intervening Westbourne Formation aquitard, displays lower groundwater levels (approximately 290–300 mAHD) and slightly greater variability, consistent with confined to semi-confined conditions and a response to regional pressure regimes rather than direct recharge.

Within the Walloon Coal Measures, the target of CSG depressurisation, the hydrograph demonstrates clear vertical head differentiation between seams, consistent with the presence of interbedded aquitards separating CSG depressurisation responses within the unit. The Upper Juandah Coal Measures (approximately 285–295 mAHD) show broadly similar heads to the overlying Springbok Sandstone and do not indicate CSG depressurisation in this coal seam. The Lower Juandah Coal Measures (approximately 235–250 mAHD) are significantly lower due to CSG depressurisation, indicating limited vertical connectivity and effective internal confinement. The Taroom Coal Measures record the lowest groundwater levels (approximately 70–95 mAHD) and exhibit the greatest temporal variability, reflecting a deeper and more responsive system subject to pressure changes from CSG depressurisation. This progressive decline in head with depth confirms strong vertical hydraulic gradients and compartmentalisation within the coal measure sequence, consistent with CSG development.

Table 4-6: Groundwater monitoring mores and their screened hydrostratigraphic units

Bore ID	Hydrostratigraphic Unit	Aquifer Type
Longswamp 31 (LS31_ALL_1p)	Condamine Alluvium	Shallow unconfined aquifer
Tipton 203 (TP203_CA_1p)	Condamine Alluvium	Shallow unconfined aquifer
Tipton 202 (TP202_SS_1p)	Springbok Sandstone	Confined to semi-confined aquifer
Tipton 200 (TP200_WCMuj_1P)	Upper Juandah Coal Measure	Coal measure aquifer (WCM)
Tipton 200 (TP200_WCMlj_1P)	Lower Juandah Coal Measure	Coal measure aquifer (WCM)
Tipton 200 (TP200_WCMta_1P)	Taroom Coal Measure	Coal measure aquifer (WCM)
Tipton 200 (TP200_HS_1P)	Upper Hutton Sandstone	Confined aquifer

Importantly, despite the pronounced vertical head gradients within the deeper formations due to CSG depressurisation, there is no evidence of upward propagation of drawdown into the overlying Springbok Sandstone or the Condamine Alluvium. The stability of groundwater levels in these units indicates that intervening formations, including the Westbourne Formation and other aquitards, effectively limit vertical leakage. Overall, the hydrograph supports a conceptualisation of a layered groundwater system in which flow and pressure responses are controlled by lithological heterogeneity and regional confinement and do not indicate any fracturing or connectivity created between the aquifers due to differential CSG induced compaction.

Summary of Results

The agricultural activities over the Condamine Alluvium present challenges when using InSAR time-series datasets to monitor subsidence. The current datasets generated using the SqueeSAR processing methodology result in large data gaps over this region. This is mitigated by using LiDAR datasets to assess slope changes.

Initial analysis of the overall surface movement for each 1km x 1km grid cell over Arrow’s PL and ATP tenements revealed 78.48% of grid cells were stable (between > -20mm/year and < 20mm/year) and 21.39% had either no data or < 5 data points. Only three (0.05%) grid cells recorded downward movement of

≤ - 20mm/year. Focusing only on grids within a 4.5km buffer zone of production CSG wells adjusted the statistics to 745 (67.12%) stable grid cells, two (0.18%) downward movement grid cells, 223 (20.09%) grid cells with <5 data points and 140 (12.61%) grid cells with no data points.

The 365 grid cells recording downward, < 5 data points or no data points proceeded to the next screening level. The average slope difference for each grid was calculated using LiDAR 10m average DEM's. Of these grid cells, 254 registered a slope change of >= 0.01% over 12 months.

As the focus of the WRMMP is to monitor subsidence impacts on MNES protected matters, any grids covering agricultural land were excluded from further analyses. Agricultural activities have artificially altered the topography so there is no 'natural' landscape to monitor. Of the 254 grid cells, 148 were within a 1km buffer of natural watercourses/waterbodies. This enabled automatic exclusion of grids covering agricultural lands.

The 148 grid cells were analysed manually to ensure only those covering natural landscapes were included in the analysis. This resulted in the number of cells reducing to 97. All these grid cells recorded an existing slope of >0.09%. Transects were drawn over these grid cells to assess absolute slope change over the previous 12 months. A total of 342 transects were drawn across the 97 grids and all recorded absolute changes between 0.000036% and 0.412490%. These values are well below the trigger level of >20% and therefore no grids exceed the investigation level and require site specific investigations for detrimental impact to MNES protected matters due to CSG induced subsidence.

A hydrograph of groundwater level data collected from multiple monitoring intervals of UWIR bores within the 148 grids demonstrates a highly stratified and vertically compartmentalised groundwater system across the Surat Basin sequence, with hydraulic behaviour strongly controlled by lithological layering. Groundwater levels exhibit a clear progressive decline with depth, from the Condamine Alluvium through the Springbok Sandstone and into the Walloon Coal Measures, confirming the presence of pronounced vertical hydraulic gradients and limited inter-aquifer connectivity, with Walloon Coal Measures depressurised by CSG development. The shallow alluvial system remains stable and recharge-supported, whereas deeper coal measure units display lower hydraulic heads and greater temporal variability, particularly within the Taroom Coal Measures. Importantly, there is no evidence of upward propagation of drawdown into overlying aquifers, indicating that intervening aquitards effectively restrict vertical leakage and that groundwater impacts are largely confined to deeper formations, with no evidence of differential CSG induced compaction creating fracturing and connectivity between aquifers.

There has therefore been no exceedance of the subsidence trigger threshold during the reporting period.

4.4 Surface water and aquatic ecology monitoring

Under the WRMMP, surface water and aquatic ecology monitoring were not required during the reporting period. Refer to the WRMMP (Section 4.3) for further details.

5. Water management

5.1 CSG water and brine management

As documented in WRMMP report, CSG co-produced water from the Surat Gas Project is treated at existing Arrow and third-party (QCLNG) facilities, with total project water production estimated at approximately 380GL over the life of the field development plan. Treated water is prioritised for beneficial use, predominantly through substitution of existing Condamine Alluvium groundwater allocations via the Condamine Alluvium Substitution Scheme (CASS) and other established beneficial use networks, thereby supporting irrigation, agricultural and other regional water demands. No routine discharge of treated CSG water to surface waters or groundwater reinjection is proposed, with water instead redistributed to end users under approved arrangements. Brine generated from the treatment process is managed through storage in existing and planned brine dams (including Daandine, Tipton and Kenya facilities), with long-term management based on crystallisation to recover solid salts for disposal at licensed salt encapsulation facilities. Salt and brine management continues to be supported by ongoing optimisation and research into crystallisation, selective salt recovery and reuse pathways.

No significant incidents relating to CSG water or brine management have been identified in the reporting period; however, risk-based monitoring, incident reporting and adaptive management processes are in place to ensure compliance and continuous improvement in water treatment efficiency, storage integrity and environmental performance.

5.2 Flood risk management

The flood risk management approach adopted is that of hazard elimination, consistent with standard hierarchies of risk management.

Worley Parsons (2013) details the hydraulic and hydrologic modelling work undertaken to produce a series of flood maps across Arrow's development areas in the Surat Basin. Flood levels, extents of inundation, maximum depths and velocities of floodwaters for the 1:50, 1:100, 1:500 and 1:1,000 year ARI flood events were simulated along prominent drainage lines, including the Condamine River, within Arrow tenements.

Condition 17A(j) requires that flood risks posed to Arrow's processing facilities and raw co-produced water and brine dams be assessed based on a 1:1,000 ARI event. It is recognised that a 1:1,000 ARI event is significantly more conservative than the local council's general planning and construction approach.

The predicted 1:1,000 ARI flood extent and depths produced by Worley Parsons (2013) have been applied to the Arrow tenements with all major infrastructure (processing facilities, brine dams etc) outside of the modelled inundation zone. Planned future major infrastructure will also be located outside the 1:1,000 ARI modelled inundation zone where practical. Should revised flood modelling or a change in design plan indicate assets are at risk in a flood event more frequent than a 1:1,000 ARI, Arrow will undertake a flood risk assessment in line with our WRMMP obligations.

6. Monitoring, risk response and adaptive management review

Monitoring, risk response and adaptive management for the Surat Gas Project are implemented in accordance with the WRMMP framework, which is designed to identify, assess and respond to potential impacts through a tiered, risk-based approach.

As noted in Sections 4.2, 6.2 and 6.3 of the WRMMP, early warning monitoring system (EWMS) values are not nominated for the WRMMP due to the current determination that aquatic ecology and ecosystems (Condition 17A(h)) are not predicted to be impacted by the SGP, and there is a predicted negligible impact to the Condamine Alluvium as a result of a change in flux (Condition 17A(f)).

A new UWIR has not been released by OGIA during the reporting period, therefore a reassessment of the need for an EWMS with early warning indicators, trigger thresholds and limits has not been required for this Annual Report. A draft UWIR 2025 (OGIA, 2025) was released for consultation after the reporting period, and outputs of the final UWIR 2025 will be considered in the next annual reporting period. If the updated UWIR indicates a potential for impact, the framework documented in the WRMMP to establish an EWMS will be implemented

6.1 Flux impacts on Condamine Alluvium and surface water resources

Modelling results presented in Section 4.2 of the WRMMP indicate that changes in groundwater flux associated with CSG production are minor and result in negligible impacts on the Condamine Alluvium and connected surface water systems. Predicted flux changes to the Condamine River are small, with minimal influence on river flows, groundwater–surface water connectivity, or downstream users.

As stated in the WRMMP and in meeting Condition 17A(g), even though the flux change from the Condamine Alluvium is predicted to be minor, Arrow has committed to prioritising supplying treated CSG water as substitution for existing Condamine Alluvium groundwater allocations through the CASS. This arrangement provides a consistent supply of water for farming operations, as farmers exchange their alluvium groundwater allocation for Arrow’s treated water, offsetting Arrow’s minor impact on groundwater availability in the alluvium.

The water is supplied to these end users via the beneficial use network (BUN) which is made up of pipelines, valves and skids to deliver treated water to landholders. To the end of this Annual Report period, Arrow has constructed the first stage of the BUN with 58 km of pipeline installed connecting landholders to the scheme, substituting five Condamine Alluvium authorisations to take water. Arrow delivered the first water through the BUN on 15 September 2025 with a total of 167.8 ML of treated water being delivered to landholders, an offset against 83.9 ML of water allocation, in the last two months of the WRMMP reporting period. Upon completion the BUN is planned to deliver over 7,000 ML of water per year to landholders through over 146 km of pipeline.

7. WRMMP revision triggers

Consistent with the requirements of Section 9.6 of WRMMP, no triggers for plan revision were activated during the current reporting period. Specifically, there were no proposed SGP changes requiring planned discharge to waterways, no new UWIR has been released by OGIA necessitating updates to EWMS levels, and no Ministerial directions issued requiring amendment of the WRMMP during the reporting period.

Accordingly, the WRMMP remains current and fit-for-purpose. Ongoing commitments include periodic review of updated UWIR outputs within prescribed timeframes, continued monitoring of project activities for potential trigger conditions, and readiness to revise and submit an updated WRMMP should any trigger criteria be met in future reporting periods.

8. Contribution to industry knowledge and research

During the current reporting period, Arrow continued to contribute to industry knowledge and research initiatives consistent with the WRMMP, including ongoing participation in regional studies and data sharing programs. This includes contribution to the Condamine Interconnectivity Research Project (CIRP) and continued support for investigations of structural features such as the Horrane Fault, which enhance understanding of groundwater connectivity and flow mechanisms in the Surat Basin.

Groundwater monitoring data and model inputs have been regularly provided to OGIA in accordance with UWIR requirements, supporting cumulative impact assessment and regional model updates. In addition, Arrow maintained its subsidence monitoring program (including InSAR, LiDAR and GNSS datasets) and contributed to broader industry understanding of CSG-induced ground movement. These activities align with WRMMP commitments to collaborative research, transparency and continuous improvement in managing water resources.

9. Compliance with the WRMMP

The approved SGP WRMMP was developed based on an adaptive management framework which meets the water-related approval condition 17A and sub-ordinate conditions of EPBC Approval 2010/5344. Compliance, therefore, with the SGP WRMMP demonstrates compliance with the approval conditions.

During the reporting period, outcomes remained consistent with the WRMMP predictions of negligible impacts, and no exceedances requiring investigation or corrective action were identified. Management continues to focus on ongoing monitoring, periodic reassessment and readiness to implement adaptive measures should conditions change.

Performance against Section 9.3 of the WRMMP indicates that the Surat Gas Project has maintained compliance with applicable approval conditions and performance criteria, supported by established monitoring, reporting and management frameworks. The project continues to operate under an adaptive management approach, with early warning and exceedance response processes in place to manage potential risks, although no trigger-based responses are currently required given the low predicted impacts.

Publication & Data Disclosure

Consistent with WRMMP requirements, annual reporting is made publicly available on the approval holder's website within required timeframes, including summaries of performance, monitoring outcomes and any corrective actions. Groundwater and associated monitoring data are shared with regulatory agencies, including OGIA and Queensland DLGWV, in accordance with UWIR and Water Monitoring Strategy requirements, contributing to regional datasets and ongoing assessment of cumulative impacts. Relevant datasets are made accessible through established data-sharing platforms (e.g., Queensland Globe), ensuring transparency and alignment with statutory reporting and disclosure obligations.

In addition to the above, Arrow's compliance with all EPBC Approval 2010/5344 conditions is documented in the report Surat Gas Project EPBC Approval 2010/5344 Annual Compliance Report 2024/2025 (S00-ARW-ENV-REP-00119) available on Arrow's website.

10. References

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